ASX Announcement
1 August 2019

NORTHERN STAR SET FOR FURTHER PRODUCTION GROWTH AS RESERVES AND RESOURCES JUMP +30%

Pogo to lead next round of organic growth after posting maiden Reserve of 1.5Moz and a 43% Resource increase to 5.95Moz at 9.6gpt

HIGHLIGHTS

- **Group Resources increased 31% or 4.9Moz, to 20.8Moz (after depletion of 915,000oz and 1.9Moz at Kalgoorlie Operations shifted to unclassified and removed); Resource grade is up 46% to 4.1gpt**
- **Group Reserves increased 35% or 1.4Moz, to 5.4Moz (after depletion of 915,00oz); Reserve grade is up 16% to 4.4gpt**
- **Reserves are calculated conservatively using an assumed price of A$1,500/oz and US$1,150/oz compared with the current spot price of ~A$2,100/oz**
- **Importantly, Measured and Indicated Resources increased 15% to 11.25Moz with grade rising 31% to 4.1gpt; This underpins continued replacement of Reserves in coming years**
- **Increased inventory paves way for further organic growth in production and mine lives**
- **Northern Star's FY20 strategy is designed to lay the foundations for the next round of growth in production and mine lives**
- **As part of this growth strategy, Northern Star has budgeted a record A$76M for exploration in FY20**
- **FY20 Group guidance is 800,000-900,000oz at A$1,200-A$1,300/oz (US$840-US$910/oz)*;**
  - **Jundee 260,000-280,000oz at A$1,115-A$1,195/oz (US$780-US$840/oz)**
  - **Pogo 200,000-240,000oz at US$850-US$925/oz (A$1,210-A$1,320/oz)*, (H1: 80,000-100,000oz; H2: 120,000-140,000oz)**
  - **Kalgoorlie 340,000-380,000oz at A$1,260-A$1,370/oz (US$880-US$960/oz)**
- **In addition to production guidance, a further 60,000oz is forecast to be stockpiled at Jundee stemming from Ramone open pit (options are being evaluated to crystallise the significant profit contained in this stockpile)**

Details of Resource and Reserve Update and FY20 Growth Expenditure

- **Resources:**
  - **Pogo up 43% to 5.95Moz at 9.6gpt; this Resource is the largest amount in the history of the project**
  - **Jundee up 7% to 4.55Moz at 3.4gpt**
  - **Kalgoorlie Operation to 6.8Moz at 3.8gpt, grade up 45%**
    - **Kanowna up 7% to 1.9Moz, grade up 48% to 3.4gpt**
    - **NST 100% Kundana at 1.4Moz, grade up 9% to 4.8gpt**
    - **51% EKJV Kundana up 5% to 1.1Moz at 6.1gpt**
    - **South Kalgoorlie 2.1Moz at 2.9gpt, grade up 38%**
- **Reserves:**
  - **Maiden Pogo Reserve of 1.5Moz at 7.5gpt**
  - **Jundee up 3% to 1.6Moz (despite depletion of 332koz)**
  - **Kalgoorlie to 2.2Moz (despite depletion of 367koz), grade up 4% to 3.7gpt**
    - **Kanowna at 0.7Moz, grade up 17% to 3.2gpt**
    - **NST 100% Kundana to 0.6Moz, grade up 6% to 4.1gpt**
    - **EKJV 51% Kundana to 0.55Moz at 5.6gpt**
    - **South Kalgoorlie up 21% to 0.3Moz at 2.9gpt**

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RESOURCE & RESERVE UPDATE

- **Record FY20 exploration budget of A$76M to underpin substantial organic growth opportunities at all operations, major areas include;**
  - **Pogo, A$20M to improve the classification of the significant Inferred Resource of 3.7Moz at 9.5gpt**
  - **Jundee, A$14M to follow up on the multiple high-grade intersections throughout the mine**
  - **South Kalgoorlie, $8M to follow up on the huge regional exploration success achieved in FY19**
- **FY20 expansionary capital budget of A$116M will fund:**
  - **A$44M Developing and bringing online new mining areas at Pogo. This also includes A$7M on processing infrastructure to de-bottleneck the front end of the plant and increase capacity**
  - **A$24M Development and infrastructure to bring Moonbeam underground online in Kalgoorlie**
  - **A$7M Development for drill drives and access for new areas at 51% EKJV Operation**
  - **A$37M Excavation of exploration drill platforms at Jundee as well as setting up access to new mining areas**

Northern Star Resources (ASX: NST) is pleased to announce a substantial increase in its Group Reserves and Resources, which in turn paves the way for the Company's next round of organic production growth.

The Company's annual Reserve and Resource Statement also features a significant increase in grades and a marked rise in Measured & Indicated Resources, which will underpin further growth in Reserves over coming years.

Northern Star Executive Chairman Bill Beament said the Statement reflected Northern Star's highly successful strategy of investing in exploration to expand the inventory, which would in turn underpin organic production growth and increased financial returns.

He said the inventory growth was particularly notable given the wider trend of reducing resources across the gold industry both within Australia and overseas.

"These outstanding results show that the Northern Star cycle of investing in exploration and development continues to drive the Company's operational and financial success," Mr Beament said.

"Not only have we have grown our world-class Reserve and Resource inventory by one-third despite mining nearly one million ounces in FY19, we have increased the grades and the size of the crucial Measured and Indicated category.

"This sets us up for repeating the next stage in our cycle, which is another round of organic production growth and further increases in free cashflow."

Mr Beament said the huge growth in the inventory at the Pogo gold mine in Alaska was more firm evidence of the strong progress being made at the project.

"Earlier this week we announced a significant increase in production and sharply lower costs at Pogo in the June quarter," he said.

"Now we have backed this up with a maiden JORC Reserve of 1.5Moz at 7.5gpt and a 43 per cent increase in the Resource to almost 6Moz at 9.6gpt. This Resource figure is the largest amount in the history of the project.

"Pogo is on track for further production growth as this financial year progresses, with output in the second-half forecast to be in the range of 120,000-140,000oz.

"We are confident that with the operational gains we are making and the outstanding Reserve and Resource position we have established, Pogo is well on its way towards returning to its historical status as a Tier 1 asset"

Mr Beament said the results at the Australian operations were also exceptional. "Almost everywhere we look at the Australian operations, there has been strong growth," he said.

RESOURCE & RESERVE UPDATE

"Kanowna Belle's Resources rose 7 per cent with a 48 per cent increase in grade, Jundee's Resources grew 7 per cent to 4.55Moz and the overall grade of Resources at the Kalgoorlie Operations is up 45 per cent," he said.

FY20 Group guidance is 800,000-900,000oz at an AISC of A$1,200-A$1,300/oz. In addition, a further 60,000oz is forecast to be stockpiled at Jundee due to milling constraints, which means that ore from the open pit mining at Ramone will not currently be processed during the year. Options are being evaluated to crystallise the significant profit contained in this stockpile.

"The FY20 guidance reflects consolidation of the record production levels achieved in the past financial year and the point in our growth cycle at which we transition from growing the inventory to investing in the next chapter of production growth.

"To that end, we have budgeted A$116 million for expansionary capital and a record A$76 million for exploration this financial year.

"This will enable us to continue upgrading the categories of the Resources and unlocking the value of our huge exploration success, realising our overall objective of converting ounces in the ground into financial returns for Shareholders."

FY2020 Production and Cost Guidance

FY2020	Production		AISC	
Guidance Range	Oz	Oz	A$/oz	A$/oz
Jundee	260,000	280,000	1,115	1,195
Kalgoorlie Operations	340,000	380,000	1,260	1,370
Pogo	200,000	240,000	1,210	1,320
NST TOTAL	800,000	900,000	1,200	1,300

Mineral Resource and Reserve Summary

FY2019 Group Mineral Resource Estimate is 156 million tonnes at 4.1gpt Au for 20.8 million ounces.

Resources for the Australian operations were calculated using an assumed gold price of A$1,750/oz (except Ashburton – A$1,850/oz). The Resources for the US Pogo operation were calculated using an assumed gold price of US$1,300/oz.

FY2019 Group Mineral Reserve Estimate is 38 million tonnes at 4.4gpt Au for 5.4 million ounces.

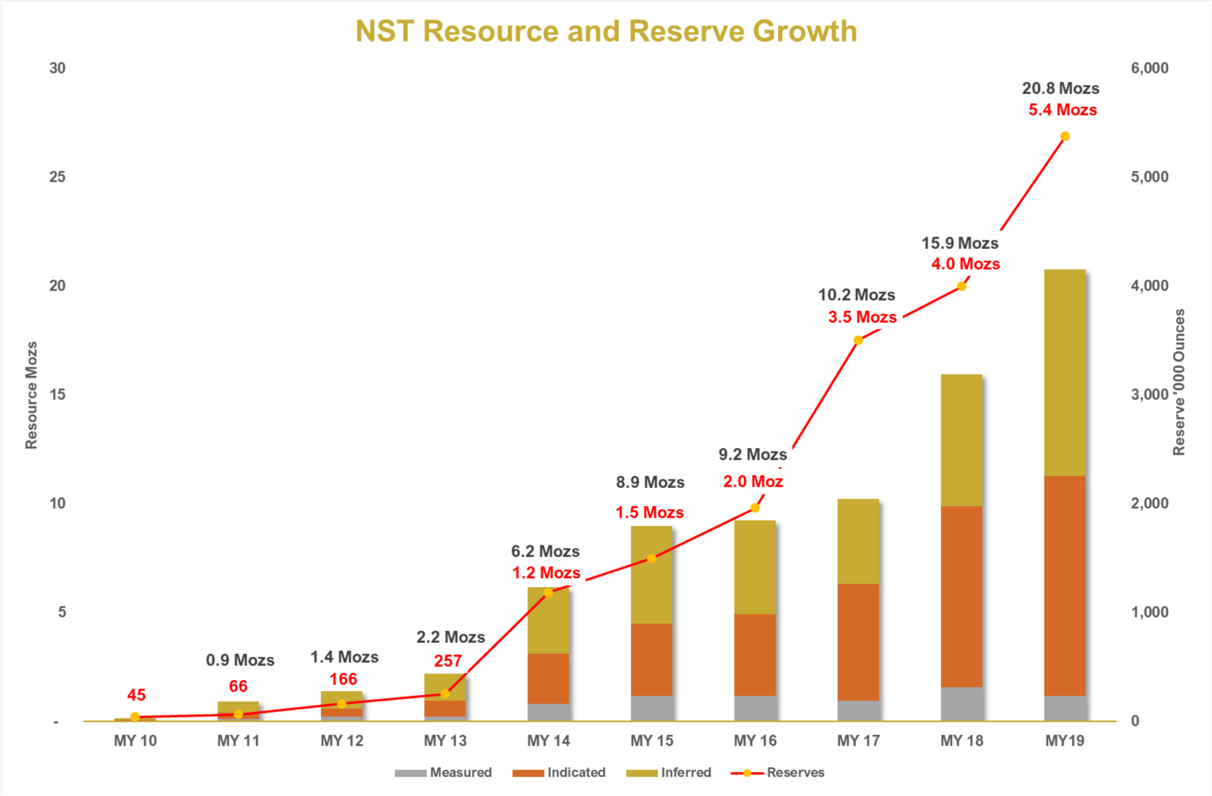
Reserves for the Australian operations were calculated using an assumed gold price of A$1,500/oz. The Reserves for the US Pogo operation were calculated using an assumed gold price of US$1,150/oz.

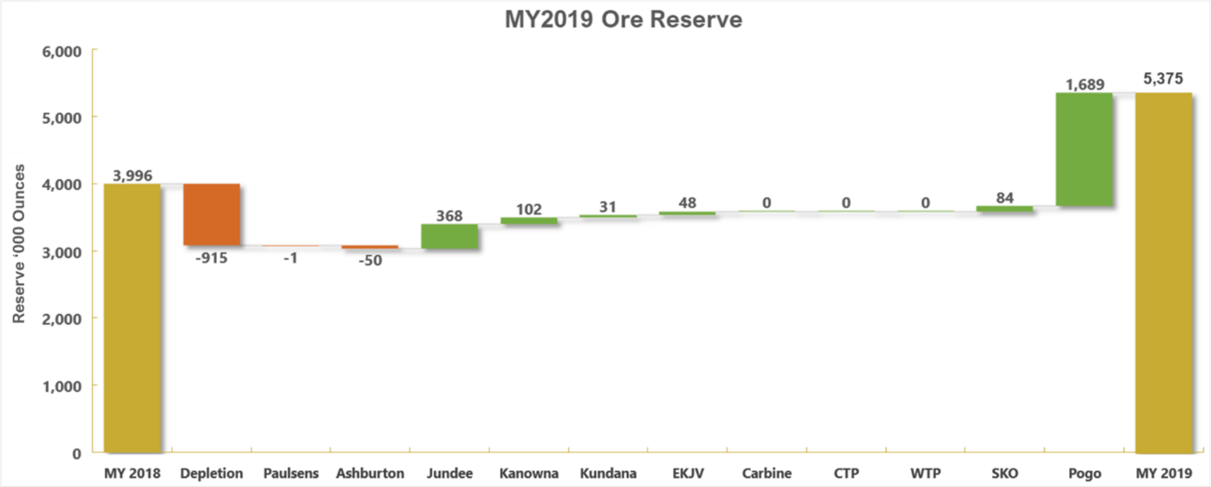
These figures, which are estimated to 30 June 2019, represent JORC 2012 combined Resources and Reserves for the assets owned by Northern Star.

MINERAL RESOURCES as at 30 June 2019												
	MEASURED			INDICATED			INFERRED			TOTAL RESOURCES		
NST ATTRIBUTABLE INCLUSIVE OF RESERVE	Tonnes (000's)	Grade (gpt)	Ounces (000's)	Tonnes (000's)	Grade (gpt)	Ounces (000's)	Tonnes (000's)	Grade (gpt)	Ounces (000's)	Tonnes (000's)	Grade (gpt)	Ounces (000's)
NORTHERN STAR TOTAL	10,926	3.4	1,206	75,163	4.2	10,050	69,941	4.2	9,503	156,026	4.1	20,760

ORE RESERVES as at 30 June 2019									
	PROVED			PROBABLE			TOTAL RESERVE		
NST ATTRIBUTABLE INCLUSIVE OF RESERVE	Tonnes (000's)	Grade (gpt)	Ounces (000's)	Tonnes (000's)	Grade (gpt)	Ounces (000's)	Tonnes (000's)	Grade (gpt)	Ounces (000's)
NORTHERN STAR TOTAL	4,486	3.5	505	33,668	4.5	4,870	38,155	4.4	5,375

A full breakdown of each project's Reserves and Resources can be found in Appendix A.

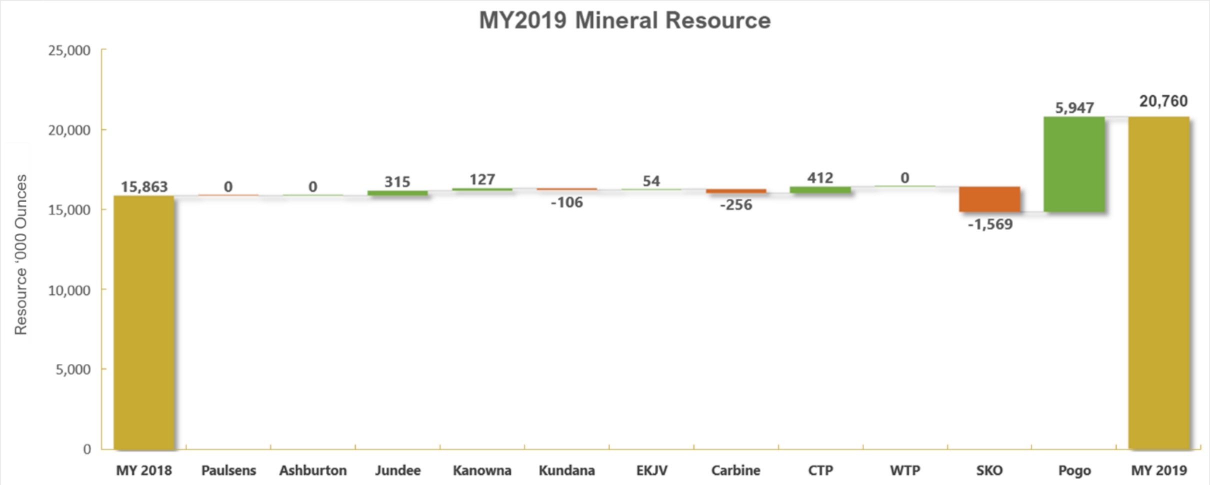

NST Resource and Reserve Growth


MY2019 Ore Reserve

The Reserve growth opportunities over the coming year are highlighted by:

- Ongoing conversion of large Inferred Resource and unclassified mineralisation within the Pogo mine area;
- Continued expansion of the 0.5Moz Central Veins maiden Resource at Pogo;
- Jundee Resource has increased to 4.55Moz, highlighting the huge scope to grow Reserves as part of the new underground exploration campaign;
- At Kanowna Belle, a 10% increase in Resources driven by multiple new ore positions are defined adjacent to the current mine infrastructure; and
- The Falcon structure at the EKJV RHP mine continues to expand and is now identified over a 1,500m strike length. This structure sits parallel and between the major K2 and Strzelecki structures.

RESOURCE & RESERVE UPDATE



Technical Asset Overview

Pogo Gold Operations

Pogo maiden Reserve of 1.5Moz (after depletion of 216koz);

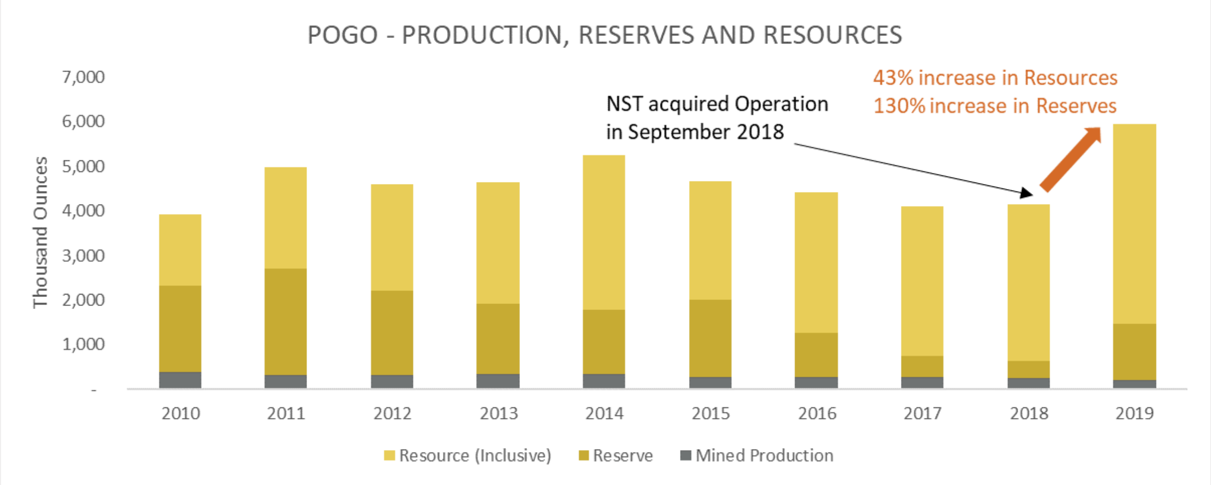
- Achieved after only six months of drilling with significant growth potential
- Reserves calculated at a cut-off grade of 4.3gpt in line with forecast cost profile of the Project

Pogo Resources up 43% to 5.95Moz at 9.6gpt (after depletion of 216koz);

- Maiden Resource of 0.5Moz at 7.9gpt for the Central Veins discovery with significant drilling results continuing
- Maiden Resource of 0.5Moz at 8.2gpt for the satellite Hill 4021 deposit
- Resources calculated at a cut-off grade of 3.8gpt

The Pogo Resource of 5.95Moz is a significant increase and represents the largest inventory in the history of the Project.

Drilling in FY2020 will continue the significant exploration drive to convert the large underground Resource into Reserves and continue to expand the Central Veins Resource.



Jundee Gold Operation

Jundee Reserves up 3% to 1.6Moz (after depletion of 332koz);

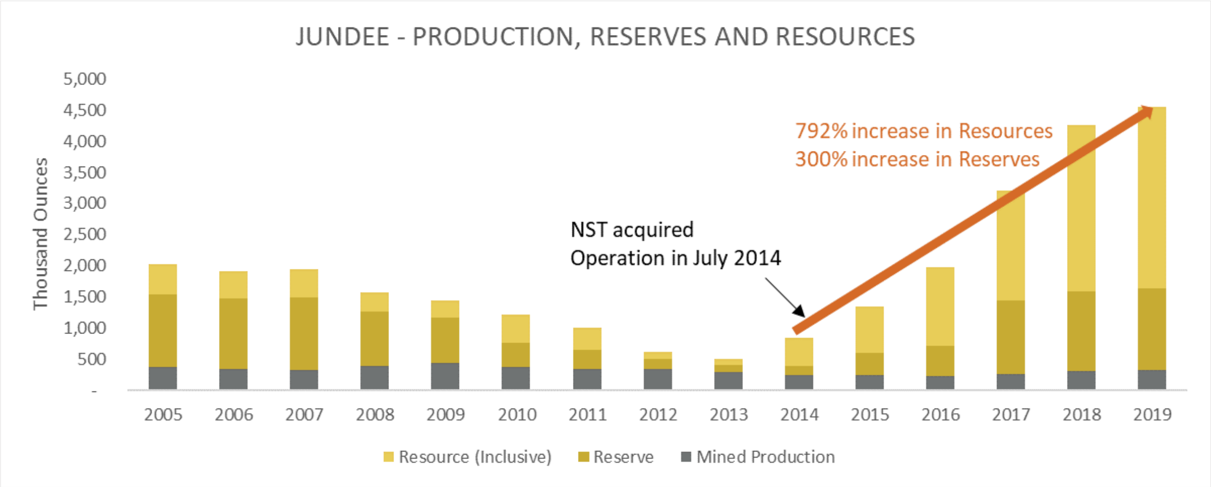
- Underground Reserves are 1.5Moz
- Surface/Open Pit Reserves are stable at 0.1Moz.

Jundee Resources up 7% to 4.55Moz (after depletion of 332koz);

- Underground Resources are 4.25Moz, an increase of 0.3Moz
- Surface/Open Pit Resources remain steady at 0.3Moz.

Drilling in FY2020 will commence a significant exploration drive to test the mineralisation of existing in-mine targets in addition to converting the large underground Resource into Reserves. Further exploration activity will be undertaken on the Ramone "look alike" discoveries with a view to building up significantly more open pit material.

As can been seen in the chart below, Northern Star since the acquisition of Jundee five years ago has successfully been able to grow the Resources, Reserves and production profile.



Kalgoorlie Gold Operation

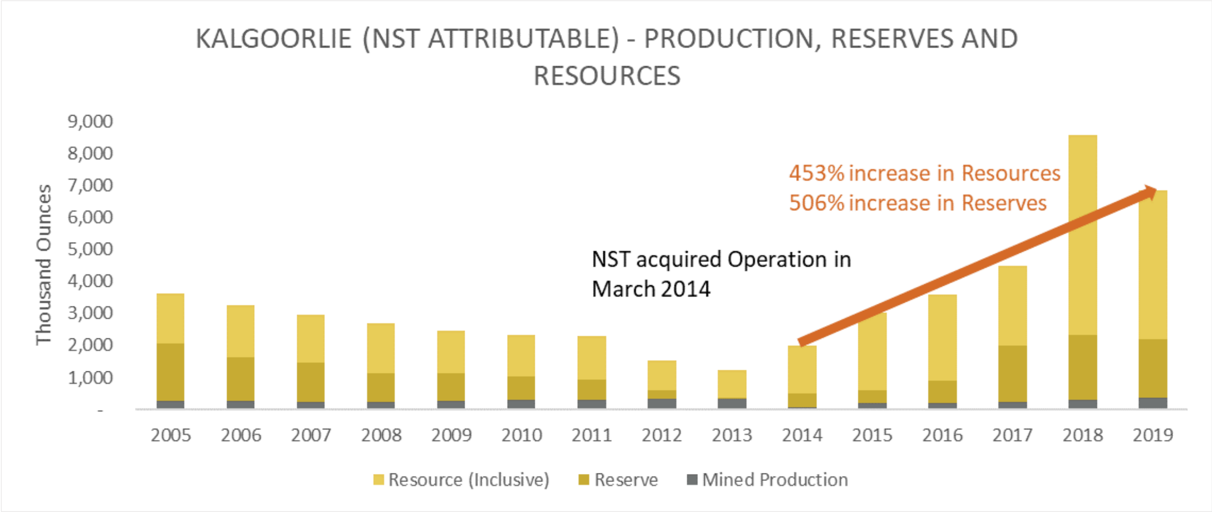
Kalgoorlie Reserves were relatively stable at 2.2Moz (after depletion of 367koz);

- Kanowna Underground Reserves were steady at 0.7Moz, but grade has improved by 17% to 3.2gpt
- NST 100% owned Kundana Underground Reserves remain at 0.6Moz, but grade has improved by 6% to 4.1gpt
- EKJV 51% owned Kundana Underground Reserves reduced slightly to 0.55Moz
- South Kalgoorlie Operations Reserves increased 21% to 0.3Moz

Kalgoorlie Resources are 6.8Moz (after depletion of 367koz) and grade is up 45%;

- Kanowna Underground Resources grew by 7% to 1.9Moz
- NST 100% Kundana Resources are 1.4Moz
- EKJV 51% Kundana Resources are 1.1Moz
- Kalgoorlie Operations was reduced by net 1.85Moz, with significant material moved to Unclassified pending further validation

RESOURCE & RESERVE UPDATE



(a) NST 100% owned Kundana

During FY2019 Northern Star recorded a slight reduction of 53,000oz in Reserves at the Kundana Operations after mining depletion. The ongoing drilling at the Xmas and Strzelecki deposits is expected to contribute to future Reserve growth in the coming year.

(b) EKJV 51% Kundana

During FY2019 Northern Star recorded a slight reduction of 82,000oz in Reserves at the East Kundana Joint Venture “EKJV” after mining depletion. The maiden Resource at Falcon is expected to contribute to future Reserves in the coming year.

(c) Kanowna Gold Mine

The Kanowna underground Reserve remained steady at 0.7Moz but has had a significant increase of 17% in grade to 3.2gpt. Growth is due to exploration success in the hanging wall to the main Lowes deposit adding higher grade material which converted to Reserve.

Yours faithfully

Bill Beament

BILL BEAMENT
Executive Chairman
Northern Star Resources Limited

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RESOURCE & RESERVE UPDATE

Competent Persons Statements

The information in this announcement that relates to Mineral Resource estimations, exploration results, data quality and geological interpretations for the Company’s Project areas is based on information compiled by Michael Mulroney, a Competent Person who is a Member of the Australasian Institute of Mining and Metallurgy and a full-time employee of Northern Star Resources Limited. Mr Mulroney has sufficient experience that is relevant to the styles of mineralisation and type of deposits under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves" for the Company’s Project areas. Mr Mulroney consents to the inclusion in this announcement of the matters based on this information in the form and context in which it appears.

The information in this announcement that relates to Ore Reserve estimations for the Company’s Project areas is based on information compiled by Jeff Brown (Australia) and Bradley Valiukas (Pogo), Competent Persons who are a Member of the Australasian Institute of Mining and Metallurgy and are full-time employees of Northern Star Resources Limited. Mr Brown and Mr Valiukas have sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Persons as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Brown and Mr Valiukas consents to the inclusion in this announcement of the matters based on this information in the form and context in which it appears.

The information in this announcement that relates to the Central and Western Tanami Gold Projects is extracted from the Tanami Gold NL ASX announcement entitled “Quarterly Report for the Period Ending 31 March 2014” released on 1 May 2014 and is available to view on www.tanami.com.au.

The information in this announcement that relates to Mineral Resource estimations, data quality, geological interpretations and potential for eventual economic extraction for the Groundrush deposit at the Central Tanami Gold Project is based on information compiled by Brook Ekers a Competent Person who is a Member of the Australian Institute of Geoscientists and a full-time employee of Northern Star Resources Limited. Mr. Ekers 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. Ekers consents to the inclusion in this announcement of the matters based on this information in the form and context in which it appears.

The Company confirms that it is not aware of any further new information or data that materially affects the information included in the original market announcement entitled “Quarterly Report for the Period Ending 31 March 2014” released on 1 May 2014 and, in the case of estimates of Mineral Resources, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. To the extent disclosed above, 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.

Forward Looking Statements

Northern Star Resources Limited has prepared this announcement based on information available to it. No representation or warranty, express or implied, is made as to the fairness, accuracy, completeness or correctness of the information, opinions and conclusions contained in this announcement. To the maximum extent permitted by law, none of Northern Star Resources Limited, its directors, employees or agents, advisers, nor any other person accepts any liability, including, without limitation, any liability arising from fault or negligence on the part of any of them or any other person, for any loss arising from the use of this announcement or its contents or otherwise arising in connection with it.

This announcement is not an offer, invitation, solicitation or other recommendation with respect to the subscription for, purchase or sale of any security, and neither this announcement nor anything in it shall form the basis of any contract or commitment whatsoever. This announcement may contain forward looking statements that are subject to risk factors associated with gold exploration, mining and production businesses. It is believed that the expectations reflected in these statements are reasonable but they may be affected by a variety of variables and changes in underlying assumptions which could cause actual results or trends to differ materially, including but not limited to price fluctuations, actual demand, currency fluctuations, drilling and production results, Resource and Reserve estimations, loss of market, industry competition, environmental risks, physical risks, legislative, fiscal and regulatory changes, economic and financial market conditions in various countries and regions, political risks, project delay or advancement, approvals and cost estimates.

APPENDIX A: RESOURCES & RESERVES

MINERAL RESOURCES STATEMENT FOR YEAR ENDED 30 JUNE 2019

MINERAL RESOURCES as at 30 June 2019

	MEASURED			INDICATED			INFERRED			TOTAL RESOURCES		
	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces
NST ATTRIBUTABLE INCLUSIVE OF RESERVE	(000's)	(gpt)	(000's)	(000's)	(gpt)	(000's)	(000's)	(gpt)	(000's)	(000's)	(gpt)	(000's)
JUNDEE GOLD PROJECT												
Surface	303	1.1	11	4,420	1.5	217	1,360	1.4	59	6,083	1.5	287
Underground	85	2.8	8	25,207	3.9	3,166	9,946	3.4	1,074	35,238	3.7	4,248
Stockpiles	557	0.9	16	-	-	-	-	-	-	557	0.9	16
Gold in Circuit	-	-	4	-	-	-	-	-	-	-	-	4
Sub-Total Jundee	945	1.3	38	29,626	3.6	3,383	11,307	3.1	1,133	41,878	3.4	4,555
KANOWNA GOLD PROJECT												
Surface	65	2.3	5	882	3.0	86	1,157	1.3	49	2,104	2.1	140
Underground	2,637	3.5	294	7,531	3.5	855	5,354	3.7	635	15,522	3.6	1,784
Stockpiles	145	2.3	11	-	-	-	-	-	-	145	2.3	11
Gold in Circuit	-	-	9	-	-	-	-	-	-	-	-	9
Sub-Total Kanowna	2,847	3.5	318	8,413	3.5	941	6,511	3.3	684	17,766	3.4	1,943
KUNDANA GOLD PROJECT												
Surface	-	-	-	-	-	-	-	-	-	-	-	-
Underground	350	4.9	55	4,248	5.5	745	4,232	4.3	578	8,831	4.9	1,378
Stockpiles	94	3.1	9	-	-	-	-	-	-	94	3.1	9
Gold in Circuit	-	-	1	-	-	-	-	-	-	-	-	1
Sub-Total Kundana Gold	444	4.6	66	4,248	5.5	745	4,232	4.3	578	8,925	4.8	1,389
EAST KUNDANA JOINT VENTURE												
Surface	-	-	-	119	5.6	21	108	2.4	8	227	4.1	30
Underground	1,034	7.5	251	2,666	6.4	544	1,654	5.1	269	5,354	6.2	1,064
Stockpiles RHP	61	3.8	7	-	-	-	-	-	-	61	3.8	7
Stockpiles Raleigh	21	4.2	3	-	-	-	-	-	-	21	4.2	3
Stockpiles GEM (100%)	1	5.0	0	-	-	-	-	-	-	1	5.0	0
Gold in Circuit	-	-	-	-	-	-	-	-	-	-	-	-
Sub-Total East Kundana JV	1,116	7.3	261	2,785	6.3	566	1,761	4.9	277	5,663	6.1	1,103
SKO GOLD PROJECT												
Surface	-	-	-	475	1.8	28	1,015	1.6	52	1,489	1.7	80
Underground	1,577	3.3	168	8,047	3.0	785	10,704	3.0	1,024	20,328	3.0	1,977
Stockpiles	100	1.7	6	-	-	-	-	-	-	100	1.7	6
Jubilee ROM stocks	81	1.8	5	-	-	-	-	-	-	81	1.8	5
Gold in Circuit	-	-	5	-	-	-	-	-	-	-	-	5
Sub-Total SKO	1,758	3.2	183	8,522	3.0	813	11,719	2.9	1,076	21,999	2.9	2,072
POGO PROJECT												
Surface	-	-	-	-	-	-	354	12.0	136	354	12.0	136
Underground	-	-	-	7,200	9.6	2,226	11,774	9.5	3,584	18,973	9.5	5,810
Stockpiles	-	-	-	-	-	-	-	-	-	-	-	-
Gold in Circuit	-	-	3	-	-	-	-	-	-	-	-	3
Sub-Total Pogo	-	-	3	7,200	9.6	2,226	12,128	9.5	3,720	19,328	9.6	5,949
CARBINE PROJECT												
Surface	-	-	-	1,008	3.0	96	47	1.8	3	1,055	2.9	99
Underground	-	-	-	503	5.8	94	757	4.7	116	1,260	5.2	209
Sub-Total Carbine	-	-	-	1,511	3.9	190	804	4.6	118	2,315	4.1	308
PAULSENS PROJECT												
Surface	-	-	-	129	3.1	13	860	2.0	54	989	2.1	67
Underground	260	5.7	48	116	5.3	20	100	5.1	16	477	5.5	84
Stockpiles	11	1.6	1	-	-	-	-	-	-	11	1.6	1
Gold in Circuit	-	-	0	-	-	-	-	-	-	-	-	0
Sub-Total Paulsens	272	5.6	49	245	4.2	33	960	2.3	70	1,477	3.2	152
ASHBURTON PROJECT												
Surface	-	-	-	7,104	2.4	546	14,227	2.5	1,122	21,331	2.4	1,668
Stockpiles	-	-	-	-	-	-	-	-	-	-	-	-
Sub-Total Ashburton	-	-	-	7,104	2.4	546	14,227	2.5	1,122	21,331	2.4	1,668
CENTRAL TANAMI PROJECT JV												
Underground	2,502	2.9	232	4,430	2.8	400	4,842	2.9	453	11,774	2.9	1,085
Stockpiles	560	0.7	13	-	-	-	-	-	-	560	0.7	13
Sub-Total Central Tanami JV	3,062	2.5	245	4,430	2.8	400	4,842	2.9	453	12,334	2.8	1,097
WESTERN TANAMI PROJECT												
Underground	107	7.8	27	1,079	6.0	208	1,449	5.8	271	2,636	6.0	506
Stockpiles	375	1.4	17	-	-	-	-	-	-	375	1.4	17
Sub-Total Western Tanami	482	2.8	44	1,079	6.0	208	1,449	5.8	271	3,011	5.4	523
NORTHERN STAR TOTAL	10,926	3.4	1,206	75,163	4.2	10,050	69,941	4.2	9,503	156,026	4.1	20,760

Note:

1. Mineral Resources are inclusive of Ore Reserves.
2. Mineral Resources are reported at various gold price guidelines :a. A$1,750/oz Au - All Australian assets except Ashburton; b. AUD $1,850 /oz Au -Ashburton; US$1,300/oz Au - USA assets.
2. Rounding may result in apparent summation differences between tonnes, grade and contained metal content.
3. Numbers are 100 % NST attributable.

Competent Persons:

1. Michael Mulroney

APPENDIX A: RESOURCES & RESERVES

ORE RESERVES STATEMENTS FOR YEAR ENDED 30 JUNE 2019

ORE RESERVES as at 30 June 2019

	PROVED			PROBABLE			TOTAL RESERVE		
NST ATTRIBUTABLE RESERVE	Tonnes (000's)	Grade (gpt)	Ounces (000's)	Tonnes (000's)	Grade (gpt)	Ounces (000's)	Tonnes (000's)	Grade (gpt)	Ounces (000's)
JUNDEE GOLD PROJECT									
Surface	303	1.1	11	2,212	1.6	112	2,515	1.5	123
Underground	85	2.8	8	10,155	4.6	1,488	10,240	4.5	1,495
Stockpiles	557	0.9	16	-	-	-	557	0.9	16
Gold in Circuit	-	-	4	-	-	-	-	-	4
Sub-Total Jundee	945	1.3	38	12,367	4.0	1,600	13,312	3.8	1,638
KANOWNA GOLD PROJECT									
Surface	-	-	-	852	2.6	70	852	2.6	70
Underground	1,626	3.2	169	3,789	3.4	410	5,415	3.3	578
Stockpiles	145	2.3	11	-	-	-	145	2.3	11
Gold in Circuit	-	-	9	-	-	-	-	-	9
Sub-Total Kanowna	1,771	3.3	188	4,641	3.2	480	6,412	3.2	668
KUNDANA GOLD PROJECT									
Surface	-	-	-	-	-	-	-	-	-
Underground	198	4.0	26	4,195	4.1	552	4,393	4.1	578
Stockpiles	94	3.1	9	-	-	-	94	3.1	9
Gold in Circuit	-	-	1	-	-	-	-	-	1
Sub-Total Kundana Gold	293	3.8	36	4,195	4.1	552	4,487	4.1	588
EAST KUNDANA JOINT VENTURE									
Surface	-	-	-	68	5.8	13	68	5.8	13
Underground	784	6.6	166	2,099	5.3	358	2,883	5.6	523
Stockpiles RHP	61	3.8	7	-	-	-	61	3.8	7
Stockpiles Raleigh	21	4.2	3	-	-	-	21	4.2	3
Stockpiles GEM (100%)	1	5.0	0	-	-	-	1	5.0	0
Gold in Circuit	-	-	1	-	-	-	-	-	1
Sub-Total East Kundana JV	866	6.3	177	2,168	5.3	371	3,034	5.6	547
SKO GOLD PROJECT									
Surface	-	-	-	-	-	-	-	-	-
Underground	418	3.6	48	2,701	2.9	254	3,119	3.0	301
Stockpiles	100	1.7	6	-	-	-	100	1.7	6
Jubilee ROM stocks	81	1.8	5	-	-	-	81	1.8	5
Gold in Circuit	-	-	5	-	-	-	-	-	0
Sub-Total SKO	600	3.3	63	2,701	2.9	254	3,300	3.0	317
POGO PROJECT									
Surface	-	-	-	-	-	-	-	-	-
Underground	-	-	-	6,103	7.5	1,470	6,103	7.5	1,470
Stockpiles	-	-	-	-	-	-	-	-	-
Gold in Circuit	-	-	3	-	-	-	-	-	3
Sub-Total Pogo	-	-	3	6,103	7.5	1,470	6,103	7.5	1,472
CARBINE PROJECT									
Surface	-	-	-	1,099	2.5	89	1,099	2.5	89
Underground	-	-	-	-	-	-	-	-	-
Stockpiles	-	-	-	-	-	-	-	-	-
Sub-Total Carbine	-	-	-	1,099	2.5	89	1,099	2.5	89
PAULSENS PROJECT									
Surface	-	-	-	-	-	-	-	-	-
Underground	-	-	-	396	4.3	54	396	4.3	54
Stockpiles	11	1.6	1	-	-	-	11	1.6	1
Gold in Circuit	-	-	-	-	-	-	-	-	-
Sub-Total Paulsens	11	1.6	1	396	4.3	54	407	4.2	55
ASHBURTON PROJECT									
Surface	-	-	-	-	-	-	-	-	-
Stockpiles	-	-	-	-	-	-	-	-	-
Sub-Total Ashburton	-	-	-	-	-	-	-	-	-
CENTRAL TANAMI PROJECT JV									
Underground	-	-	-	-	-	-	-	-	-
Stockpiles	-	-	-	-	-	-	-	-	-
Sub-Total Central Tanami JV	-	-	-	-	-	-	-	-	-
WESTERN TANAMI PROJECT									
Underground	-	-	-	-	-	-	-	-	-
Stockpiles	-	-	-	-	-	-	-	-	-
Sub-Total Western Tanami	-	-	-	-	-	-	-	-	-
NORTHERN STAR TOTAL	4,486	3.5	505	33,668	4.5	4,870	38,155	4.4	5,375

Note:

1. Ore Reserves are reported at the gold price of AUD $1,500/oz Au (Australia) or USD$1,150/oz Au (USA)
2. Rounding may result in apparent summation differences between tonnes, grade and contained metal content.
3. Ounces are estimates of metal contained in the Ore Reserve and do not include allowances for processing losses.
4. Numbers are 100 % NST attributable.

Competent Persons:

1. Jeff Brown - Australian Operations
2. Bradley Valiukas - Pogo Operation

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report

Jundee (Surface) - 30 June 2019

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.	Sampling is by both diamond drilling (DD) and Reverse Circulation (RC) drilling completed by NSR. DD samples are HQ and NQ core with sample intervals defined by the geologist to honour geological boundaries ranging from 0.3 to 1.2m in length. RC samples are collected via rig-mounted static cone splitter with sample falling though inverted cone splitter, splitting the sample in 88%/9%/3% ratio. 9% split retained for 1m composites and 3% split retained for 4m composites. 1m samples are sent for further analysis if any 4m composites return a gold value > 0.1ppm or intervals containing alteration/mineralisation failed to return a significant composite assay result. NSR Resource definition and grade control drilling routinely collects 1m composites.
	Include reference to measures taken to ensure sample representativity and the appropriate calibration of any measurement tools or systems used.	DD core is aligned and measured by tape, comparing back to down hole core blocks consistent with industry practice. RC metre intervals are delineated with spray paint to determine metres drilled. Sample rejects are left on the sample pad to indicate metres drilled for the hole.
	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 30g 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.	Diamond drilling is completed to industry standard using varying sample lengths (0.3 to 1.2m) based on geological intervals, which are then crushed and pulverised to produce a ~200g pulp sub sample to use in the assay process. Diamond core samples are fire assayed (30g charge) and screen fire assayed for visible gold. Visible gold is occasionally encountered in core. RC sampling to industry standard at the time of drilling where ~3-4kg samples are pulverised to produce a ~200g pulp sample to utilise in the assay process. RC samples are fire assayed (50g charge).
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 drilling is carried out using a face sampling hammer and a 130mm diameter bit. Diamond drilling carried used HQ3 (triple tube) and NQ2 techniques. Core is routinely orientated using the ORI-shot device.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	RC – Approximate recoveries are sometimes recorded as percentage ranges based on a visual and weight estimate of the sample. DD – Recoveries are recorded as a percentage calculated from measured core versus drilled intervals.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	Diamond drilling practice results in high core recovery due to the competent nature of the ground. RC drilling recovery is supervised on the rig and any recovery issues are recorded and rectified.
	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.	There is no known relationship between sample recovery and grade, diamond drill sample recovery is very high.
Logging	Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.	DD core and RC chip samples have been logged by qualified geologists to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies Percussion holes logging were carried out on a metre by metre basis and at the time of drilling.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging is Qualitative and Quantitative; all core is photographed wet. Visual estimates are made of sulphide, quartz and alteration as percentages.
	The total length and percentage of the relevant intersections logged.	100% of all DD and RC drilling is logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	DD core is halved with an Almonté diamond core saw. The core is quarter cut when metallurgical samples are required. Sample intervals are defined by a qualified geologist to honour geological boundaries. The left half is archived. All mineralised zones are sampled plus associated visibly barren material in contact with mineralised zones. Core is sampled on the width of the geological/mineralised structure with a minimum sample length of 0.3m and a maximum sample length of 1.2m. Total weight of each sample generally does not exceed 5kg.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC drilling uses a cyclone mounted inverted cone splitter.

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Criteria	JORC Code explanation	Commentary
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	DD core is dried at 100°C to constant mass, all samples below approximately 4kg are totally pulverised in LM5's to nominally 90% passing a 75µm screen. The few samples generated above 4kg are crushed to <6mm and riffle split first prior to pulverisation. RC samples are dried at 100°C to constant mass, all samples below approximately 3kg are totally pulverised in LM5's to nominally 85% passing a 75µm screen. Samples generated above 4kg are crushed to <6mm and cone split to nominal mass prior to pulverisation. For RC samples, no formal heterogeneity study has been carried out or monographed. An informal analysis suggests that the sampling protocol currently in use are appropriate to the mineralisation encountered and should provide representative results.
	Quality control procedures adopted for all sub-sampling stages to maximise representativity of samples.	Repeat analysis of pulp samples (all sample types) occurs at an incidence of 1 in 20 samples. Analysis of 2mm coarse crush and split has been completed for three RC bulk cone splitter rejects each of them divided into 32 equal splits.
	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.	Field duplicates, (i.e. other half of cut core) are routinely assayed. NSR routinely collects field duplicates during RC drilling.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Sample sizes are considered appropriate. No formal nomograph study has been conducted on the RC primary sub sample split. Industry standard practice supports splitting of primary sub samples at particle sizes of <6mm and P_{80} 75µm.
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.	For RC drill samples, gold concentration was determined by fire assay using the lead collection technique with a 50-gram sample charge weight. MP-AES instrument finish was used to be considered as total gold. For DD drill samples, gold concentration was determined by fire assay using the lead collection technique with a 30-gram sample charge weight. AAS instrument finish was used to be considered as total gold. Various multi-element suites are analysed using a four-acid digest with an AT/OES finish.
	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.	No geophysical derived analyses are reported.
	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.	The QAQC protocols used include the following for all drill samples: - Field QAQC protocols used for all drill samples include commercially prepared certified reference materials (CRM) inserted at an incidence of 1 in 20 samples. The CRM used is not identifiable to the laboratory with QAQC data is assessed on import to the database and reported monthly, quarterly and yearly. - NSR RC Resource definition and grade control drilling routinely inserts field blanks and monitor their performance. - Laboratory QAQC protocols used for all drill samples include repeat analysis of pulp samples occurs at an incidence of 1 in 20 samples and screen tests (percentage of pulverised sample passing a 75µm mesh) are undertaken on 1 in 40 samples. - The laboratories' own standards are loaded into the database and the laboratory reports its own QAQC data monthly. - In addition to the above, about 5% of drill samples are sent to a check laboratory. Samples for check -assay are selected automatically from holes based on the following criteria: grade above 0.5gpt or logged as a mineralised zone or is followed by feldspar flush or blank. - Failed standards are generally followed up by re-assaying a second 50g or 30g pulp sample of all samples in the fire above 0.1ppm by the same method at the primary laboratory. Both the accuracy component (CRM's and third-party checks) and the precision component (duplicates and repeats) of the QAQC protocols are thought to demonstrate acceptable levels of accuracy and precision.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	Significant intersections not verified.
	The use of twinned holes.	There is no purpose drilled twin holes.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Sampling and logging data are digitally entered into a tablet using Logchief software imported into SQL database using semi-automated or automated data entry. Digital assay files are loaded directly into the database. Visual checks are part of daily use of the data in Vulcan.

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Criteria	JORC Code explanation	Commentary
	Discuss any adjustment to assay data.	The first gold assay is almost always utilised for any Resource estimation except where evidence from re-assaying and/or check-assaying dictates. A systematic procedure utilizing several re-assays and/or check assays is in place to determine when the final assay is changed from the first gold assay.
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.	Collar positions are recorded using conventional survey methods based on Leica TS15 3" total stations and Trimble R10 GNSS instruments. The location of each station is referenced to state-wide network of Standard Survey Marks (SSM) established and coordinated by the Department of Land Administration (WA Government). Where regional drill hole positions are distant from the SSM network, the worldwide Global Navigational Satellite System (GNSS) network is used. Positional checks are carried out using a combination of existing known positions (usually based on prominent landmarks) and grid referenced information such as ortho-linear rectified photogrammetry based on the Map Gird of Australia MGA94. Collar coordinates are recorded in MGA94. Surface collar RL's have been validated utilizing an airborne elevation survey by Arvista in October 2017. Multi shot cameras and gyro units were used for down-hole survey.
	Specification of the grid system used.	Collar coordinates are recorded in MGA94 Zone 51. The difference between magnetic north (MN) and true north (TN) is 1º 34' 30". The difference between true north (TN) and AMG84 Zone 51 (AMG GN) is 1º 02' 47". The difference between true north and GDA is zero.
	Quality and adequacy of topographic control.	Topographic control is from Digital Elevation Contours (DEM) 2017, 1m contour data and site surveyed pickups.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	All Ore Reserves are based on a maximum drill hole spacing of 25m x 25m and all Mineral Resources are based on a maximum of 60m x 60m. Exploration results in this report range from 25m x 25m drill hole spacing to 60m x 60m.
	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.	Ore Reserves are generally based on 25m x 25m drilling to a maximum of 40m by 40m. Mineral Resources are generally based on 25m x 25m drilling up to a maximum of 60m x 60m. The data spacing and distribution is sufficient to establish geological and/or grade continuity appropriate for the Mineral Resource and classifications to be applied.
	Whether sample compositing has been applied.	Core is sampled to geology; sample compositing is not applied until the estimation stage. RC samples are taken as 1 m samples and 4 m composites during first pass exploration,1m samples are sent for further analysis if any 4m composites return a gold value > 0.1ppm or intervals containing alteration/mineralisation failed to return a significant composite assay result. For RC Resource definition and grade control drilling 1 m samples are routinely collected. No RC samples greater than 1m were used in estimation.
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 orientation of sampling is generally on a high angle to the main mineralisation trends as these are vertical to sub-vertical. Drill holes are drilled on a 60-degree angle, perpendicular to the strike of the mineralisation.
	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 drill orientation to mineralised structures biases the number of samples per drill hole. It is not thought to make a material difference in the Resource estimation.
Sample security	The measures taken to ensure sample security.	All samples are selected, cut and bagged in tied numbered calico bags, grouped in larger tied plastic bags, and placed in large sample cages with a sample submission sheet. The cages are either sent to the site laboratory or are transported via freight truck to Perth, with consignment note and receipted by external and independent laboratory All sample submissions are documented, and all assays are returned via email and hard copy. Sample pulp splits from the site lab are stored at the Jundee mine site and those from the Newburn Lab in Perth are stored at the Newburn Lab. RC samples processed at SGS have had the bulk residue discarded and pulp packets sent to Jundee mine site for long term storage.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	Historical audits of all Jundee data were carried out by previous operators. During 2018 and 2019, Bruce van Bloomstein (Zaremus Pty Ltd) conducted an audit of the site laboratory and audit of the external laboratories. Both audits found the laboratory procedures and performance to be adequate. All recent NSR sample data has been extensively QAQC reviewed both internally and externally.

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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 Jundee Project consists of 7 Exploration Licenses, 62 Mining Leases and 1 General Purpose Lease covering a total area of approximately 86,341 Ha. All are currently registered in the name of Newmont Yandal Operations Pty Ltd but Northern Star Resources Limited are the beneficial owners and transfers will be registered once the Office of State Revenue have completed their assessment to duty. The Project also includes 23 Miscellaneous Licenses, 3 Groundwater Licenses, a Pipeline License and the Jundee Pastoral Lease covering the bore fields, roads, airstrip, and gas pipeline. There are numerous access agreements in place including access rights over part of M53/193 which lies contiguous to, and beneath, the General Purpose Lease on which the Jundee processing plant is located. There are no heritage issues with the current operation. The majority of the Jundee leases are granted Mining Leases prior to 1994 (pre-Mabo) and as such Native Title negotiations are not required. During 2004, two agreements where struck between Ngaanyatjarra Council (now Central Desert Native Title Services (CDNTS)) and Newmont Yandal Operations, these agreements being the Wiluna Land Access Agreement 2004 and the Wiluna Claim Heritage Agreement 2004, both agreements were transferred to Northern Star on purchase of the Jundee Operations in 2014.
	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 leases and licences to operate are granted and in the order for between 3 and 21 years.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	All the exploration work has been completed by NSR.
Geology	Deposit type, geological setting and style of mineralisation.	Ramone is Archean gold mineralised deposit that is part of the Northern Yandal Greenstone belt. Gold mineralisation is hosted by a granite and controlled by a brittle stockwork fracture-system within a north-easterly trending shear zone. The mineralisation formed by a stockwork of veins with smoky quartz, sulphides minor carbonate, chlorite and sericite hosted by a monzonitic granite. The mineralisation is intruded by an East-West striking (about 96 degrees) vertical dolerite dyke that cross cuts the mineralisation and is part of a suite of magnetic dolerite dykes that intrudes the Yandal belt in an East-West direction.
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: 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.	No new significant results reported; all the significant results were reported in the ASX release "Exploration Update" dating from the 20th of December 2018.
	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.	No new significant results reported.
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.	No new significant results reported.
	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.	No new significant results reported.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No new significant results reported.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results.	No new significant results reported.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	No new significant results reported.
	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').	No new significant results reported.

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Criteria	JORC Code explanation	Commentary
Diagrams	Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	No new significant results reported.
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.	No new significant results 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.	No other meaningful data to report.
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).	Further extensional, resource definition and grade control drilling are planned for FY2019.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Plans and sections of the Ramone deposit are included in this report.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are digitally entered into a tablet using Logchief software and then transferred to an SQL based database. Assay results are returned from the laboratory as digital files and loaded directly into the database. A series of verification validations are performed prior to importing the data in the database. There are checks in place to avoid duplicate holes, sample numbers and missing intervals. There is database manager on site who is responsible for the integrity and use of the data. Only the database manager and the database administrator have access to the database. Where possible, raw data is loaded directly to the database from lab, logging and survey derived files.
	Data validation procedures used.	All the electronic log files are reviewed and validated prior to being imported into the database. Drill hole information is loaded in Vulcan and Leapfrog software for verification and validation of collar, lithology and downhole surveys. Database administrators perform a series of verification validations prior to store the information in the database. There is QA/QC geologist that reviews the QA/QC information daily and ensure that the company QA/QC protocols are followed.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The Competent Person for this Resource report has worked on site for extensive periods between 2015 and 2019.
	If no site visits have been undertaken indicate why this is the case.	Regular site visits have been undertaken.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the deposit was carried out using a systematic approach to ensure continuity of the geology and estimated mineral Resource using Leapfrog and Vulcan software. The confidence in the geological interpretation is relatively high, though a certain degree of uncertainly always remains due to the structurally complex and nuggetty nature of the ore body on a local scale.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drilling and oxidation surfaces.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations have been completed or put forward.
	The use of geology in guiding and controlling Mineral Resource estimation.	Logging and grade distribution were used to create 3D constrained wireframes. A 0.3 gpt Au was used as a guide to model the mineralised envelopes for the open pit resources and a 1.0 gpt Au was used as a guide for the underground resources. The Modelling cut-off was determined after the statistical analysis of the sample population.
	The factors affecting continuity both of grade and geology.	Continuity of the grade varies significantly, though the main mineralised structures show good continuity downdip and across strike. The geology consists of a stockwork of short range quartz veins with carbonate, chlorite and sulphides hosted by a granite. The splays or small lodes coming of this main trend tend to have a shorter continuity.

APPENDIX B: TABLE 1

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.	Mineralized zones are variable with true width ranging from 0.5m to 20m. They are extensive along strike and down dip, up to 450m and 350m respectively. Depth from surface is 350m approximately. The mineralised envelope has been extended down dip for targeting purposes any mineralisation modelled beyond the drilling coverage has not been included in the resource classification or reporting.
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.	Domains are set by grouping lodes as dictated by their structural setting, geological, mineralisation and statistical characteristics. The raw data is subdivided into domains based on geological controls and further analysed for correlation and similarity using statistics. The purpose of this analysis is to determine further domaining of the data for variography purposes (by combining groups of lodes). The Resource estimation utilises 1m composites for all RC and DD sampling data composites residuals smaller than 1m have been weighted by length for the estimation. Modelling was completed using Leapfrog and Vulcan software. Detailed exploratory data analysis, variography, Kriging Neighbourhood analysis (KNA) and model validation is carried out using Snowden Supervisor software. The Mineral Resource was estimated using ordinary kriging (OK). Vulcan software is used for data compilation, calculating and coding composite values, estimating and reporting. Estimation was completed using an oriented search ellipsoid. Three estimation passes were used with increasing search ellipsoid radius. Maximum and minimum number of samples for the estimation and ellipsoid search ranges were derived from KNA analysis, variogram ranges and drill hole spacing. Search ellipsoid radius ranges from 30m to 80m. A minimum of 12 samples and a maximum of 28 was used in the first pass, minimum of 10 samples and a maximum of 28 was used in the second pass and minimum of 6 samples and a maximum of 28 was used in the third pass. Minor variations to the number of samples have been applied in some zones based on drill spacing. Block model volumes were compared to wireframe volumes to validate sub-blocking. For the OK estimates treatment of extreme high grades was dealt with by using a cap grade strategy and high grade restraining.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Previous estimates are in line with the current estimation for this deposit.
	The assumptions made regarding recovery of by-products.	No assumptions are made and only gold is defined for estimation.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Mineral Resource model use a 1m composite generation based on dominant sample length. Ramone block model has a parent block size of 4 m in strike, 2.5 m in RL, and 4m across strike direction and sub-block sizes are 1 m in strike, 0.65m in RL, and 1m across strike direction for the open pit resources. For the underground resources the model has a parent block size of 12 m in strike, 2.5 m in RL, and 4m across strike direction. Sub-block sizes are 2 m in strike, 1.25 m in RL, and 1 m across strike direction. Block size is approximately a quarter to half of the drill spacing across strike. Average drill spacing ranges from 25m x 25m to 10m x 5m for the open pit resources. Average drill spacing ranges from 25m x 25m to 40m x 40m for the underground resources. Ore Reserves are generally based on 40m x 40m to 10m x 5m drill spacing. Mineral Resources are generally based on a 40m x 40m drilling up to a maximum of 60m x 60m drill spacing.
	Any assumptions behind modelling of selective mining units.	A 2m minimum mining width for open pit environment is assumed.
	Any assumptions about correlation between variables.	There is no correlation between variables.
	Description of how the geological interpretation was used to control the Resource estimates.	Mineralised wireframes are created within the geological shapes based on drill core logs, mapping and grade. A 0.3 gpt Au was used as a guide to model the mineralised envelopes for open pit resources and 1gpt for the underground resources. Low grades can form part of an ore wireframe. Estimations are constrained by the mineralised envelopes. Where required, late intrusives such as the Proterozoic dolerite dyke were used to sterilise the mineralisation.

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Criteria	JORC Code explanation	Commentary
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were determined by a range of statistical techniques including analysis of histogram, Log-probability and Mean- CV plots: • Contained Metal Plots assess contribution of the highest values on the quantity of metal in an estimate, • Coefficient of Variation plots analyse impact top cuts have on CV. A range of top cuts are then selected for each domain utilising the above strategies and an appropriate top cut chosen subsequent to further examination in order to assess sensitivity of selected cap grades and associated risk. Metal estimated in the Resource models are finally reconciled with production models of like areas to determine the appropriateness of the high-grade treatment on the assays. No top cutting or capping of high grades is done at the raw sample or compositing stage. For OK and ID^2, treatment of the high-grade assays occurs at the estimation stage. A top cut of 40gpt was used for estimation and a high-grade restraining for samples above 16gpt, limiting their range of influence in the estimation.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	The Mineral Resource estimate was validated using processes that are based on a combination of visual, graphical and reconciliation validations summarised as: • Visual validation of the lode and lithology coding of both the composite data and the block model. • Comparison of lode wireframe volumes to block model volumes. • Visual validation of Mineral Resource estimate against composite data in plan, section, and 3D. • Sensitivity to top-cut values uses a variety of top-cuts which are compared to themselves and to the un-cut nearest neighbour estimate at a variety of cut-offs. • Comparison of nearest neighbour, ID2 and OK estimates to the final estimate (generally OK & ID2). These comparisons are conducted through visual validation and trend analysis along Northing, Easting and RL slices. • Global, level and lode tonnages and grades, at various elemental cut-offs were compared, and, given the changes in support data, were consistent. • Statistical comparison of composites versus all estimates in block model with trend analysis plots for each domain produced by Northing / Easting / RL. • Statistical comparison of composites grades versus lode grades in a lode by lode basis. • Change of Support validation The Mineral Resource estimate shows a reasonably reflection of the composites where there are high numbers of composites used in the estimate. Where the numbers of samples reduce, the accuracy of the estimation suffers, and a more significant deviation is noted between the Mineral Resource estimate and associated composite data. These deviations are considered when assigning a Resource classification.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis. Moisture content within the ore is expected to be low.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	Mineral Resources are reported at a 0.6gpt cut-off grade. The pit cut-off grade has been calculated based on the key input components of mining, processing, recovery and administration costs. Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. • The AUD gold price as per corporate guidance. • Mill recovery factors are based on historical data and metallurgical test work. • Variable treatment costs to open pit mining for processing is a fundamental premise in the evaluation of open pit projects. Variable cut-off grade is used in the evaluation of open pit projects. Underground resources have been reported through MSO generation using a 2.0 gpt Au cut-off grade.

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Criteria	JORC Code explanation	Commentary
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	A 2m minimum mining width for Open Pit environment is assumed and incorporated into the modelling and estimation. All the resources have been reported at a 0.6gpt Au with 10% dilution within the reserve pit shell, using $1,750 AUD gold price. Underground resources have been reported through MSO generation using a minimum mining width of 2 m coupled with 2.0 gpt Au cut-off grade and an Au $1,750 gold price. It is assumed that the underground resources will be accessed through a portal at the base of the pit.
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.	Ramone ore is currently being trucked and processed in the Jundee Mill. Metallurgical test work was initiated in October 2017 to determine ore characteristics and expected recovery figures from processing material from this ore body. The metallurgical test work determined a head grade of 2.23 g/t can be expected from this mining area. Recovery of gravity recoverable gold increased with a reduction in grind size. The overall recovery also increased with a reduction in grind size. At the current operating range of 106 µm to 150 µm the total recovery can be expected to be 94.9% to 97.2%. Lime consumption is projected to be at 1.9 kg/t. Cyanide consumption is projected to be at 0.9 kg/t. Although no oxygen uptake test work was completed, head assay analysis does not indicate any major oxygen consumers. Therefore, the current Jundee liquid oxygen consumption rate of 0.68 m3/t is projected. The ore from Ramone orebody does not contain any elements of significant quantity which would adversely affect processing by conventional leach and gravity. Current Ramone open pit ore being treated at the Jundee or third party mills shows plant recoveries above 92%.
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 green fields 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.	The Project currently possesses all necessary government permits, licenses and statutory approvals in order to be compliant with all legal and regulatory requirements.
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 values have been obtained from a detailed statistical analysis of 309 measurements that have been recorded from diamond core samples taken at Ramone and nearby Deep Well that is hosted by the same geological formation. Approximately one sample is taken every 5 metres. These values are also in agreement with 72,634 bulk density measurements that been taken in the Jundee district and over 10 years of historical production data from several pits in the regional district.
	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.	Bulk density measurements for core samples are taken using the water displacement technique, where the samples are dried and weighed in air then weighed in water.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Individual bulk densities are applied in accordance with specific lithologies, mineralisation and weathering states.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The classification of Mineral Resources was based on the geological complexity, drill hole spacing, number of drill samples, sample distribution and estimation performance, The Competent Person is satisfied that the result appropriately reflects his view of the deposit. Indicated Open Pit Resources are defined by RC drilling which ranges between 10m x 5m and 25m x 25m drill spacing where there is grade and geological continuity. Small lodes or mineralised zones within 25m x 25m drill spacing are classified as Indicated when there is evidence of grade and geological continuity and they intersected by a minimum of 3 drill holes, otherwise inferred. Inferred Open Pit Resources are defined on a nominal 50m x 50m drilling pattern where there is evidence of grade and geological continuity. Indicated Underground Resources are defined by DD drilling which generally in a 40m x 40m or tighter drill spacing where there is grade and geological continuity. Inferred Underground Resources are defined by DD drilling that ranges between a 40m x 40m and 60m x 60m drilling pattern where there is evidence of grade and geological continuity. Classification has been extended half the drill hole spacing past the last mineralised intercept in a regular drilling grid for each category. Any mineralised zone not falling within the criteria described in the previous paragraphs have the unclassified resource category.

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Criteria	JORC Code explanation	Commentary
	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, quality, quantity and distribution of the data).	Input and geological data is assumed to be accurate. All the relevant factors have been considered in the classification of the Mineral Resource.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	This Mineral Resource estimate is considered representative with comments noted in the discussion below.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The Mineral Resource estimate have been internally reviewed by NSR personnel. No external audits and reviews have been completed.
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.	This Mineral Resource estimate is considered as robust and representative of the Ramone mineralisation with local estimates considered variable in nature. The application of geostatistical methods has supported to increase the confidence of the model and quantify the relative accuracy of the Resource on a global scale.
	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.	This Resource report relates to the Ramone deposit and is likely to have local variability within a global assessment further supported and reconciled against actual mine production.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Current production data is line with the model expectations and supports the accuracy and confidence in the resource model.

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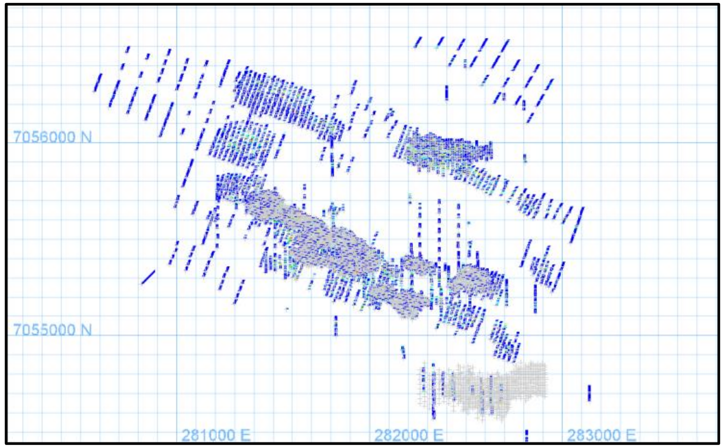
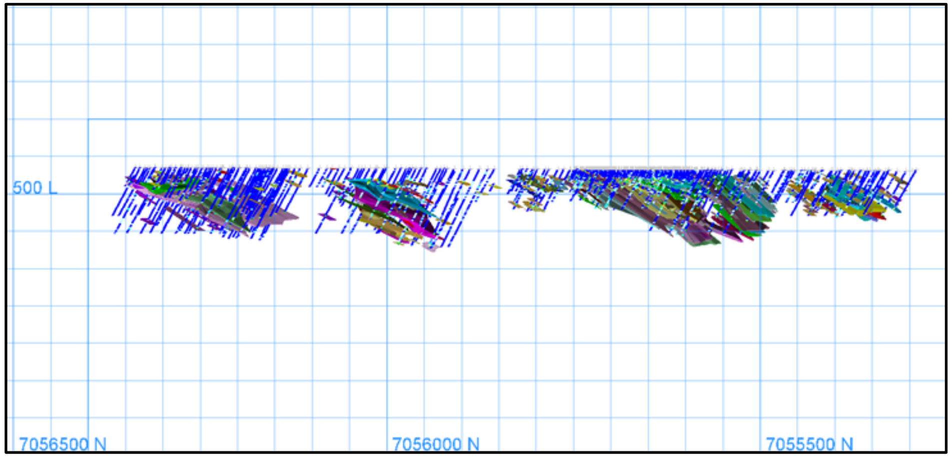
VAUSE RESOURCE

Plan view: Vause mine area Drill hole collars

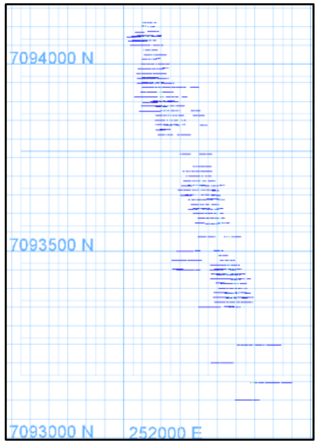


Long Section – Vause mine area drillhole traces and mineralised domains

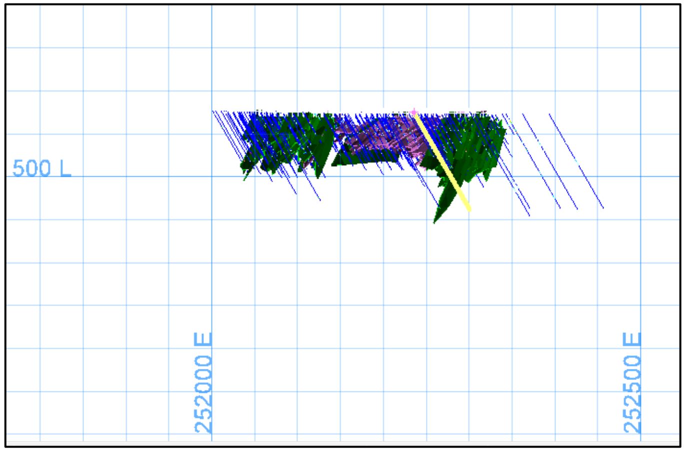


DESERT DRAGON RESOURCE

Plan view: Desert Dragon mine area Drill hole collars



Long Section – Desert Dragon mine area drillhole traces and mineralised domains



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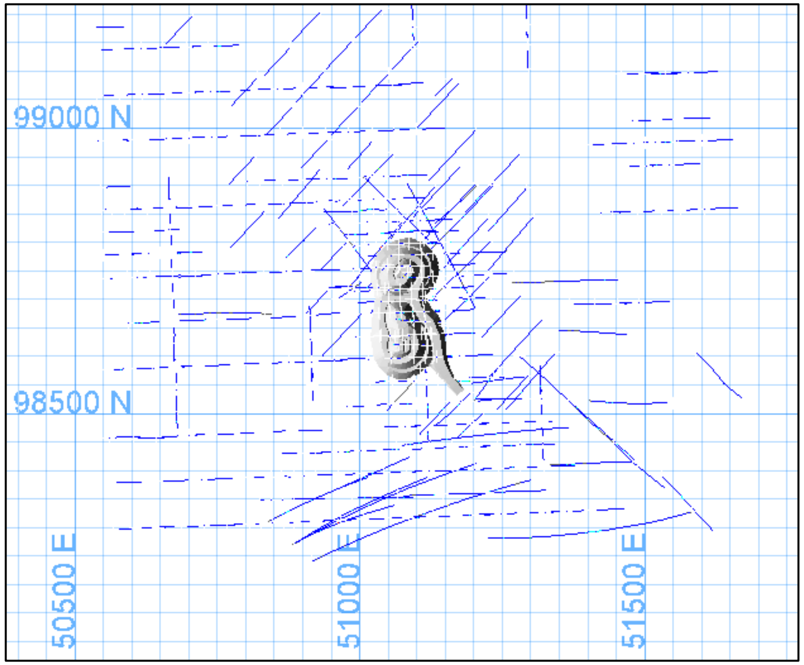
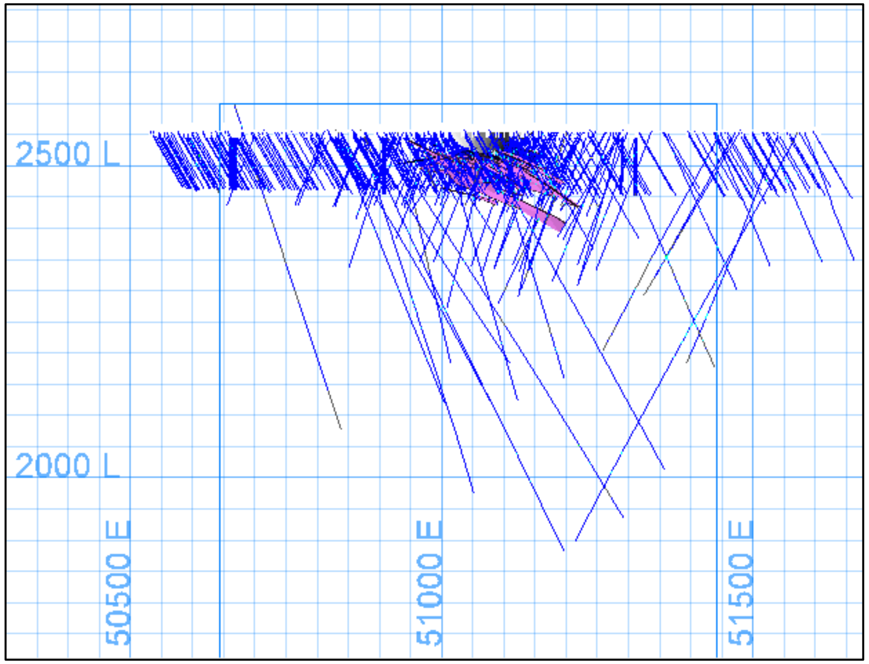
MENZIES RESOURCE

Plan view: Menzies mine area Drill hole collars	Long Section – Menzies mine area drillhole traces and mineralised domains
	

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	The Mineral Resource estimate for the Ramone and Vause Projects used as a basis for the conversion to the Ore Reserve estimate reported was compiled by Northern Star Resources (NSR). Reported ore reserves are based on updated or depleted resource models for all project areas.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	Mineral Resources are reported inclusive of ore Reserves.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Numerous and frequent Site Visits have been undertaken by the competent person.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.

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Criteria	JORC Code explanation	Commentary
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	The Jundee Gold Project is a fully operational mine and has been in operations for over 20 years. The processing parameters have been based on metallurgical test work and experience from previous open pit ore processed and actual costs of the Jundee processing plant. Mining costs are based on pricing sourced from a reputable mining contractor with considerable experience in mining open pit gold mines. The schedule of rates provided were in a fixed and variable format. There is a high level of confidence in the parameters used.
	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.	Detailed mine design and costing based upon ongoing mine performance The current study level demonstrates high confidence that the projects can achieve the mine plan and be operated in a technically sound and economically viable manner.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	The pit cut-off grade has been calculated based on the key input components (processing, recovery and administration) Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. • The AUD gold price as per corporate guidance. • Mill recovery factors are based on historical data and metallurgical test work. • Variable treatment costs to open pit mining for processing is a fundamental premise in the evaluation of open pit projects. Variable cut-off grade is used in the evaluation of open pit projects.
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).	Ore Reserves have been calculated by generating detailed mining shapes for the proposed open pits. A series of nested optimised pit shells were generated using Whittle software, an analysis of the shells was completed to select one which was then used to complete a detailed pit design to closely resemble the selected whittle shell. The Whittle optimisation used parameters generated from NSR technical personnel and technical consultants.
	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 Jundee open pits will be mined using conventional open pit mining methods (drill, blast, load and haul) by a mining contractor utilising 120t class excavators and 90t trucks. This method is used widely in mines across Western Australia and is deemed appropriate given the nature of the ore body.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	Independent Geotechnical Consultants Dempers & Seymour Pty Ltd completed a geotechnical study for the open pit projects. Recommended wall angles were applied to the Whittle optimisation and subsequent detailed pit designs.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	
	The mining dilution factors used.	A mining dilution factor of 10% of zero grade has been applied for the reporting of Reserve physicals.
	The mining recovery factors used.	A mining recovery of 95% has been applied.
	Any minimum mining widths used.	The SMU dimensions for the Reserve Estimate are 4.0 m Wide x 2.5 m High x 4.0 m Long. A minimum mining width down to 20 m for final pit extraction from the base of pit has been used.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Inferred material has not been included within this Reserve estimate (treated as waste) but has been considered in LOM planning. It is assumed that Inferred material will be converted to Reserve via grade control drilling which has been provided for and will be carried out ahead of mining.
	The infrastructure requirements of the selected mining methods.	Infrastructure requirements for Jundee Open Pit Projects have been accounted for and included in all work leading to the generation of the Ore Reserve estimate. As there is currently infrastructure in place for the Jundee underground operations and the life of Open Pit Projects are limited, planned infrastructure includes: • Offices, workshops and associated facilities; • Dewatering pipeline; • Waste Dump; and • ROM Pad. Processing will be conducted at the Jundee operation; hence no processing infrastructure is required.

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Criteria	JORC Code explanation	Commentary
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	The existing Jundee Processing plant will be utilised to treat the Open Pit ore.
	Whether the metallurgical process is well-tested technology or novel in nature.	Metallurgical test work has been completed on Open Pit ore and applied to the optimisations and is well understood.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	The metallurgical recoveries for the Ramone project were set at 94.9% for oxide, 94.9% for transitional, 94.9% for fresh rock, which corresponds with metallurgical test work undertaken. The metallurgical recoveries for the Vause project were set at 93.9% for oxide, 94.1% for transitional, 92.9% for fresh rock, which corresponds with historic data and metallurgical test work undertaken.
	Any assumptions or allowances made for deleterious elements.	There has been no allowance for deleterious elements. Test work indicates there are no 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.	Milling experience gained over the past 4 months of operation for Ramone and 2Mt of Vause open pit ore previously processed through the Jundee Processing Plant.
	For minerals that are defined by a specification, has the ore Reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable, gold only.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Jundee operates under Department of Water and Environmental Regulation (DWER) Licence L6498/1995/11 in accordance with the Environmental Protection Act WA 1986. Jundee holds one groundwater licence GWL 107143. Jundee's mine closure plan has been developed in accordance with the DMIRS and EPA Guidelines for Preparing Mine Closure Plans. The mine closure plan details studies such as waste rock characterisation that are to be completed before closure of the site. Ramone and Vause are satellite mining operations to Jundee with past completed open pits nearby and are included in the Jundee Mine Closure Plan. All ore from the Open Pit Projects will be trucked to the Jundee Gold Processing Plant for milling and as such tails storage is included in the current Jundee (DWER) licence. Dempers and Seymour Geotechnical Consultants completed a comprehensive geotechnical study for recommended wall angles and regulatory approval. There are no native title issues, mining areas have been heritage cleared for mining activities. Flora & Fauna and hydrogeological studies have been completed. The clearing permit CPS 8176/1 was granted for the development of Ramone. Approval of The Project Management Plan, PM-508-333694, in relation to the development of the Ramone Project was granted in February 2019.
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.	All processing infrastructure is in place at Jundee. The Ramone and Vause Projects are satellite pit operations and extension of the Jundee Gold Mine. The project areas are connected to Jundee by an established haul road constructed for road train haulage. Minor infrastructure will be required at the project areas and has been allowed for in the cost model.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mining costs are based on mining contract rates supplied by a reputable WA based mining contractor. Contract rates are for open pit mining services as well as drill and blast operations and associated services required to complete the project. Mining costs were built up from first principals on mine designs supplied by NSR. Capital costs were not included in the optimised parameter inputs. Capital costs based on quotes supplied and have been included in the economic cost model.
	The methodology used to estimate operating costs.	A capital and operating cost model has been developed in Excel and has been used to complete a life of mine cash flow estimate. Mining costs supplied by a reputable WA based mining contractor who built up costs from first principles from mine designs supplied by NSR.
	Allowances made for the content of deleterious elements.	Nil allowance, none expected based on metallurgical test work.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Single commodity pricing for gold only, using a long-term gold price of A$1,500 per ounce as per NST corporate guidance
	The source of exchange rates used in the study.	NST report in Australian dollars. Therefore, no exchange rate is used or required.

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Criteria	JORC Code explanation	Commentary
	Derivation of transportation charges.	Transportation costs for ore haulage from satellite pits to Jundee have been based on current NSR contractor quotes. Transportation costs also include an allowance for adequate haul road maintenance and dust suppression.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Processing costs are based on historic and actual Jundee plant processing costs. This cost component has been used to determine the cut-off grades as well as applied to the operating cash flow estimate.
	The allowances made for royalties payable, both Government and private.	WA State Government royalty of 2.5%.
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.	All financial analysis and gold price have been expressed in Australian dollars and no direct exchange rates have been applied. Revenue factors within the whittle optimisation process were used. A revenue factor shell was selected and used to complete a detailed pit design. A gold price of A$1,500 per ounce has been used in the optimisation of the Ramone Project. 2.5% WA State Government royalty.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	Gold doré from the mine is to be sold at the Perth mint.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not Applicable.
	Price and volume forecasts and the basis for these forecasts.	Not Applicable.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not Applicable.
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.	The Ore Reserve estimate is based on a financial model that is reflective of current operational costs and contract conditions. All inputs from mining operations, processing, transportation and sustaining capital as well as contingencies have been scheduled and evaluated to generate a full life of mine cost model.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities were conducted on metal price fluctuations of A$1,500 ± $300 per ounce. Due to the current short life, the project is not seen as highly sensitive to cost inputs.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders including traditional landowner claimants.
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	None
	Any identified material naturally occurring risks.	None
	The status of material legal agreements and marketing arrangements.	None
	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.	No issues.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	The classification of Open Pit Ore Reserves has been carried out in accordance with the JORC code 2012.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results appropriately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	No Measured Mineral Resource contributes to Probable Ore Reserves.

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Criteria	JORC Code explanation	Commentary
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Reserve has been internally reviewed in line with Northern Star Resources governance standard for Reserves and Resources. There have been no external reviews of this Ore Reserve estimate.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the Reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the Ramone Ore Reserve Estimate is high based on current mine and reconciliation performance. The design, schedule and financial model on which the Vause Ore Reserve is based has been completed to a "pre-feasibility study" standard, with a corresponding level of confidence.
	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.	All modifying factors have been applied to design mining shapes on a global scale.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Not applicable.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Not applicable.

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JORC Code, 2012 Edition – Table 1 Report
Jundee (Underground) – 30 June 2019
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.	This deposit is sampled by diamond drilling (DD) and Reverse Circulation (RC) drilling completed by previous operators. DD - Sampled sections are generally NQ2 or BQ. Core sample intervals are defined by the geologist to honour geological boundaries ranging from 0.3 to 1.2m in length. RC - Rig-mounted static cone splitter used, with sample falling though a riffle splitter or inverted cone splitter, splitting the sample in 87.5/12.5 ratio. 12.5% Off-split retained. 87.5% split sampled using 'pipe' or 'spear' sampling tool. Generally sampled as 4m composites. 1m composites (12% split) was sent for further analysis if any 4m composite values returned a gold value > 0.1ppm or intervals containing alteration/mineralisation failed to return a significant 4m composite assay result. RC and DD sampling by previous operators are to industry standard at that time often using 1m samples after initial 4m composites. It is unknown what grade threshold triggers the 1m re-samples. The greater majority (>90%) of samples used for Reserve and Resource estimates are DD.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Core is aligned and measured by tape, comparing back to downhole core blocks consistent with industry practice. RC and surface core drilling completed by previous operators to industry standard at that time.
	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 30g 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.	Diamond drilling completed to industry standard using varying sample lengths (0.3 to 1.2m) based on geological intervals, which are then crushed and pulverised to produce a ~200g pulp sub sample to use in the assay process. Diamond core samples are fire assayed (30g charge). Visible gold is occasionally encountered in core. RC sampling to industry standard at the time of drilling.
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 – Reverse circulation drilling was carried out using a face sampling hammer and a 130mm diameter bit Previous operators surface diamond drilling carried out by using both HQ2 or HQ3 or PQ2 (triple tube) and NQ2 (standard tube) techniques. Sampled sections are generally NQ2. Core is routinely orientated using the ORI-shot device.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	RC – Approximate recoveries are sometimes recorded as percentage ranges based on a visual and weight estimate of the sample. DD – Recoveries are recorded as a percentage calculated from measured core verses drilled intervals.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	Diamond drilling practice results in high core recovery due to the competent nature of the ground. RC and diamond drilling by previous operators are to industry standard at that time.
	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.	There is no known relationship between sample recovery and grade, diamond drill sample recovery is very high.
Logging	Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.	Core and chip samples have been logged by qualified Geologist to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies. Percussion holes logging were carried out on a metre by metre basis and at the time of drilling. Surface core and RC logging completed by previous operators assumed to be to industry standard.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging is Qualitative and Quantitative, and all core is photographed wet (some older core is pre-digital, photos not all reviewed). Visual estimates of sulphide, quartz and alteration as percentages.
	The total length and percentage of the relevant intersections logged.	100% of the drill core is logged. 100% of RC drilling is logged.
Sub-sampling techniques and	If core, whether cut or sawn and whether quarter, half or all core taken.	DD - Resource Definition Drilling uses NQ2: Core is half cut with an Almonté diamond core saw. Sample intervals are defined by a qualified geologist to honour geological boundaries. The left half is archived

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Criteria	JORC Code explanation	Commentary
sample preparation		Grade Control Drilling uses BQ: Whole core sampling is undertaken. Sample intervals are defined by a qualified geologist to honour geological boundaries. All mineralised zones are sampled, plus associated visibly barren material in contact with mineralised zones. Core is sampled on the width of the geological/mineralised structure in recognized ore zones. The minimum sample length is 0.3m while the maximum is 1.2m. Total weight of each sample generally does not exceed 5kg. For pre-Northern Star Resources (NSR) and current operator's samples, best practice is assumed.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC – Cyclone mounted riffle splitter or inverted cone splitter. Pre NSR RC sub sampling assumed to be at industry standard at that time.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Following drying at 100°C to constant mass, all samples below approximately 4kg are totally pulverised in LM5's to nominally 90% passing a 75µm screen. The very few samples generated above 4kg are crushed to <6mm and riffle split first prior to pulverisation. In 2012, Francois-Bongarcon (Agoratek International) conducted a heterogeneity studies, audit of site laboratory, and audit of plant samplers. Confirmed that the sampling protocol currently in use are appropriate to the mineralisation encountered and should provide representative results. For RC samples, all drying at 100°C to constant mass, all samples below approximately 4kg are totally pulverised in LM5's to nominally 85% passing a 75µm screen. The very few samples generated above 4kg are crushed to <6mm and riffle split first prior to pulverisation. For RC samples, no formal heterogeneity study has been carried out or monographed. An informal analysis suggests that the sampling protocol currently in use are appropriate to the mineralisation encountered and should provide representative results. For pre- NSR samples, best practice at the time is assumed.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Repeat analysis of pulp samples (for all sample types – diamond, RC, rock and soil) occurs at an incidence of 1 in 20 samples. RC drilling by previous operators to industry standard at that time.
	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.	Field duplicates, i.e. other half of cut core, have not been routinely assayed. RC drilling by previous operators assumed to be to industry standard at that time.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Sample sizes are considered appropriate.
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.	For all drill core samples, gold concentration is determined by fire assay using the lead collection technique with a 30-gram sample charge weight. An AAS or MP_AES (Microwave Plasma-Atomic Emission Spectrometry) finish is used to be considered as total gold. RC drilling by previous operators to industry standard at the time and not reviewed for this Resource.
	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.	No geophysical tools were used to determine any element concentrations
	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.	The QAQC protocols used include the following for all drill samples: ▪ The field QAQC protocols used include the following for all drill samples: - Commercially prepared certified reference materials (CRM) are inserted at an incidence of 1 in 30 samples. The CRM used is not identifiable to the laboratory, - QAQC data is assessed on import to the database and reported monthly, quarterly and yearly. ▪ The laboratory QAQC protocols used include the following for all drill samples: - Repeat analysis of pulp samples occurs at an incidence of 1 in 20 samples, - Screen tests (percentage of pulverised sample passing a 75µm mesh) are undertaken on 1 in 50 samples, - The laboratories' own standards are loaded into the database, - The laboratory reports its own QAQC data on a monthly basis. - In addition to the above, ~ 3% of samples are sent to a check laboratory. Samples for check -assay are selected automatically from holes, based on the following criteria: grade above 1gpt or logged as a mineralised zone or is followed by feldspar flush or blank.

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Criteria	JORC Code explanation	Commentary
		▪ Failed standards are generally followed up by re-assaying a second 30g pulp sample of samples between the failed standard and the next sequenced standard by the same method at the primary laboratory. Re-assays are dependent on grade above 0.1ppm Both the accuracy component (CRM's and third-party checks) and the precision component (duplicates and repeats) of the QAQC protocols are thought to demonstrate acceptable levels of accuracy and precision. QAQC protocols for Surface RC and diamond drilling by some previous operators is assumed to be industry standard.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	Significant intersections not verified.
	The use of twinned holes.	There is no purpose drilled twinned holes.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Primary Data imported into SQL database using semi-automated or automated data entry. Hard copies of NSR and previous operators, core assays and surveys are stored at site. Visual checks are part of daily use of the data in Vulcan. Data from previous operators thoroughly vetted and imported to SQL database.
	Discuss any adjustment to assay data.	The first gold assay is almost always utilised for any Resource estimation. Exceptions occur when evidence from re-assaying and/or check-assaying dictates. A systematic procedure utilizing several re-assays and/or check assays is in place to determine when the final assay is changed from the first gold assay. Some minor adjustments have been made to overlapping data.
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.	Collar positions are recorded using conventional survey methods based on Leica TS15 3" total stations and Trimble R10 GNSS instruments. The location of each station is referenced to state-wide network of Standard Survey Marks (SSM) established and coordinated by the Department of Land Administration (WA Government). Where regional drill hole positions are distant from the SSM network the worldwide Global Navigational Satellite System (GNSS) network is used. Positional checks are carried out using a combination of existing known positions (usually based on prominent landmarks) and grid referenced information such as ortholinear rectified photogrammetry based on the Australian Map Grid 1994 (MGA94_51). Collar coordinates are recorded in MGA94 or Local Jundee Grid (JUNL2) dependant on the location and orientation of orebodies. Cross checks were made on the survey control points and data in June 2005. Collar information is stored in both local coordinates and MGA94 coordinate in the drilling database. In-mine drill-hole collars are normally accurate to 10 cm. Multi shot cameras and gyro units were used for down-hole survey. Previous drilling has been set-out and picked up in both national and local grids using a combination of GPS and Survey instruments and are assumed to be to industry standards.
	Specification of the grid system used.	Collar coordinates are recorded in AMG84 Zone 51 (AMG GN) and Local Jundee Grid (JUNL2) dependant on the location and orientation of orebodies. The difference between Jundee mine grid (GN) and magnetic north (MN) as at 30 July 2018 is 39º 00' 07" and the difference between magnetic north (MN) and true north (TN) is 1º 02' 00". The difference between true north (TN) and MGA94 Zone 51 (AMG GN) is 1º 06' 26". The difference between true north and GDA is zero.
	Quality and adequacy of topographic control.	Topographic control is from Digital Elevation Contours (DEM) 2010, 1m contour data and site surveyed pit pickups.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	All Reserves are based on a maximum drill hole spacing of 40m x 40m, or 60m x60m in the case of Armada Reserves. All Resources are based on a maximum of 80m x 80m.
	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.	Reserves are generally based on 20m x 20m drilling up to a maximum of 40m x 40m, or a maximum of 60m x60m in the case of the Armada Reserve. Resources are generally based on 40m x 40m drilling up to a maximum of 80m x 80m. The data spacing and distribution is sufficient to establish geological and/or grade continuity appropriate for the Mineral Resource and classifications to be applied.
	Whether sample compositing has been applied.	Core is sampled to geology; sample compositing is not applied until the estimation stage. RC samples initially taken as 4m composites to be replaced by 1 m samples if any 4m composite values returned a gold value > 0.1ppm or intervals containing alteration/mineralisation failed to return a significant 4m composite assay result. No RC samples greater than 1m were used in estimation.
Orientation of data in relation to	Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	The orientation of sampling is generally perpendicular to the main mineralisation trends. The orientation achieves unbiased sampling of all possible mineralisation and the extent to which this is known.

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Criteria	JORC Code explanation	Commentary
geological structure	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 drill orientation to mineralised structures biases the number of samples per drill hole. It is not thought to make a material difference in the Resource estimation. As the opportunity arises, better angled holes are infill drilled.
Sample security	The measures taken to ensure sample security.	All samples are selected, cut and bagged in tied numbered calico bags, grouped in larger tied plastic bags, and placed in large sample cages with a sample submission sheet. The cages are either sent to the site laboratory or are transported via freight truck to Perth, with consignment note and receipted by external and independent laboratory. All sample submissions are documented, and all assays are returned via email. Sample pulp splits from the site lab are stored at the Jundee mine site and those from the Newburn Lab in Perth are stored at the Newburn Lab. Pre NSR operator sample security assumed to be similar and adequate.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	In 2006, Maxwell conducted an audit of all Jundee data. In 2012, Francois-Bongarcon (Agoratek International) conducted a heterogeneity studies, audit of site laboratory, and audit of plant samplers. Both audits found the sampling techniques and data to be adequate. In 2019 ZAREMUS PTY LTD carried out Independent Quality and Technical audits of all contributing SGS laboratories. All recent NSR sample data has been extensively QAQC reviewed both internally and externally. Pre NSR data audits found to be minimal regarding QAQC though in line with industry standards of the time.

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 Jundee project consists of tenements comprising 7 Exploration Licenses, 62 mining lease, 1 general purpose lease and 1 Prospecting Licence, covering a total area of approximately 86,341 Ha. All are registered in the name of Northern Star Resources Limited. The project also includes 23 miscellaneous licences, 3 groundwater licenses, a pipeline license, and the Jundee Pastoral Lease. These cover the bore fields, roads, airstrip, and gas pipeline. There are numerous access agreements in place including access rights over part of Mark Creasy's mining lease 53/193 which lies contiguous to and beneath the general-purpose lease on which the Jundee gold mine processing plant is located. There are no heritage issues with the current operation. The majority of the Jundee leases are granted Mining Leases prior to 1994 (pre-Mabo) and as such Native Title negotiations are not required. During 2004, two agreements where struck between Ngaanyatjarra Council (now Central Desert native Title Services (CDNTS)) and NYO, these agreements being the Wiluna Land Access Agreement 2004 and the Wiluna Claim Heritage Agreement 2004.
	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 leases and licences to operate are granted and in the order for between 3 and 20 years.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Data relevant to this Resource was predominantly NSR (Northern Star Resources), who have operated the mine since July 1, 2014. The Jundee/Nimary Deposits were discovered in the late 1980's/early 1990's after LAG and soil sampling by Mark Creasy (Jundee) and Hunter Resources (Nimary) identified large surface gold anomalies. The deposits were drilled out over the following years by Eagle Mining (which took over Hunter Resources), and Great Central Mines (which formed a joint venture with Creasy and later purchased his share). Open pit operations commenced in mid-1995, with the first gold poured in December 1995. Great Central Mines assumed full control of the field with its successful takeover of Eagle Mining in mid-1997. Great Central Mines was later taken over by Normandy in mid-2000, which in turn was taken over by Newmont in early-2002. All previous work is accepted and assumed to industry standard at that time.
Geology	Deposit type, geological setting and style of mineralisation.	Jundee is an Archean lode-gold mineralised deposit that is part of the Northern Yandal Greenstone belt. Gold mineralisation is controlled by a brittle fracture-system, is commonly fracture-centred, and is predominantly hosted in dolerite and basalt. Mineralisation can be disseminated or vein style host.
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole	Too many holes to practically summarise all drill information used. (See diagram).

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Criteria	JORC Code explanation	Commentary
	○ down hole length and interception depth ○ hole length.	
	If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.	Exclusion of the drill information will not detract from the understanding of the report. Holes are close spaced and tightly constrained to an active mine area.
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.	Reported exploration results are uncut.
	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.	Short intervals are length weighted to create the final intersections.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalents are reported.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Due to complex mineralisation geometry and varying intercept angles the true thickness is manually estimated on a hole by hole basis.
	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').	Downhole length in addition to estimated true width is shown in the report tables if intersection structure is known. The drill hole intercept true thickness is notes as "Unknown" otherwise.
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.	Plan view and long section view of Jundee showing drill collars is attached.
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.	Only selected high grade intercepts are reported for the period of Feb 2018 (previous ASX exploration update) and July 2018. This in not representative, but indicative of Jundee high grade potential
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.	No other meaningful data to report.
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).	Further extensional and definition drilling is planned for FY2019 from both underground and surface positions.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Representative diagrams are attached with this report.

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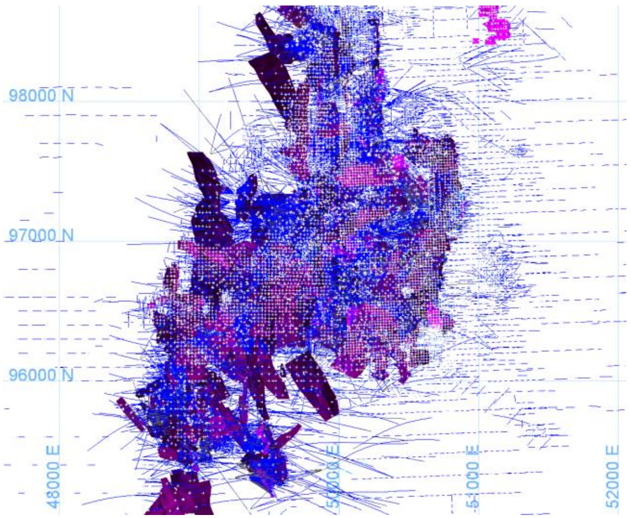
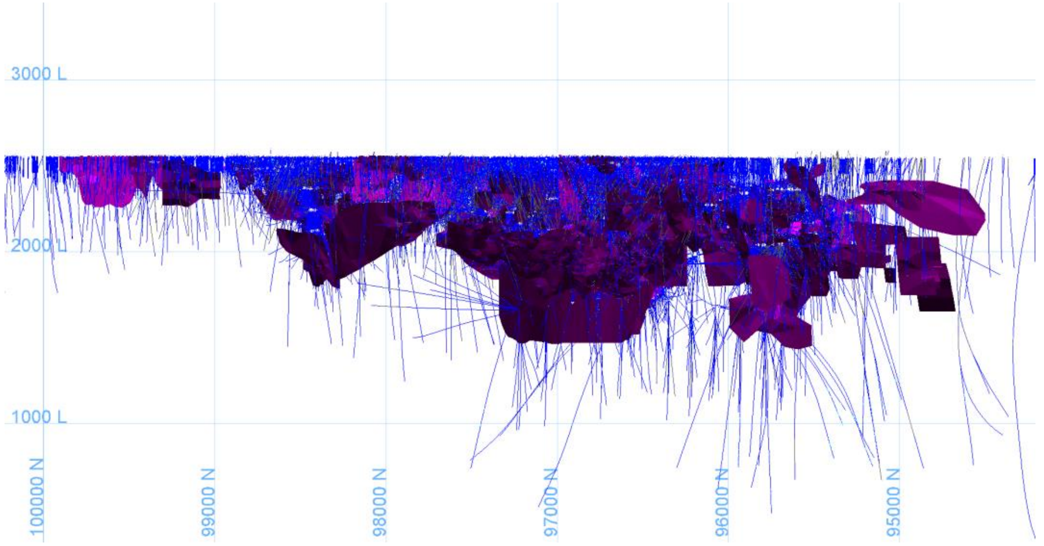
JUNDEE UNDERGROUND - REPRESENTATIVE PLAN & LONG SECTION	
Plan View - Jundee deposits with drill hole traces.  	Long Section View - Jundee deposits with drill hole traces. Wireframes denote major mineralised structures. 

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	NSR (Northern star Resources) sampling and logging data is digitally entered into a tablet then transferred to an SQL based database. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly to the database from lab, logging and survey derived files. Pre NSR data considered correct.
	Data validation procedures used.	Pre NSR data has been partially validated by internal database administrators.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The Competent Persons for this Resource report has visited site including the Underground workings. The resource models and background data has been produced by personnel with extensive onsite experience.
	If no site visits have been undertaken indicate why this is the case.	Site visits have been undertaken.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the deposit was carried out using a systematic approach to ensure continuity of the geology and estimated mineral Resource using Vulcan software. The confidence in the geological interpretation is relatively high, though a certain degree of uncertainly always remains due to the structurally complex and nuggetty nature of the orebody on a local scale. The confidence is supported by all the information and ~25 years of open pit and underground operations.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drilling, oxidation surfaces, and underground style high grade ore zone interpretations.

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Criteria	JORC Code explanation	Commentary
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations have been completed or put forward.
	The use of geology in guiding and controlling Mineral Resource estimation.	Drill core logging, pit mapping, and underground mapping used to create 3D constrained wireframes.
	The factors affecting continuity both of grade and geology.	Continuity of the grade varies significantly, though lodes with the greatest continuity are generally sub-parallel to the dolerite and basalt packages in which they are hosted. Splays or link lodes coming off this main trend tend to have a shorter continuity.
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.	Mineralised zones are narrow, with true width ranging from 0.3 to 1m, but can be up to 5m. They are extensive along strike and down dip, up to 1000m and 500m, respectively, but are often highly discontinuous, and generally have a tabular geometry. Depth = surface to ~1710mRl (~845m below surface).
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.	Domains are set by grouping lodes as dictated by their structural setting, geological mineralisation and statistical characteristics. The raw data is subdivided into domains based on geological controls and further analysed for correlation and similarity using statistics. The purpose of this analysis is to determine further domaining of the data for variography purposes (by combining groups of lodes). Seam compositing (from hanging wall to footwall) of drill-hole samples is almost exclusively used. A very small proportion of UG lodes, which exhibit a wider disseminated style of mineralisation, use a nominal 1 metre downhole composite. Detailed exploratory data analysis is carried out on each deposit, using Snowden Supervisor software. Most of the Resource is estimated using ordinary kriging (OK). A minor proportion of the Resource is estimated using inverse distance squared (ID2) and multiple Indicator Kriging (MIK). The estimation type used is dictated by the dataset size of the domain. Vulcan software was used for data compilation, domain wireframing, calculating and coding composite values, estimating and reporting. Maximum distance of extrapolation from data points was statistically determined and varies by domain. Block model volumes were compared to wireframe volumes to validate sub-blocking. Where OK or ID2 estimates were used, treatment of extreme high grades was dealt with by using a cap grade strategy.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Reconciled historical production from underground operations is comparable with new estimate.
	The assumptions made regarding recovery of by-products.	No assumptions are made, and only gold is defined for estimation.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Most underground models use a seam modelling methodology where the parent block size is 2.5m in strike, 1m in RL, and a variable width constrained by the width of the vein in the across strike direction. Sub-block sizes are 2.5m in strike, 1m in RL, and 0.5m across strike direction. The use of seam models is more amenable for narrow vein mineralisation and gives greater flexibility in manipulating models for mining dilution.
	Any assumptions behind modelling of selective mining units.	A 2.2m minimum mining width for underground environment is assumed.
	Any assumptions about correlation between variables.	There is no correlation between variables.
	Description of how the geological interpretation was used to control the Resource estimates.	“Mineralised” wireframes are created within the geological shapes based on drill core logs, mapping and grade. Low grades can form part of an ore wireframe. Estimations are constrained by the interpretations.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied in the Estimation stage and determined by a range of statistical techniques including: • Disintegration analysis of Histogram, Log-probability and Mean- CV plots • Contained metal plots: assessment of contribution of the highest values on the quantity of metal in an estimate • Outlier analysis; removal of outliers and analysis of impact on the CV of domain • Interrogation of Disintegration points of seam composites

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Criteria	JORC Code explanation	Commentary
		A range of top cuts were selected for each domain utilising the above strategies and an appropriate top cut chosen after further sensitivity analysis against Nearest neighbour estimations to assess sensitivity of selected top cut grades and associated risk. Metal estimated in the Resource models are finally reconciled with production models of like areas to determine the appropriateness of the high-grade treatment on the assays. No top cutting or capping of high grades is done at the raw sample or compositing stage. For OK and ID2, treatment of the high-grade assays occurs at the estimation stage. In MIK estimation this occurs in the form of the grade assigned to the highest indicator bin. Top cuts vary by domain and range from 20gpt – 1,100gpt.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	The Mineral Resource estimate was validated using processes that are based on a combination of visual, graphical and reconciliation style validations summarised as: - Visual validation of the lode and lithology coding of both the composite data and the block model. - Comparison of lode wireframe volumes to block model volumes - Visual validation of Mineral Resource estimate against composite data in plan, section, and in 3D. - Sensitivity to top-cut values: a variety of top-cuts are estimated and compared to themselves and to the un-cut nearest neighbour estimate at a variety of cut-offs. - Kriging efficiency and slope of regression interrogated for each material domain. - Comparison of nearest neighbour, inverse distance squared, and ordinary kriged estimates to the final estimate (generally OK or MIK). These comparisons are conducted through visual validation and trend analysis along Northing, Easting, and RL slices. - Comparison with previous Mineral Resource estimates. Global, level and lode tonnages and grades, at various elemental cut-offs were compared, and, given the changes in support data, were consistent; - Comparison of Mineral Resource estimate versus grade control models. Local underground GC models are produced using, in addition to the diamond drill holes used in the Mineral Resource estimate, face chip and drive mapping data. These comparisons are done on a level basis at various cut-offs. - Statistical comparison of composites versus all estimates in block model: trend analysis plots for each domain are produced by Northing / Easting / RL. The Mineral Resource estimate generally shows a reasonably reflection of the composites where there are high numbers of composites used in the estimate. When the numbers of samples reduce the accuracy of the estimation suffers and a more significant deviation is noted between the Mineral Resource estimate and associated composite data. These deviations are considered when assigning a Resource classification.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis. Moisture content within the ore is expected to be low.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	Underground Resources have been reported through MSO generation using a minimum mining width of 2.2m coupled with cut-off grades calculated on a variable cost basis and an Au $1,750 gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	Underground Resources are reported using a minimum mining width of 2.2m inclusive of 0.5m internal dilution on both the Hangingwall and footwall.
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.	Assumed that material will be trucked and processed in the Jundee Mill. Recovery factors vary for the various mining areas and are based on lab testing and on-going operational experience. No Metallurgical assumptions have been built or applied to the Resource model.
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 green fields project, may not always be well advanced, the status of early consideration of these potential environmental impacts	Jundee currently possesses all necessary government permits, licenses and statutory approvals in order to be compliant with all legal and regulatory requirements.

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Criteria	JORC Code explanation	Commentary
	should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	
Bulk density	Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.	Bulk density values used were based on an updated study of the average lithological densities across the mine site completed in 2013. This study consisted of a detailed statistical analysis of 72,634 measurements that have been recorded from all underground deposits. These values are also in agreement with over 10 years of production data.
	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.	Bulk density measurements are taken daily using the water displacement technique. One bulk density measurement is taken for each lithology in every hole every day. An attempt is made to collect a bulk density measurement from every mineralised zone and each lithology represented in drill hole core. A total of 85,000 bulk density measurements have been taken.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Individual bulk densities are applied in accordance with specific lithologies, mineralisation, and weathering states.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Measured Resources are defined if Geological confidence is high enough from grade control models based on geological mapping and surveyed ore outlines in development drives, diamond drill holes and face samples which are imported into Vulcan and modelled in 3D. Indicated Resources are defined by drilling which is predominantly 20m x 20m to 40m x 40m but may range up to 60m x 60m maximum. Lodes classified as Indicated are supported by a minimum of 5 face chip or Diamond drill holes or mapping. Inferred Resources are defined on a nominal 40m x 40m drilling pattern and may range up to 80m x 80m. Resources based on less than 40m x 40m spaced drilling, but which have a low level of confidence in the geological interpretation may also be classified as inferred.
	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, quality, quantity and distribution of the data).	Input and geological data is assumed accurate backed up by previous successful mining history at the site on this mineralisation.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	This mineral Resource estimate is considered representative with comments noted in the discussion below.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The Mineral Resource estimates, methodology and systems have been subject to one external review through NSR and four internal audits by previous operators and senior technical personnel over the last 10 years.
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.	This mineral Resource estimate is considered as robust and representative of the Jundee mineralisation with local estimates considered variable in nature. The application of geostatistical methods has supported to increase the confidence of the model and quantify the relative accuracy of the Resource on a global scale and against actual production reconciliation.
	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.	This Resource report relates to the Jundee deposit and is likely to have local variability. The global assessment is a better reflection of the average tonnes and grade estimate, further supported and reconciled against actual mine production.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Comparison with previous Mineral Resource estimates and production data was undertaken. Global, level and lode tonnages and grades, at various elemental cut-offs were compared, and, given the changes in support data, were consistent.

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Reported ore reserve based on Resource and grade control models.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	Mineral Resources are reported inclusive of the Ore Reserves

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Criteria	JORC Code explanation	Commentary
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Numerous and frequent site visits have been undertaken by the competent person and actual design and evaluation work conducted at Jundee site. Familiarity with the mine site and historical performance was considered in providing the Reserve Estimate.
	If no site visits have been undertaken indicate why this is the case.	Site visits were undertaken.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	Detailed mine design and costing based upon ongoing mine performance. The 2019 Reserves contains material associated with paste fill activities to enable access into old mining area. The current study level is consummate with a pre-feasibility study.
	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.	This is a current and operating mine. As such, for most of the reserve material, current operating design parameters and costs have been used in the generation of these reserves. The reserves associated with paste filling are at a pre-feasibility level, with a practical mine plan and economic assessment underpinning their reserve status.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	A cut-off grade is generated, and all potential reserve material is evaluated, based on the direct costs of all tasks involved and corporate gold price guidance. Historic actual costs are relied upon heavily in determining cut-off grades and costs.
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).	Stope shapes are created manually on all Resource material, using a minimum stope mining width of 2.2m. Access designs are created to allow detailed economic evaluation. Measured Resource material is converted to Proved and Probable Reserve, and Indicated Resource is converted to Probable Reserve.
	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.	A top down narrow vein long hole open stope extraction is currently the main mining method employed at Jundee. No backfilling of stopes currently occurs. A secondary mining method currently being implemented at Jundee is narrow vein air leg stoping. This method aids in the extraction of flat lying lodes which require uneconomic dilution for effective long hole stoping extraction. Deemed appropriate due to ongoing successful implementation of design assumptions in the current mining operation. Some areas including remnant areas are assessed using paste fill options, have utilised the site void model, and taken extraction methodologies from existing operations utilising paste fill. Detailed tailing characterisation studies have been conducted to allow paste plant selection, and application of appropriate capital and operating costs.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	2.2m minimum mining width (stopes) and 85% stope mining recovery to account for internal pillars, in line with historical performance.
	The major assumptions made, and Mineral Resource model used for pit and stope optimisation (if appropriate).	2.2m minimum mining width for stopes. Detailed designs available for each stope. Historical mining costs applied for economic evaluation.
	The mining dilution factors used.	A 7% tonne dilution factor was used for development, whilst 22.5% was applied for stopes. These values are based on historical mine reconciliation records. For the paste fill assessment areas, a variable dilution factor was applied between 0-15% based on the ore blocks location in comparison to the fill surface.
	The mining recovery factors used.	An 85% factor is applied where stope pillars have not been incorporated into the design and 95% for detailed design where pillars have been considered. For the paste filled areas, a variable recovery of between 70%-100% was applied based on the ore blocks location in comparison to the fill (next to, encompassed within, or located on top of).
	Any minimum mining widths used.	The minimum mining width for stopes is 2.2m.
	The way Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Inferred material is included within the mine plan, however material is only classified as Reserve when the Measured and Indicated material can cover all costs associated with the mining of that material. Designed stopes with greater than 50% inferred blocks are excluded from the reported reserve.
	The infrastructure requirements of the selected mining methods.	Infrastructure in place, currently an operating mine. This includes underground capital development, accommodation village, workshop, office, water bores, ROM pad, processing facility, and communication networks. Additional infrastructure would be required for the paste filled areas, comprising a paste plant, surface and underground reticulation and this has been designed and costed to Pre-feasibility level.
	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	Material will be trucked and processed in the existing Jundee Mill which is a standard CIP plant with gravity circuit, operating since 1995.

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Criteria	JORC Code explanation	Commentary
Metallurgical factors or assumptions	Whether the metallurgical process is well-tested technology or novel in nature.	Well tested technology.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Recovery factors vary for the various mining areas and are based on laboratory testing and historical and/or current operational experience.
	Any assumptions or allowances made for deleterious elements.	No allowances made and considered immaterial to the mineralisation reported.
	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.	All mineralisation systems have significant bulk drill core test work undertaken prior to mining and current resource/reserves have a history of operational experience
	For minerals that are defined by a specification, has the ore Reserve estimation been based on the appropriate mineralogy to meet the specifications?	No specification defined minerals are reported.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Jundee is an ongoing operation, currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are either granted or in the process of being granted.
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.	As the Jundee mine has been operating for several years, all required surface and underground access infrastructure is already in place to facilitate mining and processing. A paste fill plant and associated reticulation would be required for the paste fill ore zones.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	All capital costs have been estimated based upon projected requirements and experience of costs incurred through similar activities in the past.
	The methodology used to estimate operating costs.	The operating cost estimates are based upon historical costs incurred. Paste fill costs were determined through benchmarking costs at other paste fill sites, in conjunction with consultant recommended rates.
	Allowances made for the content of deleterious elements.	No allowance made - none expected
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Revenue was based on a gold price AUD $1500/oz.
	The source of exchange rates used in the study.	Corporate guidance.
	Derivation of transportation charges.	Mining and haulage costs are based on historical costs incurred in the previous cost periods.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Processing costs have been set using the forecast costs in line with the recent increase in processing throughput at Jundee, coupled with the historical operating costs data.
	The allowances made for royalties payable, both Government and private.	WA State Govt royalty of 2.5%.
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.	Revenue was based on a gold price of AUD $1,500/oz.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	It is assumed all gold is sold directly to market at the Corporate gold price guidance of AUD $1,500/oz.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not Applicable.
	Price and volume forecasts and the basis for these forecasts.	Corporate Guidance.

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Criteria	JORC Code explanation	Commentary
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not Applicable.
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.	All costs assumptions are made based on historical performance from the plant and quotes from experienced mining contractor. The economic forecast is representative of the current market condition. Paste fill costs were sourced from study recommendations.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Jundee Reserves are relatively insensitive to gold price fluctuations due to the higher-grade nature of the mineralised systems.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders including traditional landowner claimants.
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.	None.
	The status of material legal agreements and marketing arrangements.	None.
	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.	Jundee is a currently operating mine site with all government and third-party approvals in place for the stated Reserves.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	Reserve classifications are derived from the underlying Resource model, with Measure Resource converting to Proved and / or Probable Reserve, and Indicated Resource converting to Probable Reserve where applicable and economically justified.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results appropriately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Negligible.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	There have been no external reviews of this Ore Reserve estimate. The Ore Reserve has been prepared and peer reviewed internally within Northern Star Resources.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the Reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the Reserve is high based on current mine and reconciliation performance.
	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.	The Reserves are best reflected as Global estimates.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	As an operating mine confidence in modifying factors is high.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Reconciliation results from past mining at Jundee has been considered and factored into the Reserve assumptions where appropriate.

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JORC Code, 2012 Edition – Table 1 Report

Kanowna Surface (Six Mile Deposit) – 30 June 2019

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.	Samples were obtained using reverse circulation (RC) drilling and HQ diamond drilling (DD).
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	For 2014, RC samples were split using a rig-mounted cone splitter on 1m intervals to obtain a sample for assay. 4m Composite spear samples were collected for the entirety each hole. The 1m split samples were then taken for any composite sample that returned an assay grade >0.1gpt. The 1m splits were also taken for composite samples either side of the anomalous composite. For 2015, RC drilling the 1m cone-split sample was submitted for assay for all intervals. For DD drilling, half core samples were submitted for assay. Holes were sampled at a nominal 1m sample interval, although this was varied to match geological criteria. The minimum sample size used is 0.3m.
	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 30g 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.	Samples were taken to Genalysis Kalgoorlie for preparation by drying, crushing to <3mm, and pulverising the entire sample to <75µm. 300g pulp splits were then dispatched to Genalysis Perth for fire assay 50gm charge and AAS finish analysis. Anticipated high grade zones were analysed by 1kg Leachwell or triplicate fire assay analysis.
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 drilling is completed using a 5.75" drill bit, downsized to 5.25" at depth. Historically, RAB, Aircore, RC and DD holes have been drilled in the area. Historic DD in the area has been conducted in NQ2 diameter (50.5mm). Recent DD core was drilled in HQ diameter and oriented using the Reflex ACT Core orientation system.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	Core is measured and any determined loss recorded in the database. RC samples are routinely weighed to assess recovery.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	RC drilling contractors adjust their drilling approach to specific conditions to maximise sample recovery. Moisture content and sample recovery is recorded for each RC sample. No recovery issues were identified during 2014-2015 RC drilling. For diamond drilling the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.
	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 bias has been noted.
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.	RC chips were sieved, washed and logged. RC sample chips are logged in 1m intervals for the entire length of each hole. Regolith, lithology, alteration, veining and mineralisation are all logged separately for each metre. Where possible, quantitative measures are used such as percentage values for individual minerals or vein types. All DD holes were logged to end of hole for regolith, lithology, alteration, veining and mineralisation. Where possible, quantitative measures are used such as percentage values for individual minerals or vein types. Quantitative structural measurements were also taken.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All logging is quantitative where possible and qualitative elsewhere. A photograph is taken of every core tray.
	The total length and percentage of the relevant intersections logged.	RC sample chips are logged in 1m intervals for the entire length of each hole. Regolith, lithology, alteration, veining and mineralisation are all recorded.
Sub-sampling techniques and	If core, whether cut or sawn and whether quarter, half or all core taken.	For DD highly oxidized saprolite, full core samples were submitted for assay as the sample deteriorates significantly upon cutting. Once competent core is reached, sampling switches to half core sampling.

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Criteria	JORC Code explanation	Commentary
sample preparation	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	All RC samples are split using a rig-mounted cone splitter to collect a 1m sample 3-4kg in size. These samples were submitted to the lab from any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside of mineralised zones, spear samples were taken over a 4m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	The sample preparation is considered appropriate.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Field duplicates were taken for RC samples at a rate of 1 in 20. For the composite samples the spearing process was repeated from the opposite side of the green bag. For 1m split samples, the full rig sample was passed through a riffle splitter to provide a duplicate. For 2015 RC drilling, the duplicate was taken from the cone splitter. No duplicate sampling of core (sending the remaining half core sample) has been conducted as the geological value of the core is considered higher than the need to duplicate sample.
	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.	Sample preparation was conducted at Genalysis Kalgoorlie, commencing with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Core samples are jaw crushed to a nominal -6mm particle size. If the sample is greater than 3kg, a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3kg (typically 1.5kg) at a nominal <3mm particle size. The entire crushed sample (if less than 3kg) or sub-sample is then pulverised to 90% passing 75µm, using a Labtechnics LM5 bowl pulveriser. For fire assay, 300g pulp subsample is taken with an aluminium scoop and stored in labelled pulp packets. For Leachwell, 1kg of pulped sample is taken.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Grind checks are performed at both the crushing stage(3mm) and pulverising stage (75µm), requiring 90% of material to pass through the relevant size.
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.	A 50g Fire assay charge is used with a lead flux, dissolved in the furnace. The prill is totally digested by HCl and HNO3 acids before Atomic absorption spectroscopy. Repeatability of sub-samples was outside acceptable limits with 2014 DD drilling indicated the presence of coarse gold within cm scale stockwork veining as the likely cause for the poor repeatability. In order to improve assay repeatability test work analysing 1kg samples using the Leachwell technique with AAS finish, was completed on coarse bulk reject sample from 2014 RC and DD drilling. Leachwell is not to "total" technique but is considered to approximate the cyanide extractable gold that would be recovered in routine metallurgical processes. The initial conditions involved a 12-hour bottle roll. A fire assay on the Leachwell tails was completed to assess how effective the method had been in extracting the gold. The initial test work indicates a slightly longer bottle roll is required to leach the coarse gold. Additional test work utilizing a 24hr bottle roll is planned. Leachwell was not available for 2015 Diamond Drilling so a triplicate fire assay was sued for zones with anticipated coarse gold. The average was then taken as the final sample grade.
	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.	No geophysical tools were used to determine any element concentrations.
	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 materials (CRMs) are inserted into the sample sequence randomly at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. blanks are inserted into the sample sequence at a rate of 1 per 20 samples. This is random, except where high grade mineralisation is expected. Here, a Blank is inserted after the high-grade sample to test for contamination. Failures above 0.2gpt are followed up, and re-assayed. New pulps are prepared if failures remain. Field Duplicates are taken for all RC samples (1 in 20 sample). No Field duplicates are submitted for diamond core.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off.
	The use of twinned holes.	No twinned holes were drilled for this data set.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging is entered directly into an Acquire database. Logs are exported to csv files. A hardcopy and electronic copy of this csv file is then stored. Assay files are received in csv format and loaded directly into the database by the Project Geologist. A geologist then checks that the results have inserted into the database correctly. Hardcopy and electronic copies of these are also kept. No adjustments are made to this assay data.
	Discuss any adjustment to assay data.	Planned holes are pegged using a Differential GPS (DGPS) by field assistants. During drilling, single-shot magnetic surveys are taken every 30m to ensure the hole remains close to design. This is performed by the driller using the Globaltech Pathfinder DS1 survey system and checked by the supervising geologist. A final survey is taken once the end of hole is reached. The final collar is picked up after hole completion by Differential GPS in the MGA 94 Zone 51 grid.
Location of data points	Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.	
	Specification of the grid system used.	

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Criteria	JORC Code explanation	Commentary
	Quality and adequacy of topographic control.	For 2014 DD drilling, each hole was gyroscopic surveyed to verify the single shot surveys. Topographic control is through an airborne survey conducted in 2009 by Survey Graphics mapping consultants using airborne DGPS (Differential Global Positioning System). Alternative frames were orthorectified using a 30m DEM within the mapping area and a 50m DEM outside the mapping area, captured using photogrammetry. This topographic control has been verified by the DGPS pickup of numerous hole collars
Data spacing and distribution	Data spacing for reporting of Exploration Results.	No exploration results reported.
	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 spacing is considered appropriate. Drill hole spacing across the area greatly varies. Up to 100m below surface, spacing is typically 40m x 40m which is reduced at depth where few drill holes intersect ore.
	Whether sample compositing has been applied.	No compositing has been applied during sampling.
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.	No sampling bias is considered to have been introduced by the drilling orientation.
	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.	There are various mineralised orientations at Six Mile, including porphyry contacts and stockwork lodes, with two main shear orientations; NW-trending shears dipping steeply (70-80°) to the SW and ENE trending shears dipping steeply (70-80°) to the South. Many of the drill holes in the Six Mile area have been drilled at poor orientations to these structures due to poor understanding of the geology prior to the recent interpretation. Wherever this has occurred, it is clearly noted in the report. These holes are only suitable as an exploration tool for further targeting and are unlikely to be used in any future Resource.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources' in a secure yard. Once submitted to the laboratories, they are stored in a secure fenced compound and tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	An internal review of RC sampling has been conducted to determine if the low repeatability is due to coarse gold, poor sampling or both. A number of steps have been taken to improve the primary sampling including the fitting of an additional arm and spirit level to the cone splitter to ensure it is kept straight and training drill offsiders in sample theory to help ensure a more consistent sample.

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.	All holes mentioned in this report are located within on Mining Lease M27/63, held by The Kanowna Mines Ltd, a wholly owned subsidiary of Northern Star Resources.
	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.	No known impediments exist and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Western Mining Corporation (WMC) commenced exploration in the Six Mile AREA in 1983. Early exploration consisted of costeans, followed by RC drilling. A Resource of 119,482 tonnes @ 3.2gpt was calculated and mining began in 1986. Mining ceased in 1988 due to reconciliation issues. In the mid 1990's, 3 DD holes were drilled by WMC to test for mineralisation below the main pit, although assay results were poor. The current location of the core is unknown. Delta Gold acquired the tenement in 2000 and drilled 20 RC holes and 1 DD hole below the existing pit. This allowed a Resource to be calculated of 2.6 million tonnes @ 2.1gpt. Placer Dome subsequently acquired the tenement through their takeover of Aurion Gold in 2002 and conducted no exploration until the Barrick takeover in 2004. Barrick Gold conducted channel sampling of the pit walls in 2007 followed by 2 DD holes in 2008 with limited success.
Geology	Deposit type, geological setting and style of mineralisation.	The Six Mile deposit is situated within the Boorara domain of the Kalgoorlie Terrane, part of the Norseman-Wiluna Greenstone Belt. The Scotia-Kanowna dome, a D2 granodiorite pluton, intrudes a Boorara domain sequence of lower basalt, komatiites, upper basalt and felsic volcanics

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Criteria	JORC Code explanation	Commentary
		The Six Mile area is dominated by massive chlorite-amphibole basalt with at least two phases of quartz feldspar porphyry intrusion. Two main shear orientations exist within the pit. NW-trending and ENE-trending. Mineralisation occurs within quartz-carbonate veins hosted by these discrete shears Stockwork mineralisation is hosted within the basalt in proximity to shallow to moderately dipping lodes. Mineralisation also exists on the Footwall and Hangingwall of porphyry contacts. The Main Fletcher Porphyry hosts consistent low-grade mineralisation, and a supergene lode exists in the Main Pit zone.
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: 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.	Too many holes to practically list the complete dataset, the long section and plan reflect the hole positions used for previous estimation stated. No exploration results reported.
	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.	Exclusion of the drill information will not detract from the understanding of the report.
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.	No exploration results reported
	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.	No exploration results reported.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No exploration results reported.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	No exploration results reported.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	No exploration results reported.
	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').	No exploration results reported.
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.	Appropriate plans and section have been included in this report.
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.	No exploration results 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.	No further relevant work has been carried out at the Six Mile project.
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).	Following the reinterpretation of the Six Mile project, and the creation of a new geological model, a Resource modelling exercise was undertaken. It is envisaged that further drilling will be undertaken to increase the confidence in the area and convert the Inferred Resource to Indicated, as well as increasing the size of the reportable Resource.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	

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Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	All data is stored in a digital database with logging of changes and management of data integrity. Validation is enforced when the data is captured. Data is exported to ASCII files before importation into Resource modelling software, no manual editing is undertaken on any data during the export/import process.
	Data validation procedures used.	Random checks through use of the data and data validation procedure prior to Resource estimation.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The CP has visited the site once in 2015 Multiple site visits undertaken by geologists supervising the drilling programs and preparing the geological interpretation.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	There is reasonable confidence in the geological interpretation. The geological interpretation is based on a combination of geological logging and mapping within the existing pit. Geological logging includes both contemporary and historic data. The main geological features are exposed in the existing pit and are believed to be well understood. Geological features not exposed are solely supported by drill data.
	Nature of the data used and of any assumptions made.	Nil.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative estimates have been conducted.
	The use of geology in guiding and controlling Mineral Resource estimation.	Wireframes of the interpreted geology have been used to constrain mineralisation.
	The factors affecting continuity both of grade and geology.	Grade continuity is affected by a high component of coarse gold distributed throughout the mineralisation. Geological structures are complex interplay of structure and intrusive bodies.
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.	Mineralisation has been identified over a strike length of approximately 600m and over a depth of approximately 350m. Mineralised horizons vary in thickness between 2.6m and 15m, with an average thickness of around 3.0m.
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.	Drill holes were composited into 1m intervals down hole within each interpreted domain. The composite lengths were allowed to vary between half and one and a half times the nominal composite length to ensure that no sampling was lost during the compositing process. The average grade and total length of the composite data was compared against the average grade and total length of the un-composited data to check the compositing process. The distribution of composite lengths was checked to ensure that the majority of the composites were close to the targeted length. Simple Ordinary Kriging was used to estimate all mineralised domains. The local mean values used during Simple Kriging was estimated from the declustered mean of the top-cut composited sample data.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	The estimated grades were assessed against sample grades and, where applicable, previous estimates.
	The assumptions made regarding recovery of by-products.	No assumptions are made.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Grades were estimated into 20m(E-W) x 5m(N-S) x 20m (RL) panels for the majority of domains. Two supergene domains were estimated using 20m(E-W) x 20m(N-S) x 5m(RL) panels. The majority of domains were estimated in 2D, where a significant proportion of the domain was thicker than 5m, grades were estimated in 3D. Search distances used for estimation based on variogram ranges and vary by domain.
	Any assumptions behind modelling of selective mining units.	No assumptions made.
	Any assumptions about correlation between variables.	No assumptions made.
	Description of how the geological interpretation was used to control the Resource estimates.	Mineralisation wireframes are created within the geological shapes based on drill core logs.

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Criteria	JORC Code explanation	Commentary
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the sample data based on a statistical analysis of the data and vary by domain.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	The Kriging neighbourhood was refined using statistical measures of Kriging quality. The estimated grades were assessed against sample grades and against declustered mean values.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	Cut-off grades for reporting the Resource were developed using a gold price of A$1,700 and budgeted Kanowna Belle mining costs for 2015-16.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	An open pit optimisation study was run to select the portion of the model to be included in the Resource tabulation. Dilution and recovery factors were included in the optimisation study. Mining costs were developed with reference to typical unit costs currently available. The reported Resource is contained within the optimum shell for an A$1,700/oz. gold price.
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.	Metallurgical recovery factors have been developed based on extensive experience processing similar material from the Kanowna area.
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 green fields 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.	The utilisation of existing Kanowna Belle infrastructure will minimise the impact of development of the project. It has been assumed that the permits required for the operation will be readily obtainable.
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 measurements from project drilling and from production within the area were used to assign values within interpreted weathering horizons.
	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.	No/minimal voids are encountered in the ore zones.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Bulk densities are applied to domains for the ore zone and by oxidation state.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: - Geologic grade continuity. - Density of available drilling. - Statistical evaluation of the quality of the kriging estimate.
	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, quality, quantity and distribution of the data).	Appropriate account has been taken of relevant factors.
	Whether the result appropriately reflects the Competent Person’s view of the deposit.	This mineral Resource estimate is considered representative.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The Mineral Resource model has been reviewed internally by Northern Star Principal Resource Geologist.

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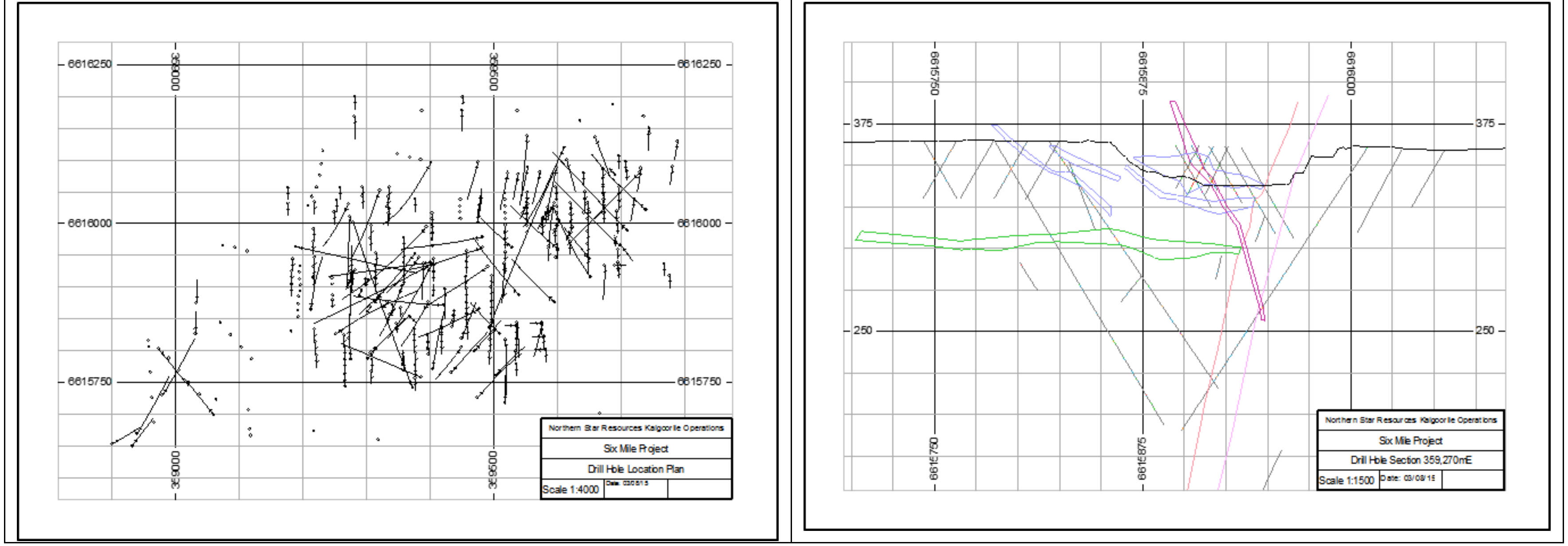
Criteria	JORC Code explanation	Commentary
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of 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.	This Mineral Resource estimate is considered as robust and representative of the Six Mile style of mineralisation. The estimate is considered to be robustly estimated on a global scale for material classified as Inferred.
	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.	Global estimate, with local variation to be expected.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No production data to compare.

SIX MILE - REPRESENTATIVE PLAN AND CROSS SECTION



Plan view: Six Mile Resource drill collars and Traces

Cross Section: Six Mile Resource with drilltraces and mineralisation interp

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JORC Code, 2012 Edition – Table 1 Report

Kanowna Surface (Woodline – Fenceline) – 30 June 2019

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.	Reverse circulation drilling was used to obtain 1m samples from which 2kg (Delta Gold holes) or 3kg (Barrick/NSR holes) was pulverised to produce a 50g charge for fire assay. For the Delta Gold holes, less prospective zones or wet zones were sampled with five metre composites that were assayed with aqua-regia digest and AAS finish on a 50g charge. All composite intervals returning greater than 0.01gpt Au were subsequently re-sampled from one metre intervals retained in plastic bags, dried, riffle split, and then treated as above. Diamond drill core was half-core sampled on a nominal 1m sample length and was pulverised to produce a 50g charge for fire assay. For the Delta gold holes, less prospective zones sampled by V-cut in 4m intervals and then treated as above. Any significant anomalous composite intervals were re-sampled by taking all core from the remaining hemisphere of the V-cut as 1m samples and then treated as above.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Sample intervals are marked on the core by a geologist typically every 1m to honour geological boundaries. Sample interval lengths vary from 0.3m and 1.2m (NQ). The same half of the core was selected for each sample interval, placed in numbered calico bags and submitted to the laboratory for analysis. The other half of the core was left in the core tray which was stamped for identification, stored and catalogued.
	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 30g 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.	Assaying is by fire assay with a 40 or 50g charge and AAS analysis for gold. All sampling data is entered onto logging sheets or tablet computer and entered into the central Acquire database.
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.).	Most drill holes are 130-145mm reverse circulation but supplemented with a small proportion NQ diamond drill holes. The diamond drill holes were of NQ or NQ2 diameter in fresh rock; however, some HQ3 triple tube drilling was used through the regolith, which includes the main mineralised zones.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	Diamond drilling recoveries were accounted for by recording core loss intervals measured in linear downhole metres to the nearest five centimetres. All diamond core was dried before sample preparation making the original moisture of the sample irrelevant to sample and assay integrity. For Barrick / NSR RC drill holes: RC drill recoveries were logged by the geologist or field assistant whilst drilling. These recoveries were based on a visual estimation of the proportion of sample returned relative to a full one metre sample. Moisture was logged as wet, moist or dry where wet means all or part of the sample was a slurry, moist means the material was wet enough to clump together and therefore not split effectively through a riffle or cone splitter and dry was any sample that was sufficiently free of moisture to properly run through a riffle or cone splitter. For Delta Gold RC drill holes: Drilling reports show that moisture and recovery for RC drill holes was noted through the drilling campaign and sampling techniques modified accordingly, however this information is not contained within the Northern Star drill database, so no analysis of this data is possible.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	Where recovery data is available, that data shows that 96% of samples have sufficient recovery to be considered a representative sample. Most of those poor recoveries are from the first two metres of the hole where the resultant gold grades will have little or no impact on the estimated grades.
	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.	Where moisture data is available, that data shows that 4% of samples were wet and therefore may not be representative. A negligible proportion of samples were moist (samples where there may be a small effect on the reliability of the gold grade of the sample). This analysis shows that there not a relationship between moisture and gold grade that would compromise the integrity of the estimate. Although the moisture data has been lost for the Delta Gold holes, the sampling protocol of drying and resampling wet zones that passed the 0.01gpt Au threshold means that any wet samples from these holes will not have had a material effect on the estimate. There is no known relationship between recovery and grade.

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Criteria	JORC Code explanation	Commentary
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 DD core was logged by geologists with lithology, mineralisation, structure, alteration, veining and regolith were recorded. Quantitative measures such as structural measurements, intensity of alteration, percentage of mineralisation, thickness of veins and veins per metre were also recorded. Geotechnical measurements on DD core include RQD, Recovery, and Fracture Frequency. Photographs are taken of each core tray when wet. All mineralised intersections are logged and sampled. All core and chips have been logged to the detailed exploration logging scheme of Delta Gold/Barrick/Northern Star (i.e. a single logging scheme that has evolved with only minor changes over time). Selected diamond core has been geotechnically logged as required.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging is qualitative and all core is photographed and half core retained in archive. Visual estimates are made for mineralisation percentages for core.
	The total length and percentage of the relevant intersections logged.	100% of the drill core and RC chips are logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	All diamond drill core was sawn longitudinally and one half submitted to the laboratory. DD core is sampled by sawn half-core on intervals controlled by geological domaining represented by mineralisation, alteration and lithology. A selected number of grade control holes were full cored. Mineralised intersections are sampled with a maximum and minimum length of 1.2m and 0.2m, respecting lithological or alteration contacts. The down hole depth of all sample interval extents is recorded.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	All RC drill samples were either cone or riffle split on the drill rig and that sample was then submitted to the laboratory.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	For Barrick / NSR drill holes: Sub sampling: Laboratory Sample Preparation - DD: Drill core samples submitted to the laboratory are crushed to a nominal 6mm in a jaw crusher (no grind checks used for this step) and then pulverised to 90% passing 75µm in an LM5 puck mill. Samples too large (>3kg) for the LM5 mill are first crushed in a Boyd crusher to 90% passing 3mm and the sub-sampled to less than 3kg with a rotary splitter. Laboratory Sample Preparation - RC: Samples are pulverised to 90% passing 75µm in an LM5 puck mill. Samples too large (>3kg) for the LM5 mill are first jaw-crushed 90% passing 3mm and then sub-sampled to less than 3kg with a rotary splitter. For the crushing and pulverising steps above grind checks are conducted on a 1 in 25 samples basis to confirm effectiveness. Field Duplicates: Field duplicates were taken on a one-in-twenty samples basis for RC drilling with a second split of the 1m sample to provide a second nominally 3kg sample to be processed identically to all original samples. Diamond core did not have duplicate samples taken. Laboratory Splits: A second pulp 250-300g was taken from the LM5 mill on a 1 in 50 samples basis and processed identically to other samples for the remainder of the assay workflow. The specific details of the sub-sampling techniques and sample preparation for the Delta Gold holes is not well documented but is believed to be somewhat similar to the methods described above.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Most holes have all intervals sampled. Approximately 80% of the latest round of RC drilling (WDRC17***) were not sampled over the top 30m, as that has previously shown to be barren.
	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.	Quarter core sampling is often undertaken as a check.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Grind checks are performed at both the crushing stage (3mm) and pulverising stage (75µm) requiring 90% of material to pass through the relevant size.
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.	All one metre samples were assayed with a fifty-gram charge weight with an AAS (atomic absorption spectroscopy) finish. This method is considered to report the total gold content of the sample. Delta Gold composite samples were assayed with aqua-regia digest and AAS finish on a 50g charge. Laboratory Checks: The laboratories used were required to routinely repeat a fire assay from the pulp for 1 in 20 samples. Laboratory Repeats: Higher grade samples (above a nominal 1 gpt cut-off) were re-assayed from the original pulp until the result was deemed repeatable, by the laboratory.

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Criteria	JORC Code explanation	Commentary
		Delta Gold reports document the use of company supplied standard material and that the results were acceptable, being within 10% of the accepted value, but the exact details of the protocol(s) are not described and the QA data is not available.
	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.	No geophysical tools were used to determine any element concentrations.
	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.	Sampling and assaying QAQC procedures include: - Periodical resubmission of samples to primary and secondary laboratories (minimum >5%). - Submittal of independent certified reference material - Sieve testing to check grind size - Sample recovery checks. - Unannounced laboratory inspections For Barrick / NSR drill holes, commercially produced, certified standards were submitted to the laboratory on a 1 in 20 basis. Ground Bunbury Basalt (similar in appearance to an RC sample from mafic rocks), of a gold concentration known to be below normal ppm detection limits (but not certified), was submitted in the sample stream on a 1 in 50 basis to be processed identically to all original samples. Primary laboratory Bureau Veritas meets ISO 9001:2000. MinAnalytical labs are NATA accredited for compliance with ISO/IEC17025:2005
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	The significant intercepts of the Woodline area are considered to be verified on the basis that the project has been drilled with different methods by different teams from two different parent companies over twenty years and has returned results that are consistent with each other and demonstrate continuity of grade and thickness of mineralisation. All recent assay data (definitely all Barrick/NSR assay data and probably much of the Delta Gold data), has been directly imported into the digital database directly from laboratory reports, eliminating any potential for typographical errors.
	The use of twinned holes.	Five RC holes were drilled in 2017 attempting to replicate the long high-grade intercepts in earlier RAB drilling. While high grade was intercepted, the new holes did not replicate the downhole length. RAB and AC holes not used in the Resource.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	All assay data adheres to Kanowna QAQC standards and is further validated by a qualified person before it can be used in the Resource estimation process. All data is stored in the site Acquire database with hard copies of all logging and sample results filed for each hole. Assay files are received in csv format and loaded directly into the database by the supervising geologist who then checks that the results have inserted correctly. Hardcopy and electronic copies of these are also kept.
	Discuss any adjustment to assay data.	Assay adjustment: Stored in the NSR Acquire database are various 'priorities' of sampling. This does not reflect the quality of sample but is due to the combining of two historic databases. A series of holes has assays in both priorities with on defaulting to zero, and the other actual grades. Samples were adjusted outside of the AcQuire database to only contain real assays.
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.	Newer drill hole collars were picked up by differential GPS in the MGA94 Zone 51 map grid. Earlier drill holes were mostly picked up by theodolite on a local exploration grid and later referenced back to the MGA94 map grid. Prior to use, all pre-2017 collars were adjusted vertically to match the 2012 Lidar surface, 2017 drilling RL's were within10 cm or the Lidar surface. All recent drill holes were surveyed downhole by various methods; including a single shot downhole camera, EMS (Electric Multi Shot) method, or in-rod gyroscopic survey tools. Holes are typically surveyed at 15m and 30m intervals down hole thereafter. Data from electronic tools was imported directly into the digital database from electronic data files to avoid typographical errors. Survey Adjustment:

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Criteria	JORC Code explanation	Commentary
		Stored in the NSR Acquire are various types of survey azimuths. Due to the combining of two historic databases, and inconsistent conversion to MGA grid resulted in bearings that were not plausible. Some holes use "OLD BRG" some "MGA BRG", with discrepancies showing mainly in collar shot (gets adjusted depending on what grid is nominated in the collar file, but this is unreliable) Azimuths for 64 holes were adjusted outside of the AcQuire database.
	Specification of the grid system used.	MGA 94.
	Quality and adequacy of topographic control.	A digital terrain model was commissioned from Cardno-Spectrum Surveys in 2012 for the purpose of this Resource estimate.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	The drilling attained a 20m x 20m spacing on the sub-horizontal paleo channel mineralisation and the sub-vertical fresh-rock porphyry related mineralised surface.
	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.	This drill spacing is considered appropriate for an indicated Resource on the paleochannel mineralisation.
	Whether sample compositing has been applied.	Samples were composited to 1m prior to estimation.
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 majority of the drilling is oriented between 55° and 60° dip on an azimuth roughly perpendicular to the strike of the controlling porphyry dyke. This drill orientation adequately tests both the sub-horizontal paleo channel and supergene surfaces and the sub-vertical porphyry-related surfaces without introducing a sampling bias.
	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.	Holes with orientations that are considered likely to introduce sampling bias are excluded from the estimation during the validation process.
Sample security	The measures taken to ensure sample security.	All core is kept within the site perimeter fence on the Mining Lease M27/103. Samples are dispatched and/or collected by an offsite delivery service on a regular basis. Each sample batch is accompanied with a: • Job number • Number of Samples • Sample Numbers (including standards and duplicates) • Required analytical methods • A job priority rating A Chain of Custody is demonstrated by both Company and Bureau Veritas / MinAnalytical in the delivery and receipt of sample materials. Any damage to or loss of samples within each batch (e.g. total loss, spillage or obvious contamination), is reported to the Company in the form of a list of samples affected and detailing the nature of the problem(s).
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	This Resource estimate and supporting data has not been externally audited.

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 Woodline deposit is on mining Lease M27/37 which is 100% owned by Northern Star Resources and held in good standing. A gazetted, but disused, road passing through the prospect is in the process of being either closed or degazetted so that mining may proceed.
	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.	No known impediments exist and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	All Resource quality drilling (RC and Diamond) on the Woodline prospect has been undertaken by the one company operating the Kanowna Belle Gold Mine, albeit with a succession of different parent companies having ownership of that operation (Delta Gold, Aurion Gold, Placer Dome, Barrick Gold and now Northern Star Resources).

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Criteria	JORC Code explanation	Commentary
Geology	Deposit type, geological setting and style of mineralisation.	The Woodline deposit encompasses two distinct mineralisation styles. The primary mineralisation is mineralisation is associated with a felsic dyke that has intruded a shear zone passing through a basalt sequence. The intrusive has elevated gold grades of the order of 0.2gpt throughout, with high grade zones on the sheared margins associated with pervasive sericite-albite alteration and fine disseminated pyrite. Syn- or post- intrusion shearing has also produced a narrow but laterally continuous quartz-ankerite-chlorite-arsenopyrite-pyrite vein with high gold grades that roughly follows the sheared intrusive margin. Supergene processes have laterally dispersed gold away from the primary source at the base of weathering to create the lowermost sub-horizontal mineralised surface. Other supergene surfaces occur at the base of channels of transported sands. Alluvial gold in the base of the channels, which are nested on top of each other, is believed to have nucleated the precipitation of supergene gold mobilised from the primary source by weathering processes.
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: 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.	Too many holes to practically list, the long section and plan reflect the hole positions used for estimation stated. Full Resource report lists all holes in an appendix.
	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.	Exclusion of the drill information will not detract from the understanding of the report.
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.	Exploration results not being reported.
	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.	Exploration results not being reported.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	Where mineralisation orientations are known, downhole lengths are reported.
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.	Appropriate plans and section have been included in this report.
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.	Exploration results not being 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.	A 2012 SAM (sub-audio magnetics) geophysical survey over the Woodline Prospect was targeting the larger-scale exploration potential of the area and as such is not relevant to the local scale of this Resource estimate.

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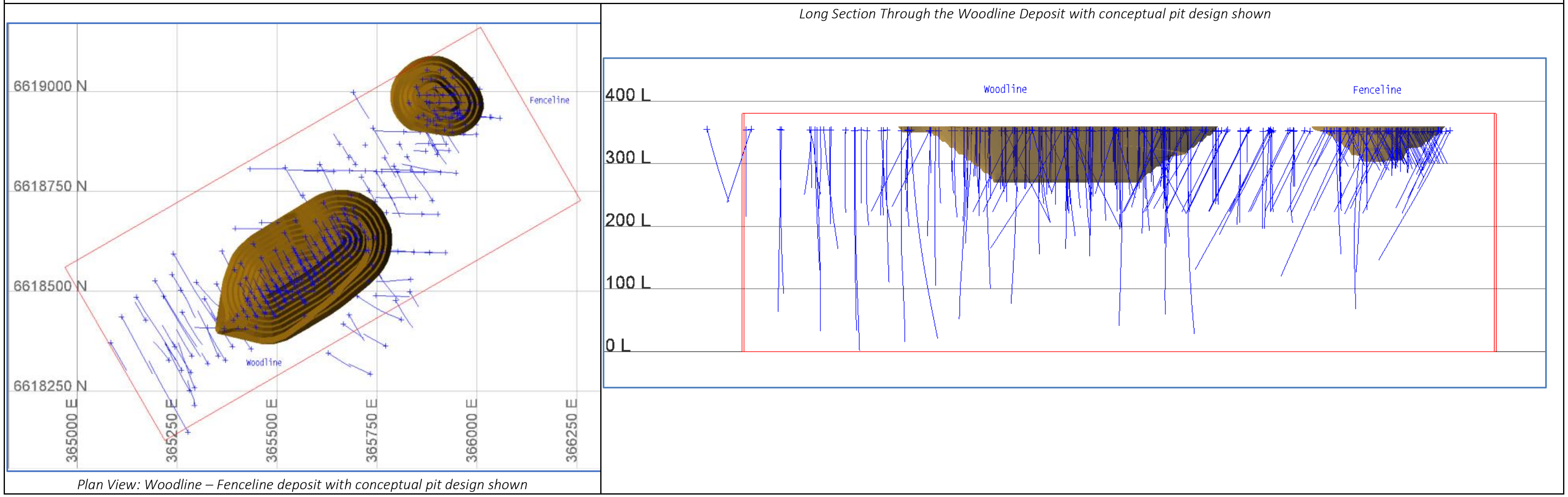
Criteria	JORC Code explanation	Commentary
Further work	The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).	Further testing of the paleochannel at depth and exploring for the source. Further grade control drilling would be required prior to mining.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Shown below and in the resource report

WOODLINE DEPOSIT - REPRESENTATIVE PLAN & LONG SECTION



Long Section Through the Woodline Deposit with conceptual pit design shown

Plan View: Woodline – Fenceline deposit with conceptual pit design shown

APPENDIX B: TABLE 1

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Wherever possible data has been taken into the digital database by directly importing it from digital files. Barrick / NSR drill holes were validated by compiling a hardcopy of all relevant data on a hole-by-hole basis with a coversheet for each. As each piece of information was checked against the information in the database the relevant section of the coversheet was signed off by the person who did that check. The position and orientation of all drill holes was checked in three-dimensions using Vulcan mining software, with the consistency of the fresh-rock geology proving useful for spatially validating the dataset The internal consistency of grade and thickness of intercepts does not indicate any material problems with the sample and assay data of older holes for which the above checks cannot be applied.
	Data validation procedures used.	Random checks through use of the data and data validation procedure prior to Resource estimation. This led to assay, survey and collar adjustments as outlined in section 2.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The CP has visited the site and found all as expected.
	If no site visits have been undertaken indicate why this is the case.	Site visit undertaken.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	There is a high level of confidence in the interpretation of the fresh-rock and lowermost supergene mineralisation surfaces. There is good support with the increased drilling, for the interpretation of the paleochannel surface(s) from drill hole logging data and the lateral continuity of these surfaces is reasonable. The spatial interpretation of these surfaces and general geological context is supported by a detailed study of the genesis of mineralisation in a similar nearby prospect (Golden Valley and Moonlight Paleochannel deposits).
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drill hole logs and previous interpretations.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	The biggest change from this Resource to the previous was the recognition of a deep and well developed paleochannel which will contain the bulk of any ounces in a Reserve pit.
	The use of geology in guiding and controlling Mineral Resource estimation.	Interpretations and confining wireframes are developed using the geology related to the mineralised lodes. This includes lithology, alteration, veining, structure and mineralisation. This data is sourced from geological logging of drill holes and mapping. The 2017 drilling focused heavily on identifying/defining the Woodline Paleochannel.
	The factors affecting continuity both of grade and geology.	Continuity can be affected by expected variations in local deposition within the larger paleo channel.
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.	Mineralised portion of the Woodline Paleochannel extend over 800m strike and 100 min width, up to 80m deep. Top 30m is barren, then consists of multiple, horizontal mineralised lenses. Porphyry related (fresh rock) mineralisation is modelled over 900m of strike extend and with a dip extent of between 50m and 250m depending on the extent of drilling. The mineralised zone tends to be around 15m wide with the individual mineralised surfaces within that zone between one and two metres wide. Supergene mineralised surfaces are modelled in oxidised and transitional domains outside of the channel and are only a small component of the Resource.
Estimation and modelling techniques	The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.	Drill data was composited to a nominal length of 1m for all domains. All supergene and primary intercepts are hard coded in the Mapfile to avoid re-snapping interpretation after collar adjustments. In the interpreted paleo channel, all blocks are 5m by 5m by 1m (vertical). Within the remainder of the model 10m by 10m by 10m blocks, sub celled to 1 by 1 by 1m m (elevation) are used. Small sub cells were used to reflect the narrow vertical primary structures. Drilling is nominally on 20m sections with some areas infilled to around 10m spacing. Search ellipses were orientated to match the strike and dip of each domain, paleochannel estimation is unconstrained. Inverse distance cubed was adopted as the grade estimation method. Validation steps undertaken included: • Visual comparison of model vs composite grades • Swath plots based on RL in the paleochannel

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
		Comparison of grades estimated by inverse distance squared vs grades estimated by inverse distance cubed and grades estimated by nearest neighbour.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	The estimated grades were assessed against sample grades and, where applicable, previous estimates. This estimate is comparable in total ounces to the last reported model (2011).
	The assumptions made regarding recovery of by-products.	No assumptions are made and only gold is defined for estimation.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements detected or estimated. However high clay content has been identified in the channel mineralisation.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	10mE 10mN 10mRL parent blocks sub celled to 1m*1m*1m cells using 1m composites. Each block was estimated, no parent cells used. Search ellipsoids in the paleochannel are 40m*40m*1m. For footwall and hangingwall lodes that are tightly constrained, an ellipsoid was used with 60m*60m*60m, remaining supergene domains estimated with 30m*30m*4m. Drill hole spacing is a nominal 20 by 20m.
	Any assumptions behind modelling of selective mining units.	No assumptions made.
	Any assumptions about correlation between variables.	No assumptions made.
	Description of how the geological interpretation was used to control the Resource estimates.	Estimation is constrained within domain wireframes that are developed using the geology related to the mineralised lode. This includes lithology, alteration, veining, structure and mineralisation. This data is sourced from geological logging of drill holes and mapping. Paleochannel material is estimated with a small flat ellipsoid into unconstrained blocks.
	Discussion of basis for using or not using grade cutting or capping.	As is typical for gold deposits the data distributions are highly skewed and typically have a CV > 1.5 (ratio of standard deviation to the mean). In order to prevent overestimation top cuts were chosen.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Visual comparisons comparing drill hole composites and block model grades. Within the designed pit area, the comparison is favourable, outside the pit in areas of wider spaced drilling, high grades can be smeared. These areas however are not reported as Resource. Are is unmined so no reconciliation data is available.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	Cutoff grade of 0.68gpt based on economics of the project, reported inside the designed pit shell.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	The mineralisation is amenable to open cut mining methodology subject to gold price. Due to the deep weathering profile the entire pit would be mostly free dig, with limited drill and blast requirements.
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.	Metallurgical test work results show that the mineralisation is amendable to processing through the Kanowna Belle treatment plant, however high clay content has been identified in the channel mineralisation. Ore processing throughput and recovery parameters were estimated based on limited metallurgical sampling. More test work is in progress.
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 green fields project, may not always be well advanced, the status of early consideration of these potential environmental impacts	A “License to Operate” is held by the operation which is issued under the “Environmental Protection Act 1986”, administered by the Department of Environmental Regulation (DER). The license stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licenses and lease conditions.

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Criteria	JORC Code explanation	Commentary
	should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	The Kanowna operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits.
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 densities were assigned to the model based on the degree of weathering logged.
	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.	No/minimal voids are encountered in the ore zones.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Bulk densities have been taken directly from the 2011 Resource report.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classifications of Indicated and Inferred have been assigned primarily on drill density.
	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, quality, quantity and distribution of the data).	Input and geological data is assumed accurate.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	This Mineral Resource estimate is considered representative within the designed pit area.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	This Resource estimate and supporting data has not been externally 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.	Swath plots by northing, easting and RL were produced for each lode to verify that the model grades honoured the tenor of the drill hole grades.
	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.	This Resource report relates to the contiguous Woodline and Fenceline deposits. Each of the estimated lodes will show local variability even though the global estimate reflects the total average tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Deposit is unmined, no reconciliation data is available.

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star Resources Limited June 2019 Mineral Resource.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	A site visit has been completed, and covered aspects including site access, assessment of old workings, clearing requirements, and potential infrastructure placement.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	A minimum Pre-Feasibility level study is completed prior to converting an ore zone into ore Reserve.

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Criteria	JORC Code explanation	Commentary
	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.	Ore Reserves have been calculated by generating detailed mining shapes for the proposed open pits. A series of nested optimised pit shells were generated using Whittle software, an analysis of the shells was completed to select one which was then used to complete a detailed pit design to closely resemble the selected whittle shell. The Whittle optimisation used parameters generated from NSR technical personnel and technical consultants. A detailed mine schedule and cost model has been generated using an excel spreadsheet model. Appropriate ore dilution and recoveries have been applied within the excel spreadsheet model.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	The pit cut-off grade has been calculated based on the key input components (processing, recovery and administration) Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. The AUD gold price as per corporate guidance. Mill recovery factors are based on historical data and metallurgical test work. Variable cut-off grade is used in the evaluation of open pit projects.
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).	Mineral Resource is converted to Ore Reserve after completing a detailed mine design complete with a detailed financial assessment. The Mineral Resource block model is used. Ore Reserves have been calculated by generating detailed mining shapes for the proposed open pits. A series of nested optimised pit shells were generated using Whittle software, an analysis of the shells was completed to select one which was then used to complete a detailed pit design to closely resemble the selected whittle shell. The Whittle optimisation used parameters generated from NSR technical personnel and technical consultants.
	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 selected mining method for the Woodline & Fenceline deposits are of a bench mining open pit method. The proposed open pits are to be mined using conventional open pit mining methods (drill, blast, load and haul) by a mining contractor utilising 120 t class excavators and 90t trucks. This method is used widely in mines across Western Australia and is deemed appropriate given the nature of the ore body.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	Independent geotechnical consultants completed a geotechnical study for the Woodline project. Recommended wall angles were applied to the Whittle optimisation and subsequent detailed pit designs.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	
	The mining dilution factors used.	A mining dilution factor of 10% of zero grade has been applied for the reporting of Reserve physicals.
	The mining recovery factors used.	A mining recovery of 95% has been applied.
	Any minimum mining widths used.	The SMU dimensions for the Reserve Estimate are 2.0 m Wide x 5.0 m High x 5.0 m Long. A minimum mining width down to 20 m for final pit extraction from the base of pit has been used.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Inferred material has not been included within this Reserve estimate (treated as waste) but has been considered in LOM planning. It is assumed that Inferred material will be converted to Reserve via grade control drilling which has been provided for and will be carried out ahead of mining.
	The infrastructure requirements of the selected mining methods.	Infrastructure required for the proposed Woodline and Fenceline Open Pits have been accounted for and included in all work leading to the generation of the Ore Reserve estimate. As there is currently infrastructure in place for the Kanowna Belle underground operations and the life of the Woodline project is limited planned infrastructure includes: Offices, workshops and associated facilities; Dewatering pipeline; Water will be pumped to a water storage pond and used for dust suppression. Any excess water will be pumped and discharged into Golden Feather pit located 900m to the south. Waste Dump; and ROM Pad. Processing will be conducted at the Kanowna Belle operation; hence no processing infrastructure is required.

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Criteria	JORC Code explanation	Commentary
		The Kanowna Belle plant is made up of crushing, grinding, gravity gold recovery, flotation, roasting, CIL, elution and gold recovery circuits.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	The Kanowna Belle plant is made up of crushing, grinding, gravity gold recovery, flotation, roasting, CIL, elution and gold recovery circuits. The milling facilities are designed to process approximately 1.8 million tonnes per annum. The plant has the capability to treat both refractory and free milling ores, through either a flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery) or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plant campaigns both refractory and free milling ores every month. Ore Reserves are calculated using processing plant recovery factors that are based on test work and historical performance.
	Whether the metallurgical process is well-tested technology or novel in nature.	Standard CIL extraction process utilising the existing KB processing facility.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Based on metallurgical test work carried out and milling experience gained through processing similar paleo channel material through the KB processing facility.
	Any assumptions or allowances made for deleterious elements.	No assumption made.
	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.	Based on metallurgical test work carried out and milling experience gained through processing similar paleo channel material through the KB processing facility.
	For minerals that are defined by a specification, has the ore Reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	All ore from the Woodline Project will be trucked to the Kanowna Belle Processing Plant for processing. The Kanowna Belle Mine is operated subject to the requirements of the Western Australian Mining Act 1978 and the Mines (Safety) Act, regulated by the Department of Mines, Industry Regulation and Safety. The Mining Leases covering the Kanowna Belle operation stipulate environmental conditions for operation, rehabilitation and reporting. A “Licence to Operate” is held by the operation which is issued under the requirements of the “Environmental Protection Act 1986”. Kanowna Belle holds groundwater licence GWL 62498-6 which includes the Woodline Project mining tenements. There are no native title issues. Heritage surveys have been completed in the Woodline and Fenceline project. There are no heritage sites identified that impact on the designed pits or associated infrastructure. Flora & Fauna and hydrogeological studies have been completed. Soil characteristics studies have been completed.
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 Woodline Project is located 6km north of Kanowna Belle and will be operated from the Kanowna Belle Mine Site. 2.5km of new haul road will be constructed to connect Woodline to existing NSR haul roads. The new section of haul road is on NSR 100% owned mining tenements. Minor infrastructure will be established at Woodline to support the project. Access to the Kanowna Belle operation is provided by well-maintained public and private roads. Employees reside in Kalgoorlie and commute to site daily. Potable water for the Kanowna Belle operations is pumped from Kalgoorlie to a storage facility on site. Non-potable water requirements are sourced from bore fields up to 10 km away from the mine site. Makeup water for the Kanowna Belle process plant is supplied by pipeline from a bore field located in the Gidgi paleochannel approximately 15 km from the plant site with some water is sourced from abandoned pits. Electricity is provided by the state electricity grid. A 15 km long 33 kV line from Kalgoorlie provides all electricity requirements of the operations. Sources of fuel, such as diesel, gasoline, propane, etc., are readily available at competitive pricing from local suppliers, as there are multiple operating plants in the Kalgoorlie area.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mining costs based on mining contract rates supplied by a reputable WA based mining contractor. Mining costs were built up from first principals on mine designs supplied by NSR. Capital costs are excluded in the optimised parameter inputs. Capital costs based on quotes supplied and have been included in the Woodline economic cost model.
	The methodology used to estimate operating costs.	A capital and operating cost model has been used to complete a life of mine cash flow estimate. Mining costs supplied by a reputable WA based mining contractor who built up costs from first principles from mine designs supplied by NSR.

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Criteria	JORC Code explanation	Commentary
	Allowances made for the content of deleterious elements.	No allowances made, none expected.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Single commodity pricing for gold only, using a long-term gold price of AUD $1,500 per ounce as per corporate guidance.
	The source of exchange rates used in the study.	Not applicable.
	Derivation of transportation charges.	Transportation costs for ore haulage from Woodline to KB has been based on current NSR contractor schedule of rates. Transportation costs also include an allowance for adequate haul road maintenance and dust suppression.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance.
	The allowances made for royalties payable, both Government and private.	WA State Government royalty of 2.5%.
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.	All financial analysis and gold price have been expressed in Australian dollars and no direct exchange rates have been applied. A gold price of AUD $1,500 per ounce has been used in the optimisation of the Woodline Project.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	Gold doré from the mine is to be sold at the Perth mint.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not applicable.
	Price and volume forecasts and the basis for these forecasts.	Corporate guidance.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not applicable.
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.	The Ore Reserve estimate is based on a financial model for that has been prepared at a “pre-feasibility study” level of accuracy economic modelling. All inputs from mining operations, processing, transportation and sustaining capital as well as contingencies have been scheduled and evaluated to generate a full life of mine cost model. • Economic inputs have been sourced from suppliers or generated from database information relating to the relevant area of discipline. • A discount rate of 6.2% has been applied. • The NPV of the project is positive at the assumed commodity prices.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities have been used with gold price ranges of A$1,300 to A$1,700 per ounce.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
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 issues.
	The status of material legal agreements and marketing arrangements.	No issues.
	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	No issues.

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Criteria	JORC Code explanation	Commentary
	the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the Reserve is contingent.	
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	Classifications of Measured, Indicated and Inferred have been assigned based on data integrity, continuity of mineralisation and geology, drill density and the quality of the estimation (kriging efficiency).
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results accurately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Nil.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Ore Reserves reporting processes has been subjected to an internal review by NSR Senior Technical personnel in July 2017.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the Reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	The design, schedule and financial model on which the Ore Reserve is based has been completed to a "pre-feasibility study" standard, with a corresponding level of confidence.
	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.	Estimates are global but will be reasonable accurate on a local scale.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Not applicable.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Not applicable.

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JORC Code, 2012 Edition – Table 1 Report

White Feather Reward: Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="3">Sampling techniques</td><td>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.</td><td>A combination of sample types was used to collect material for analysis including surface diamond drilling (DD) and surface Reverse Circulation drilling (RC). All RAB holes were excluded from the estimate. Where enough diamond drill holes were present, some RC holes were excluded due to inadequate survey and assay methods.
<table>
<tr><th>Lode</th><th>Total Holes</th><th>#DD</th><th>#RCD</th><th>#RC</th><th>12 month RC</th><th>12 month DD</th><th>12 month total</th><th>% drilled in last 12 Monts</th><th>DD samples</th><th>RC samples</th><th>Total samples</th></tr>
<tr><td>WF1</td><td>51</td><td>18</td><td>6</td><td>27</td><td>0</td><td>2</td><td>2</td><td>4%</td><td>55</td><td>122</td><td>177</td></tr>
<tr><td>WF2</td><td>23</td><td>11</td><td>1</td><td>11</td><td>0</td><td>1</td><td>1</td><td>4%</td><td>35</td><td>47</td><td>82</td></tr>
<tr><td>WF3</td><td>22</td><td>12</td><td>4</td><td>6</td><td>0</td><td>1</td><td>1</td><td>5%</td><td>39</td><td>28</td><td>67</td></tr>
<tr><td>WF4</td><td>40</td><td>23</td><td>6</td><td>11</td><td>0</td><td>0</td><td>0</td><td>0%</td><td>52</td><td>63</td><td>115</td></tr>
<tr><td>WF6</td><td>12</td><td>7</td><td>5</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0%</td><td>15</td><td>5</td><td>20</td></tr>
<tr><td>WF7</td><td>13</td><td>8</td><td>5</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0%</td><td>18</td><td>8</td><td>26</td></tr>
</table>
Sampling is by both diamond drilling (DD) and Reverse Circulation (RC) drilling completed by both NSR and previous operators.
Diamond core was placed in core trays for logging and sampling. Samples intervals are defined by the geologist to honor geological boundaries. Diamond core samples are mainly HQ and NQ (2) and vary between 0.3m and 1.2m (NQ2) or between 0.2m and 1m (HQ). For 2018 drilling maximum HQ sample interval was reduced to 0.7m.
For NSR RC samples were split using a rig-mounted cone splitter on 1m intervals to obtain a sample for assay. There are no records for historical RC splitting methods used.
Reverse circulation drilling was used to obtain 1m samples from which 2kg (Delta Gold holes) or 3kg (Barrick/NSR holes) was pulverised to produce a 50g charge for fire assay. For the Delta Gold holes, less prospective zones or wet zones were sampled with five metre composites that were assayed with aqua-regia digest and AAS finish on a 50g charge. All composite intervals returning greater than 0.01gpt Au were subsequently re-sampled from one metre intervals retained in plastic bags, dried, riffle split, and then treated as above.</td></tr>
<tr><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>Core is aligned and measured by tape, comparing back to downhole core blocks consistent with industry practice.
RC metre intervals are delineated with spray paint to determine metres drilled. Sample rejects are left on the sample pad to indicate metres drilled for the hole.</td></tr>
<tr><td>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 30g 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.</td><td>RC sampling was split using a rig mounted cone splitter to deliver a sample of approximately 3 kg.
DD drill core was cut in half using an automated core saw, where the mass of material collected will vary on the hole diameter and sampling interval.
All samples were delivered to a commercial laboratory where they were dried, crushed to <3 mm if required. For samples <3kg the entire sample is pulverised to 75 µm to produce a 50g charge for fire assay or either a 1000g or 400g sample for Leachwell analysis. Samples >3kg may be split at the <3mm crush stage using a rotary splitter to produce a 3kg subsample.
Visible gold is observed in the core and coarse gold is characteristic. The larger volume analysed in Leachwell method has been used to mitigate against the coarse gold distribution characteristic of the deposit. Where visible gold was observed, samples were submitted for screen fore assay utilising a 75µm screen. The entire half core sample is pulverised, then split to produce a 1kg sample. The sample is passed through a 75µm screen to produce a coarse and fine fraction sample. The entire coarse fraction (and screen) are fired to calculate the amount of coarse gold. Two 50g charges of the fine fraction are fire assayed to determine gold in the fine fraction. The weighted average grade of the coarse fraction assays is reported as calculated gold grade for the interval.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both RC and Diamond Drilling techniques were used to drill the White Feather deposit.
Surface diamond drill holes were completed using HQ2 (63.5 mm) and NQ2 (50.7 mm) coring.
Recent diamond core is routinely orientated using the Reflex ACT Core orientation system.
RC Drilling was completed using a 5.75” face sampling drill bit, downsized to 5.25” at depth.
Seven RC pre-collars were drilled followed by diamond tails. Pre-collar depth was determined in the drill design phase depending on the target been drilled and production constraints.</td></tr>
<tr><td>Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>For DD drilling, any core loss is recorded on the core blocks by the driller. This is then captured by the logging geologist and entered as interval into the hole log.
RC drill recoveries were logged by the geologist or field assistant whilst drilling based on a visual estimation of the proportion of sample returned relative to a full one metre sample. Moisture was logged as wet, moist or dry where wet means all or part of the sample was a slurry, moist means the material was wet enough to clump together and therefore not split effectively through a riffle or cone splitter and dry was any sample that was sufficiently free of moisture to properly run through a riffle or cone splitter.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	RC drilling contractors adjust their drilling approach to specific conditions to maximize sample recovery. No recovery issues were identified during 2014 - 2015 RC drilling. For diamond drilling the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor. Most sample recovery issues occurred in the top 50m of the holes in the oxide zone. As this was not the target of the program and no significant mineralisation was expected, no additional measures were taken to increase recovery through this zone.
	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.	Recovery was excellent for diamond core and no relationship between grade and recovery was observed. Average recovery for the project is 98%.
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 is logged for regolith, lithology, veining, alteration, mineralisation and structure. Structural measurements of specific features are also taken through oriented zones. RC sample chips are logged in 1m intervals for the entire length of each hole. Regolith, lithology, alteration, veining and mineralisation are all recorded. All logging codes for regolith, lithology, veining, alteration, mineralisation and structure is entered into an AcQuire database using suitable pre-set dropdown codes and validation functions to remove the likelihood of human error. All core and chips have been logged to the detailed exploration logging scheme of Delta Gold/Placer Dome/Barrick/Northern Star (i.e. a single logging scheme that has evolved with only minor changes over time).
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet.
	The total length and percentage of the relevant intersections logged.	In all instances, the entire drill hole is logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core is cut using an automated core saw. In most cases, half the core is taken for sampling with the left half being stored for later reference. Full core sampling may be undertaken where data density of half core stored is sufficient for auditing purposes.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	All RC samples are split using a rig-mounted inverted cone splitter to collect a 1 m sample weighing 3-4 kg. All samples were intended and assumed to be dry and moisture content was recorded for every sample.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Preparation of NSR samples was conducted at Genalysis and Min Analytical preparation facilities. Sample preparation commenced with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal 3 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to 3 kg at a nominal <3 mm particle size. For fire assay, leach well the entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% passing 75 µm, using a Labtechnics LM5 bowl pulveriser. 300 g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets for fire assay. Leach well samples had a 1000g or 400g pulp sub-samples collected. The specific details of the sub-sampling techniques and sample preparation for the Delta Gold holes is not well documented but is believed to be somewhat similar to the methods described above. The sample preparation is considered appropriate for the deposit.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are utilised to guide the selection of sample material in the field. Standard procedures are used for all processes within the laboratory. Grind checks are performed at both the crushing stage (3 mm) and pulverising stage (75 µm), requiring 90% of material to pass through the relevant size.
	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.	Field duplicates were taken for RC samples on a ratio of 1 in 20.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material been sampled.
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.	A 50 g fire assay charge is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO_3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis. FA is considered to report total gold content of the sample. A 400 g (or 1000g) leach well charge is bottle rolled with water and sodium cyanide. The settled solution is sampled for analysis with AAS. Leach well digestion is a partial extraction. The tailings residue from 1 in 10 or 1 in 20 Leach well results is sampled and assayed by 25g fire assay with AAS finish to determine residual grade. Delta Gold composite samples were assayed with aqua-regia digest and AAS finish on a 50g charge. Aqua regia digest is considered a partial digest. NSR samples with visible gold were routinely screen fire (1kg) assayed using a 75µm mesh.

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Criteria	JORC Code explanation	Commentary
	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.	No geophysical tools were used to determine any element concentrations.
	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 materials (CRMs) are inserted into the sample sequence at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a nominal rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t if received are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades at the pulverising stage. No field duplicates were submitted for diamond core. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs The QA studies indicate that accuracy and precision are within industry accepted limits.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off.
	The use of twinned holes.	Twinned holes were only drilled in circumstances of intercepting significantly high grades (>5,000 g/t) to evaluate repeatability and grade trends. Re-drilling of some drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database as an 'A'. Re-drilled holes are sampled whilst the original drill hole is logged but not sampled.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging and sampling are directly recorded into AcQuire. Assay files are received in csv or sif format and loaded directly into the database using an AcQuire importer object. Assays are then processed through a form in AcQuire for QAQC checks. Hardcopy and noneditable electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data.
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.	A planned hole is pegged using a Differential GPS by the field assistants. The final collar is picked up after hole completion by field assistants with a Differential Global Positioning System (DGPS) rover unit in the MGA 94_51 grid. During drilling single-shot surveys are conducted every 30 m to ensure the hole remains close to design. This is performed using the Reflex Ez-Trac system which measures the gravitational dip and magnetic azimuth, results are uploaded directly from the Reflex software export into the Acquire database. At the completion of diamond drilling two methods of surveying have been utilised in 2018. Two holes utilised driller operated north seeking Reflex EZ-Gyro in-rod survey instrument taking readings every 10 m, In and Out runs and reported in 5 m intervals. Three holes utilized a surveyor operated DeviFlex RAPID continuous in rod survey instrument taking readings every 2 seconds, In and Our runs and reported in 3 m intervals. Historical mine workings have been digitised and located in 3D by reference to surface features. Location of these working is treated as inaccurate and thus mineralisation surrounding the inferred position of workings has been excluded from the resource.
	Specification of the grid system used.	Collar coordinates and survey azimuth are recorded in MGA94_51.
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups of holes over the last 15 years.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing across the area varies from approximately 20 m to 100 m spacing.
	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 spacing and distribution is considered sufficient to support the resource estimate.
	Whether sample compositing has been applied.	Core is sampled to geology; sample compositing is not applied until the estimation stage. RC samples initially taken as 4m composites to be replaced by 1 m samples in mineralised zones though it is unknown at what grade threshold the 1m sub-samples were analysed for. Compositing of the data to 1m was used in the estimate.

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Criteria	JORC Code explanation	Commentary
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 orientation of the historically mined White Feather Reward is well known and suggests the drilling direction originally undertaken by NSR during resource definition drilling was perpendicular to the orientation of mineralisation. See appendix for picture of orebodies.
	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.	No sampling bias is considered to have been introduced by the drilling orientation. Where drill holes have been particularly oblique, they have been flagged as unsuitable for resource estimation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits have been undertaken of the data and sampling practices at this stage.

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.	All holes mentioned in this report are located within the M27/164 tenement, which is owned by Kanowna Mines PTY LTD a wholly owned subsidiary of Northern Star Resources. The tenement on which the White Feather Reward deposit is hosted (M27/164) covers the historic Kanowna Town site which remains gazetted. The town site boundary is approximately 500m south-west of White Feather Reward. White Feather Reward is located on Crown Reserve 4459 – Common. M27/164 has a partial royalty to Oxford Credits Corporation Pty Ltd however this royalty does not extend over the area of drilling that is the subject of this release.
	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.	No known impediments exist, and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Gold discovered in October 1893 via a 2 m wide outcrop of quartz veining with underground mining continuing into the early 1900s. The bulk of mining on the White Feather trend was completed by 1918, with periods of small scale tribute mining coming to an end in the mid 1940's due to significant water ingress. White Feather Reward was mined to a maximum depth of 150 m below surface. Systematic exploration of the prospect was initiated by Amax Limited in the early 1980s with surface sampling and costeaning. Gencor continued exploration with 35 shallow holes spaced 70-130 m seeking a shallow resource. Delta drilled 17 RC holes focusing on porphyry mineralisation, surface mapping and consolidation of project literature including the compilation of underground mine plans. Aurion (2001) and Placer Dome (2002-2005) drilled broad spaced deep holes identifying more than one vein beneath the project. Barrick Gold held tenure of the project from 2006 up to 2014 with limited exploration. Early 2014 saw Northern Star Resources purchase the Kanowna camp from Barrick Gold which initiated a review of the project due to its close proximity to Kanowna Belle Mine and Mill infrastructure.
Geology	Deposit type, geological setting and style of mineralisation.	The White Feather trend is an approximately N-S striking, (tending N-E striking in the White Feather Reward area), moderate to steeply east dipping fault system that occupies the hinge of a regional anticline cored by Ballarat Conglomerate and quartz porphyry. White Feather is located within the Talbot Formation of the Boorara Domain. The White Feather Fault is thought to be a reactivated D1 fault, similar to the Fitzroy Fault which hosts the Kanowna Belle Deposit. Gold mineralisation along the White Feather fault zone occurs within quartz veins outcropping over a strike of approximately 3.5km that preserve a variety of textures including shear laminations, brecciation and undeformed open space infill. Veins are narrow (0.3 m to 2 m) aligned to North East strike in the White Feather Reward area. Porphyries exhibit a background pervasive low-grade tenor of Au mineralisation to <0.3 g/t. The main mineralising event is associated with the dominant N-S to NE quartz lodes. The lodes are typically hosted in the mafic -ultramafic conglomerate and show a spatial association with the porphyry contacts although the main mineralised structural fabric penetrates the porphyry bodies (although veining is less well developed typically weaker). Gold occurs as coarse grains within these veins.

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Criteria	JORC Code explanation	Commentary
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length.	A summary of the data present in the White Feather project can be found above. The collar locations are presented in plots contained in the NSR 2019 resource report. Drill holes vary in survey dip from -53 to -90 degrees, with hole depths ranging from 24 m to 584 m, with an average depth of 254 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All validated drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	Excluded data is not considered material
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.	No assay results have been top cut for the purpose of this report. A lower cut-off of 1gpt has been used to identify significant results, although lower results are included where a known ore zone has been intercepted, and the entire intercept is low grade
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	If true width cannot be estimated the intersection is noted as "downhole length"
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.	Appropriate plans and section have been included at the end of this Table and in the NSR 2019 resource report.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	No other material exploration data has been collected for this area.
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).	Further drilling is contingent upon project review and assessment of exploration potential along the greater White feather trend.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

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Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are either recorded on paper and manually entered into a database system or is captured digitally via a logging laptop and directly loaded into the database system. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly into the database from laboratory and survey derived files.
	Data validation procedures used.	The database has further checks performed to back -up those performed in Section 2. The complete exported data base including drill and face samples is brought into Datamine and checked visually for any apparent errors i.e. holes not on surface DTM's. Multiple checks are then made on numerical data. This includes: • Empty table checks to ensure all relevant fields are populated • Unique collar location check, • Review of source data within the data base including, collar surveys, down hole surveys and assays Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported. This data will not be used in the estimation process. Historical drilling located within 100 m of recent Northern Start drilling has been classified with a Data Class system, assigning a numerically higher confidence to these holes for the consideration of classifying the estimate. Holes that are located greater than 100 m from recent Northern Star drilling are classified with a numerically lower Data Class and assist with assigning lower confidence in the estimate. In addition to being Resource Flagged as "Yes" or "No", drill holes are assigned a Data Class, which provides a secondary level of confidence in the data quality. Data Class (DC) values range from 0 to 3, with criteria summarised below: • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR • Recent data; minor issues with data such as QAQC fail but away from the ore zone. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits were undertaken by the Geology Manager.
	If no site visits have been undertaken indicate why this is the case.	Site visits were undertaken by the Geology Manager.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the White Feather project was carried out using a systematic approach to ensure continuity of the geology and estimated mineral resource. The confidence in the geological interpretation is high and is supported with information acquired from drilling. The interpretation of all the White Feather project wireframes was conducted using the sectional interpretation method in Datamine RM software. Where drilling data was present sectional interpretation was completed at approximately 20 m spacing. Wireframes were checked for unrealistic volumes and updated where appropriate.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drill holes, and structural models.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations are proposed
	The use of geology in guiding and controlling Mineral Resource estimation.	The interpretation of the mineralised White Feather structures is based on the presence of quartz veining/shearing and continuity between sections of these structures and adjacent mineralised structures.
	The factors affecting continuity both of grade and geology.	The White Feather structure is continuous over the length of the deposit, a lack of drill density to the South has resulted in the interpretation being shortened with either quartz or the controlling structure used to guide this interpretation.
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 strike length of the White Feather structure is approximately 1,500 m. The primary mineralised zone has been interpreted over 700 m. Mineralisation is known to occur from the base of cover to approximately 430 m below surface.
	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	WF1 and halo – gold estimate, lithologically controlled as a narrow quartz vein structure of a single mineralised domain and sub economic gold enriched halo. Domain was analysed for top cuts, variography was completed and indicates grade continuity in the SE plunge direction. The domain was estimated with Ordinary Kriging and the halo

APPENDIX B: TABLE 1

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td>Estimation and modelling techniques</td><td>extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.</td><td>estimated with Inverse Distance Squared, using a search range of ~120 m in direction 1 and 80 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 7 samples and a maximum of 12 samples.
WF2 and halo – gold estimate, lithologically controlled as a narrow quartz vein structure of a single mineralised domain and sub economic gold enriched halo. Domain was analysed for top cuts, variography was completed and indicates grade continuity in the NE plunge direction. The domain was estimated with Ordinary Kriging and the halo estimated with Inverse Distance Squared using a search range of ~70 m in direction 1 and direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 5 samples and a maximum of 12 samples.
WF3 and halo – gold estimate, lithologically controlled as a narrow quartz vein structure of a single mineralised domain and sub economic gold enriched halo. Domain was analysed for top cuts, variography was completed and indicates grade continuity in the NE plunge direction. The domain was estimated using the Inverse Distance Squared method with a search range of ~85 m in direction 1 and 60 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 4 samples and a maximum of 12 samples.
WF4 and halo– gold estimate, lithologically controlled as a narrow quartz vein structure and sub economic mineralised halo, comprised of two domains determined by narrow geometry and orientation. Domains have been analysed for top cuts, variography was completed and indicates grade continuity in the SE plunge direction. The domain was estimated with Ordinary Kriging and the halo estimated with Inverse Distance Squared using a search range of ~115-120 m in direction 1 and 50-80 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 7 samples and a maximum of 12 samples.
WF6 – gold estimate, lithologically controlled as a narrow quartz vein structure material of a single mineralised domain. Domain was analysed for top cuts, variography was completed and indicates grade continuity in the east plunge direction. The domain was estimated using the Inverse Distance Squared method with a search range of 60 m in direction 1 and 50 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 5 samples and a maximum of 12 samples.
WF7 – gold estimate, lithologically controlled as a narrow quartz vein structure material of a single mineralised domain. Domain was analysed for top cuts, variography was completed and indicates grade continuity in the east plunge direction. The domain was estimated using the Inverse Distance Squared method with a search range of 60 m in direction 1 and 50 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 5 samples and a maximum of 12 samples.
WFI - – gold estimate, lithologically controlled porphyry intrusion of a single mineralised domain. Domain was analysed for top cuts, variography was completed and indicates grade continuity in the east plunge direction. The domain was estimated with Ordinary Kriging using a search range of 100 m in direction 1 and 90 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 5 samples and a maximum of 12 samples.</td></tr>
<tr><td></td><td>The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.</td><td>Multiple estimation techniques were used to verify the final estimate grade. These included (where possible) OK, ID^2 and ID^3 and Nearest Neighbour estimation.</td></tr>
<tr><td></td><td>The assumptions made regarding recovery of by-products.</td><td>No assumptions are made and only gold is defined for estimation.</td></tr>
<tr><td></td><td>Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).</td><td>No deleterious elements estimated in the model.</td></tr>
<tr><td></td><td>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</td><td>Block size was determined by sample density and where drill spacing is approximately 30 – 40 m, a 10 x 10 x 20 m block size was chosen.
<table>
<tr><td>Domain</td><td>XMIN</td><td>YMIN</td><td>ZMIN</td><td>XMAX</td><td>YMAX</td><td>ZMAX</td><td>XINC</td><td>YINC</td><td>ZINC</td><td>#X</td><td>#Y</td><td>#Z</td></tr>
<tr><td>White Feather</td><td>367,100</td><td>6,613,900</td><td>- 100</td><td>367,600</td><td>6,614,500</td><td>400</td><td>10</td><td>10</td><td>20</td><td>50</td><td>60</td><td>25</td></tr>
</table>
All the varying block sizes are added together after being estimated individually.
Search ellipse dimensions were derived from the variogram model ranges.</td></tr>
<tr><td></td><td>Any assumptions behind modelling of selective mining units.</td><td>No selective mining units are assumed in this estimate.</td></tr>
<tr><td></td><td>Any assumptions about correlation between variables.</td><td>No other elements other than gold have been estimated.</td></tr>
<tr><td></td><td>Description of how the geological interpretation was used to control the resource estimates.</td><td>Ore wireframes were created as solids in Datamine Studio RM version 1.4 software. The geology model was used as a guide for the creation of the ore lodes:
All lodes except the halos used the presence of veining and grade as an indicator of an ore lode.
The geology model was used for the mineralised intrusive porphyry domain.
For mine planning purposes a waste model was created by sectional polygon extending at least 20 m from mineralisation</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
	Discussion of basis for using or not using grade cutting or capping.	The influence of sample distribution outliers in the composited data has been reduced by top-cutting where required. Top-cut analysis was carried out on the composite gold values, by ascertaining where a break in the grade population occurred in the upper percentiles of each ore lode or domain. Where the high grades were deemed to be significantly anomalous for that grade population, a top cut was applied using the method outlined below. The top cut values are applied in several steps, using a technique called influence limitation top capping. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, the following variables were created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) • AU_BC (spatial variable to determine where non-top cut estimate occurred) The top-cut and non-top cut values are estimated using search ranges based on the variogram, and the *_BC values estimated using very small ranges (e.g. 10 x 10 x 10 m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). This process allows blocks close to high grade samples to be estimated with the full uncut dataset but blocks outside this restricted range are estimated using the top cut dataset. This limits the spread of very high grades but retains the high local value in these blocks, which more closely reflects the style of mineralisation. WF1 ore lode had both a “hard” top cut and influence limitation top cuts applied, due to extreme outliers.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Model validation has been carried out including visual comparison of the composites and block model, swath plots of the declustered composites and estimated blocks; global statistics and check for negative or absent grades.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 2.0 g/t cut off using a 2.5 m minimum mining MSO at a $AU1750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No minimum mining assumptions have been made during the resource wireframing or estimation process.
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.	No metallurgical or recovery assumptions have been made during the mineral resource estimate.
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 green fields 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.	No environmental assumptions have been made during the mineral resource estimate.
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.	An investigation into average density values for the various lithological units White Feather was completed and the mean densities by lithology were coded into the block model post estimation.
	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.	Bulk density measurements were taken using the Archimedes technique onsite; 42 measurements were taken, the majority of which were taken from the 2017 and 2018 diamond drill programs.

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Criteria	JORC Code explanation	Commentary
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	There have been assumptions made based on the consistency of bulk density values within lithologies logged at White Feather. Porphyry and mineralised veins were assigned a bulk density of 2.7 with the encompassing conglomerate and waste assigned a density of 2.77.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The resource classification has been applied to the mineral resource estimate based on the drilling data spacing, grade and geological continuity, data integrity, and kriging confidence (slope of regression), where appropriate.
	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, quality, quantity and distribution of the data).	The classification considers the relative contributions of geological and data quality and confidence, as well as grade confidence and continuity.
	Whether the result appropriately reflects the Competent Person’s view of the deposit.	The classification reflects the view of the Competent Person.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	All resource models have been subjected to internal peer reviews.
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 relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC code
	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.	The statement relates to global estimates of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Historic production records are incomplete, so no comparison or reconciliation has been made.

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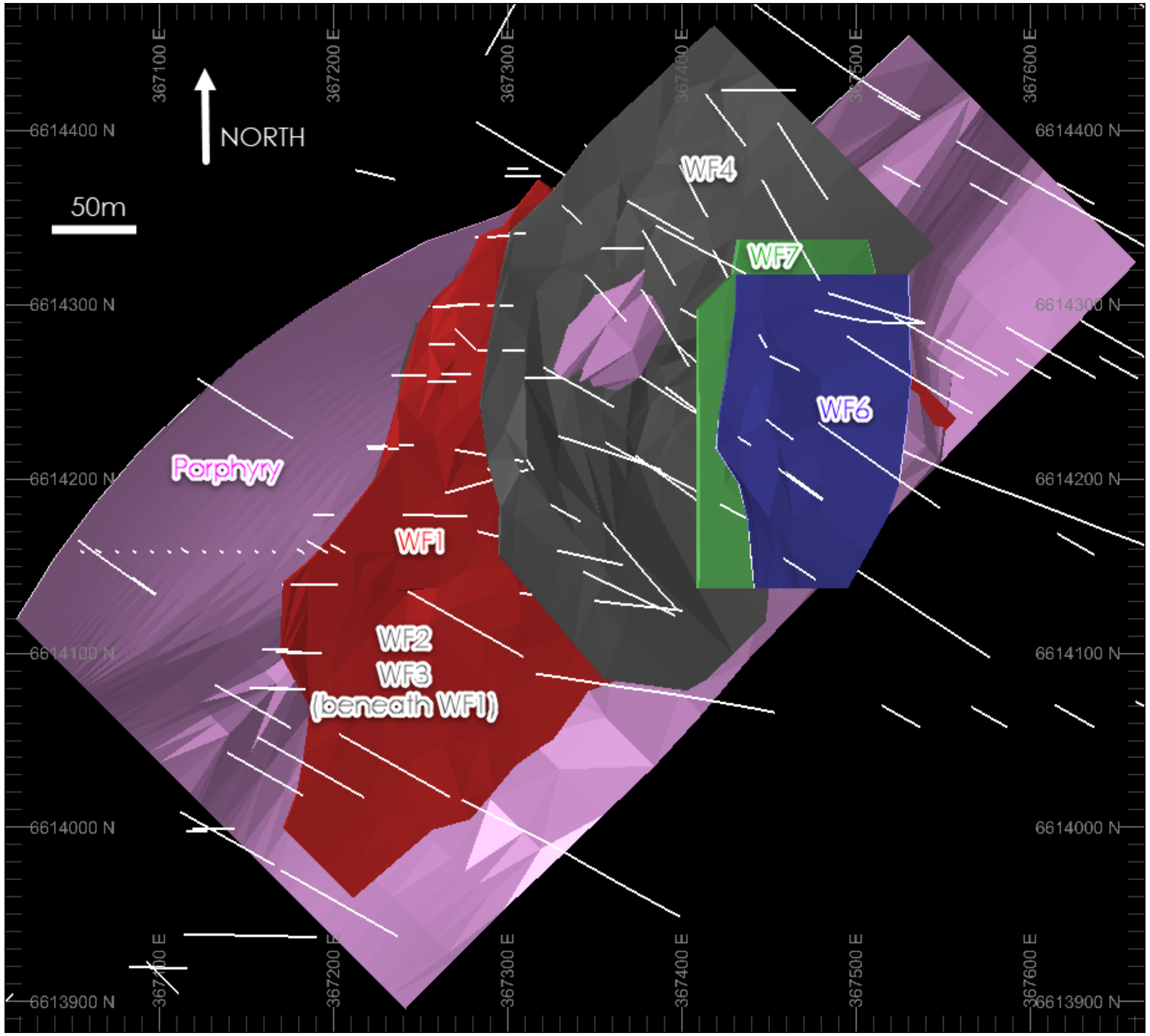

Figure 1. Plan view of the White Feather project and the data used in each resource estimate

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JORC Code, 2012 Edition – Table 1 Report

Red Hill Nemesis: Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="3">Sampling techniques</td><td>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.</td><td>A combination of sample types was used to collect material for analysis including underground diamond drilling (DD) and surface diamond drilling (RC). All RAB holes were excluded from the estimate. Where sufficient diamond drill holes were present, some RC holes were excluded due to inadequate survey and assay methods.
<table>
<tr><td>Lode</td><td>Total holes</td><td>#DD</td><td>#RCD</td><td>#RC</td><td>12 month RC</td><td>12 month DD</td><td>12 month total</td><td>% drilled in last 12 months</td><td>DD samples</td><td>RC samples</td><td>Total samples</td></tr>
<tr><td>Red Hill</td><td>474</td><td>28</td><td>3</td><td>443</td><td>3</td><td>3</td><td>6</td><td>1%</td><td>3,168</td><td>15,790</td><td>18,958</td></tr>
<tr><td>Nemesis</td><td>91</td><td>15</td><td>-</td><td>76</td><td>-</td><td>-</td><td>-</td><td>-</td><td>639</td><td>3,133</td><td>3,772</td></tr>
</table>
Sampling is by both diamond drilling (DD) and Reverse Circulation (RC) drilling completed by both NSR and previous operators.
Diamond core was placed in core trays for logging and sampling. Samples intervals are defined by the geologist to honour geological boundaries. Diamond core samples are mainly HQ and NQ2 and vary between 0.3 m and 1.2 m (NQ2) or between 0.2 m and 1 m (HQ). For 2018 drilling maximum HQ sample interval was reduced to 0.7 m.
For NSR RC samples were split using a rig-mounted cone splitter on 1m intervals to obtain a sample for assay.
Reverse circulation drilling was used to obtain 1m samples from which 2 kg (Delta Gold holes) or 3 kg (Barrick/NSR holes) was pulverised to produce a 50 g charge for fire assay. For the Delta Gold holes, less prospective zones or wet zones were sampled with five metre composites that were assayed with aqua-regia digest and AAS finish on a 50 g charge. All composite intervals returning greater than 0.01 Au g/t were subsequently re-sampled from one metre intervals retained in plastic bags, dried, riffle split, and then treated as above.</td></tr>
<tr><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>RC samples were split using a rig-mounted cone splitter on 1 m intervals to obtain a sample for assay.
Core is aligned and measured by tape, comparing back to downhole core blocks consistent with industry practice.
RC metre intervals are delineated with spray paint to determine metres drilled. Sample rejects is left on the sample pad to indicate metres drilled for the hole.</td></tr>
<tr><td>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 30g 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.</td><td>RC sampling was split using a rig mounted cone splitter to deliver a sample of approximately 3 kg
DD drill core was cut in half using an automated core saw, where the mass of material collected will vary on the hole diameter and sampling interval.
All samples were delivered to a commercial laboratory where they were dried, crushed to <3 mm if required. For samples <3 kg the entire sample is pulverised to 75 µm to produce a 50 g charge for fire assay or either a 1000 g or 400 g sample for Leachwell. Samples >3 kg may be split at the <3 mm crush stage using a rotary splitter to produce a nominal 3 kg subsample.
Visible gold is observed in the core and coarse gold is characteristic. Sampling practices are optimised to obtain the largest practical sample size. Extensive test work by Golder and Associates for the Red Hill feasibility study determined that the larger sample volumes offered by Leachwell (1 kg) and Screen fire (1 kg) provided an effective sample volume and the 400 g Leachwell could provide an appropriate economic and economic compromise.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both RC and Diamond Drilling techniques were used to drill the Red Hill deposit.
Surface diamond drill holes were completed using HQ (63.5 mm) and NQ2 (50.7 mm) coring.
Core is orientated using the Reflex ACT Core orientation system.
RC Drilling was completed using a 5.75” drill bit, downsized to 5.25” at depth.
3 RC pre-collars were drilled followed by NQ2 diamond tails. Pre-collar depth was determined in the drill design phase depending on the target been drilled and production constraints.
Historical drilling has been conducted using RC and Diamond HQ (63.5 mm). Core was oriented using methods current for the period.</td></tr>
<tr><td>Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>For DD drilling, any core loss is recorded on the core block by the driller. This is then captured by the logging geologist and entered as interval into the hole log.
RC drill recoveries were logged by the geologist or field assistant whilst drilling based on a visual estimation of the proportion of sample returned relative to a full one metre sample. Moisture was logged as wet, moist or dry where wet means all or part of the sample was a slurry, moist means the material was wet enough to clump together and therefore not split effectively through a riffle or cone splitter and dry was any sample that was sufficiently free of moisture to properly run through a riffle or cone splitter.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	RC drilling contractors adjust their drilling approach to specific conditions to maximize sample recovery. No recovery issues were identified during 2018 RC drilling. For diamond drilling the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.
	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.	Recovery was excellent for diamond core and no relationship between grade and recovery was observed. Average recovery for the projects is 98%.
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 is logged for regolith, lithology, veining, alteration, mineralisation and structure. Structural measurements of specific features are also taken through oriented zones. RC sample chips are logged in 1m intervals for the entire length of each hole. Regolith, lithology, alteration, veining and mineralisation are all recorded. All logging codes for regolith, lithology, veining, alteration, mineralisation and structure is entered into the AcQuire database using suitable pre-set dropdown codes to remove the likelihood of human error. All core and chips have been logged to the detailed exploration logging scheme of Delta Gold/Placer Dome/Barrick/Northern Star (i.e. a single logging scheme that has evolved with only minor changes over time).
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet.
	The total length and percentage of the relevant intersections logged.	In all instances, the entire drill hole is logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core is cut using an automated core saw. In most cases, half the core is taken for sampling with the left half being stored for later reference. Full core sampling may be undertaken where data density of half core stored is sufficient for auditing purposes.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	All RC samples are split using a rig-mounted cone splitter to collect a 1 m sample weighing 3-4 kg. All samples were intended and assumed to be dry and moisture content was recorded for every sample.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Preparation of NSR samples was conducted at Genalysis and Min Analytical preparation facilities. Sample preparation commenced with sorting, checking and drying at less than 110° C to prevent sulphide breakdown. Samples are jaw crushed to a nominal 3 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to 3 kg at a nominal <3 mm particle size. For fire assay, leach well assay the entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% passing 75 µm, using a Labtechnics LM5 bowl pulveriser. 300 g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets for fire assay. Leach well samples had a 1000 g or 400 g pulp sub samples collected. The sample preparation is considered appropriate for the deposit.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are utilised to guide the selection of sample material in the field. Standard procedures are used for all processes within the laboratory. Grind checks are performed at both the crushing stage (3mm) and pulverising stage (75 µm), requiring 90% of material to pass through the relevant size.
	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.	Field duplicates were taken for RC samples on a ratio of 1 in 20. Umpire sampling programs are carried out on an ad-hoc basis.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material been sampled.
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.	A 50 g fire assay charge is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO_3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis. FA is considered to report total gold content of the sample. A 400 g (or 1000g) leach well charge is bottle rolled with water and sodium cyanide. The settled solution is sampled for analysis with AAS. Leach well digestion is a partial extraction. The tailings residue from 1 in 20 Leach well results is sampled and assayed by 25g fire assay with AAS finish to determine residual grade. Combining the Leachwell and tails grades can be used to determine total gold content of the sample. One in twenty samples in historical resource drilling were mat split to produce 250g to 1kg screen fire assays in addition to the 400g Leachwell sample.
	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.	No geophysical tools were used to determine any element concentrations.

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Criteria	JORC Code explanation	Commentary
	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 materials (CRMs) are inserted into the sample sequence at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a nominal rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t if received are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades. No field duplicates were submitted for recent diamond core. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs The QA studies indicate that accuracy and precision are within industry accepted limits. Multiple reviews of QA processes were undertaken by previous operators for feasibility studies and grade control during mining and QA any issues identified were resolved at the time.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off.
	The use of twinned holes.	Re-drilling of some of the drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database as an 'A'. Re-drilled holes are sampled whilst the original drill hole is logged but not sampled.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging and sampling are directly recorded into AcQuire. Assay files are received in csv format and loaded directly into the database using an AcQuire importer object. Assays are then processed through a form in AcQuire for QAQC checks. Hardcopy and noneditable electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data. Leachwell and fire assay results are too incompatible to allow sensible factoring of Leachwell to match fire assays (or vice versa).
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.	Under NST a planned hole is pegged using a Differential GPS by the field assistants. The final collar is picked up after hole completion by field assistants with a Differential Global Positioning System (DGPS) rover unit in the MGA 94_51 grid. During drilling single-shot surveys are conducted every 30 m to ensure the hole remains close to design. This is performed using the Reflex Ez-Trac system which measures the gravitational dip and magnetic azimuth, results are uploaded directly from the Reflex software export into the Acquire database. At the completion of diamond drilling three methods of surveying have been utilised in 2018. Five holes utilised driller operated north seeking Reflex EZ-Gyro in-rod survey instrument taking readings every 10 m, In and Out runs and reported in 5 m intervals. Two holes utilized a surveyor operated DeviFlex RAPID continuous in rod survey instrument taking readings every 2 seconds, In and Our runs and reported in 3m intervals. One hole was surveyed by ABIMS down hole surveyors. These six holes comprise less than 1% of the total drill hole data set. All historical drilling was surveyed by EDM theodolite in either AMG84 or Redhill local grid. Locations for older holes were either estimated or surveyed by EDM theodolite in AMG66 coordinates. All coordinates have been transformed to MGA 94 Zone 51. All holes with estimated coordinates are located in the Nemesis area. Holes drilled by Delta were down hole surveyed by Gyro or digital electronic multi shot tools. Diamond tails were surveyed by single shot Eastman camera at 30m intervals. Many older holes, (North Ltd. holes), were surveyed by electronic multishot or Eastman Camera. However, a significant proportion were non-surveyed and were assumed to run straight at designed orientations. Many holes with some down-hole survey measurements were not surveyed to full depth. Quality of the historical down hole surveys vary with ~400 of the 624 holes at the project surveyed with a down hole gyroscope (reference and north seeking) whilst the other drill holes rely on magnetic based azimuth systems.
	Specification of the grid system used.	Collar coordinates and survey azimuth are recorded in MGA94_51.
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups during active mining.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing across the area varies from approximately 10 m to 170 m spacing.
	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 spacing and distribution is considered sufficient to support the resource and reserve estimates.

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Criteria	JORC Code explanation	Commentary
	Whether sample compositing has been applied.	Core is sampled to geology; sample compositing is not applied until the estimation stage. RC samples initially taken as 4m composites to be replaced by 1 m samples in mineralised zones though it is unknown at what grade threshold the 1m sub-samples were analysed for. Compositing of the data to 1m was used in the estimate.
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 orientation of the historically mined Red Hill and Nemesis deposits are well known and suggests the drilling direction originally undertaken by NSR during resource definition drilling was appropriate to the orientation of mineralisation. See appendix for picture of orebodies.
	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 dominant vein orientation is shallowly dipping and no sampling bias is considered to have been introduced by the drilling orientation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No recent audits have been undertaken of the data and sampling practices at this stage.

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.	All holes mentioned in this report are located within the M25/57 and M27/164 tenements, which is owned by Kanowna Mines PTY LTD a wholly owned subsidiary of Northern Star Resources. The Red Hill Pit has been backfilled with tailings from the Kanowna Belle Mill. M27/57 is subject two Royalty agreements, the parties to the first are Kanowna Mines and Dioro Exploration (Northern Star South Kalgoorlie). The parties to the second agreement are Grange Resources and Kanowna Mines (Northern Star). M27/164 has a partial royalty to Oxford Credits Corporation Pty Ltd however this royalty does not extend over the area of drilling that is the subject of this release.
	The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.	The tenements are in good standing. Part of the Nemesis area is included within the historical Kanowna Town site. Special permission is required from the Kalgoorlie City Council prior to any work being conducted within the area. A single lease, M27/240, to the SW of Red Hill is owned and occupied by a private individual.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Gold discovered in October 1893 with a 2 m wide outcrop of quartz veining with underground mining continuing into the early 1900s and continues intermittently until the 1980's. Systematic exploration of the prospect was initiated by Sabminco NL and North Limited in 1994 with Delta Gold acquiring and consolidating the Red Hill tenements in 2000 which culminated in 2,714 holes prior to mining Red Hill open pit in 2001. Mining continued until 2007 with Red Hill – Nemesis project producing 356,980 ounces. Barrick Gold held tenure of the project from 2006 up to 2014 with limited exploration. Early 2014 saw Northern Star Resources purchase the Kanowna camp from Barrick Gold which initiated a review of the project due to its close proximity to Kanowna Belle Mine and Mill infrastructure.
Geology	Deposit type, geological setting and style of mineralisation.	Red Hill - Nemesis are felsic porphyritic intrusions located within the Talbot Formation of the Boorara Domain. Intrusive porphyries occupy a structural corridor which trends 060 degrees and extends approximately 4 kilometres to the north east of the Kanowna Belle Gold Mine. In total Red Hill Nemesis is viewed as a bulk 'stockwork' mineralised porphyry dominated by flat to shallow dipping quartz vein sets. In detail gold mineralisation at Red Hill proper is hosted within the Red Hill porphyry stock by three phases of mineralisation; Gold hosted in the altered rock mass provides background grades of the order of 0.3g/t, Gold hosted in early quartz-carbonate and quartz-carbonate-pyrite veins In the order of mm to several cm wide, and the dominant phase of gold hosted in late stage planar, shallowly dipping quartz veins occur on a scale of mm to several m wide. Visible free gold is commonly observed within and these veins are estimated to contribute 60% of the contained gold at Red Hill. Gold mineralisation in the Nemesis Domain is dominated by three styles; a. Gold hosted in breccias, gold hosted in steep east-west trending quartz-pyrite veins and pyrite Stringers and gold hosted in late stage planar flat dipping quartz veins like those observed at Red Hill. The majority of mineralisation is free milling

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Criteria	JORC Code explanation	Commentary
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length.	A summary of the data present in the Red Hill – Nemesis project can be found above. The collar locations are presented in plots contained in the NSR 2019 resource report. Drill holes vary in survey dip from -48 to -90, with hole depths ranging from 3 m to 1, 320 m, with an average depth of 86 m. The assay data acquired from these holes are described in the NSR 2019 Resource report. All validated drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	The exclusion of any information is not considered material
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.	No top-cutting is applied when reporting intersection results. All reported assay results are reported as down hole width. Exploration intercepts have been determined based on geological characteristics such as vein frequency and alteration and grade distribution. Due to the highly variable style of mineralisation these intervals may include zones of relatively low grades.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	Down hole widths have been quoted.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	Due to the geometry of the ore body only down hole widths have been quoted. It is considered that drilling is oriented approximately perpendicular to the dominant vein sets. As such downhole lengths are a good approximation of the vertical width intercepted but do not provide information on lateral extent.
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.	Appropriate plans and section have been included at the end of this Table and in the NSR 2019 Resource report.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	No other material exploration data has been collected for this area.
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).	Further drilling is proposed to test the current resource area for bulk potential below Nemesis and Red Hill pits. Limited infill is planned to test the continuity of mineralisation within the resource area.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

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Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are either recorded on paper and manually entered into a database system or is captured digitally via a logging laptop and directly loaded into the database system. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly into the database from laboratory and survey derived files.
	Data validation procedures used.	The database has further checks performed to back -up those performed in section 2. The complete exported data base including drill holes brought into Datamine and checked visually for any apparent errors i.e. holes not on surface DTM's. Multiple checks are then made on numerical data. This includes: • Empty table checks to ensure all relevant fields are populated • Unique collar location check, • Review of source data within the data base including, collar surveys, down hole surveys and assays Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported. This data will not be used in the estimation process. In addition to being Resource Flagged as "Yes" or "No", drill holes are assigned a Data Class, which provides a secondary level of confidence in the data quality. Data Class (DC) values range from 0 to 3, with criteria summarised below: • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR • Recent data; minor issues with data such as QAQC fail but away from the ore zone. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate. Limited drilling was possible to assign Data Class 2 to, due to a lack of recent drilling proximal for verification and/or validation of raw meta data. Where open pit mining has previously taken place, drill holes were assigned Data Class 2, following review of the geological continuity suggested by the drilling. Therefore, Data Class 1 drilling has been included in the Red Hill-Nemesis MRE, due to otherwise insufficient drilling being present to produce an estimate. Areas of the model where include Data Class 1 drilling have therefore been assigned Unclassified and are for targeting purposes only.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits were undertaken by the Geology Manager.
	If no site visits have been undertaken indicate why this is the case.	The Competent Person has maintained a presence onsite.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the Red Hill and Nemesis project was carried out using a systematic approach to ensure continuity of the geology and estimated mineral resource. The confidence in the geological interpretation at Red Hill is high where the existing pit it located and within the Inferred classification below this; it is supported with information acquired from drilling. The confidence in the Nemesis geological interpretation is moderate and requires additional drilling to determine the mineralisation controls present. Hence Nemesis has been assigned predominantly Unclassified Resource Classification, regardless of drill spacing. The interpretation of all the Red Hills project wireframes was conducted using the sectional interpretation method. Where drilling data was present sectional interpretation was completed at approximately 10 m spacing. Wireframes were checked for unrealistic volumes and updated where appropriate. The Nemesis porphyry interpretation was created using the sectional interpretation method. However, due to the high variability of porphyry position, geometry and poor gold grade relationship between sections, and uncertainty of the geological information from the historic drilling, the estimation uses categorical indicator kriging within this wireframe. due to
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drill holes, and structural models.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretation has been put forward
	The use of geology in guiding and controlling Mineral Resource estimation.	The interpretation of the mineralised porphyry is based on the presence of porphyry intruding the host conglomerate, continuity between sections and adjacent mineralisation.

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<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td></td><td>The factors affecting continuity both of grade and geology.</td><td>The Red Hill - Nemesis porphyry is continuous over the length of the deposit. The Mystery fault forms the primary boundary between the mineralised porphyries terminating the Red Hill mineralisation in the south and located north adjacent of the Nemesis porphyry. Grade is affected by the density of stock work enriching veins at the deposit.</td></tr>
<tr><td>Dimensions</td><td>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.</td><td>The strike length of the Red Hill – Nemesis porphyry is approximately 900 m. The primary mineralised zone has been interpreted over this entirety. Mineralisation is known to occur from the base of cover to approximately 470 m below surface.</td></tr>
<tr><td>Estimation and modelling techniques</td><td>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.</td><td>Red Hill – gold estimate, lithologically controlled as a porphyry intruding a conglomerate. Three domains have been recognised and estimated using indicator estimation based on grade; porphyry waste, low grade and high-grade domains. Domains have been analysed for top cuts and variography with grade continuity in the SE plunge direction. The three domains were estimated using Inverse Distance Cubed, using a search radius of 20 m in direction 1 and 2 for the waste and low-grade domains and 10 m for direction 1 and 2 for the high-grade domain. Three passes were used for the estimation with distances based on variography. The first pass for each domain had a minimum of 8 samples and a maximum of 22 samples.
Nemesis – estimated gold using Categorical Indicator Kriging. Originally probability analysis was completed on composites based on whether lithology has been assigned porphyry or not (Categorical). A wireframe was then created where the selected probability of porphyry is present; this wireframe is used to select composites within, which is then used to complete another probability analysis this time based on grade (<0.3 g/t waste, >0.3 g/t to <2 g/t low grade and >2 g/t high grade). The same approach is completed for the equivalent non-porphyry wireframe, with grade probability analysis completed based on whether the host rock was <0.3 g/t for waste >0.3 g/t to <2 g/t for low grade and >2 g/t for high grade. This resulted in six wireframes/volume models for estimation; probability of high, low-grade and waste within the porphyry and conglomerate lithologies. Top cutting and variography analysis were completed on all six data sets within these wireframes. The variography indicated all domains were omni directional. Search ranges for each estimate were based on variography ranges; the low and high-grade porphyry had ranges of ~20 m in first and second direction. The waste domains had ranges of ~60 m in first direction and second directions. Minimum samples of 8 and maximum of 22 are used for all the estimations.</td></tr>
<tr><td></td><td>The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.</td><td>Multiple estimation techniques were used to verify the final estimate grade. These included (where possible) OK, ID2 and ID3 and Nearest Neighbour estimation.</td></tr>
<tr><td></td><td>The assumptions made regarding recovery of by-products.</td><td>No assumptions are made and only gold is defined for estimation.</td></tr>
<tr><td></td><td>Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).</td><td>No deleterious elements estimated in the model.</td></tr>
<tr><td></td><td>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</td><td>Block size was determined by sample density and mineralised geometry. Where Nemesis mineralisation is more discrete a 10 x 10 x 10 m block size was chosen.
<table>
<tr><th>Domain</th><th>XMIN</th><th>YMIN</th><th>ZMIN</th><th>XMAX</th><th>YMAX</th><th>ZMAX</th><th>XINC</th><th>YINC</th><th>ZINC</th><th>#X</th><th>#Y</th><th>#Z</th></tr>
<tr><td>Red Hill</td><td>366100</td><td>6613800</td><td>-200</td><td>367410</td><td>6614680</td><td>410</td><td>20</td><td>20</td><td>20</td><td>131</td><td>88</td><td>61</td></tr>
<tr><td>Nemesis</td><td>366100</td><td>6613800</td><td>-200</td><td>367410</td><td>6614680</td><td>410</td><td>10</td><td>10</td><td>10</td><td>66</td><td>44</td><td>32</td></tr>
</table>
All the varying block sizes are added together after being estimated individually.
Search ellipse dimensions were derived from the variogram model ranges.</td></tr>
<tr><td></td><td>Any assumptions behind modelling of selective mining units.</td><td>No selective mining units are assumed in this estimate.</td></tr>
<tr><td></td><td>Any assumptions about correlation between variables.</td><td>No other elements other than gold have been estimated.</td></tr>
<tr><td></td><td>Description of how the geological interpretation was used to control the resource estimates.</td><td>Ore wireframes were created as solids in Maptek Vulcan v9.1 software. The geology model was used as a guide for the creation of the ore lodes:
All lodes used the presence of porphyry and grade (> 0.3 g/t) as an indicator of an ore lode.
The geology model was used as the mineralised porphyry domain for Red Hill.
The categorical appointment of porphyry at Nemesis was used control distribution of ore grades greater than 0.3 g/t.
For mine planning purposes a waste model was created by sectional polygon extending at least 20m from mineralisation</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
	Discussion of basis for using or not using grade cutting or capping.	The influence of extreme sample distribution outliers in the composited data has been reduced by top-cutting where required. Top-cut analysis was carried out on the composite gold values, by ascertaining where a break in the grade population occurred in the upper percentiles of each ore lode or domain. Where the high grades were deemed to be significantly anomalous for that grade population, a top cut was applied using the method outlined below. The top cut values are applied in several steps, using a technique called influence limitation top cupping. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, the following variables were created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) • AU_BC (spatial variable to determine where non-top cut estimate occurred) The top-cut and non-top cut values are estimated using search ranges based on the variogram, and the *_BC values estimated using very small ranges (e.g. 10 x 10 x 10 m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). This process allows blocks close to high grade samples to be estimated with the full uncut dataset but blocks outside this restricted range are estimated using the top cut dataset. This limits the spread of very high grades but retains the high local value in these blocks, which more closely reflects the style of mineralisation. Red Hill Low grade, Red Hill high grade, Nemesis conglomerate high grade and Nemesis low grade ore lodes also had a “hard” top cut and influence limitation top cuts applied, due to extreme outliers and small sample datasets
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Model validation has been carried out including visual comparison of the composites and block model, swath plots of the declustered composites and estimated blocks; global statistics and check for negative or absent grades.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 1.5 g/t cut off within a 2.5 m minimum mining width including +/- 0.5 m dilution MSO’s using a $AU1750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No minimum mining assumptions have been made during the resource wireframing or estimation process.
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.	No metallurgical or recovery assumptions have been made during the mineral resource estimate.
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 green fields 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.	No environmental assumptions have been made during the mineral resource estimate.
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.	A thorough investigation into average density values for the various lithological units was completed and the mean densities by lithology were coded into the block model post estimation. Oxidised porphyry and sediments were assigned a bulk density of 2. Transitional porphyry assigned 2,45 and transitional sediments 2.4. Fresh porphyry had a bulk density of 2,72 whilst fresh sediments had a bulk density of 2.65.

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Criteria	JORC Code explanation	Commentary
	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.	Bulk density measurements for Red Hill were taken using the Archimedes technique onsite; 225 measurements were taken in a 2001 scoping study prior to mining, 195 of these were logged as porphyry. Nemesis determination of specific gravity was calculated using the Archimedes technique and down hole gamma technique. 159 samples and 1,402 m (13 holes) had been measured in a 1997 Golden Feather Feasibility Study.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	There have been assumptions made based on the consistency of bulk density values within lithologies logged at Red Hill – Nemesis.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The resource classification has been applied to the mineral resource estimate based on the Data Class, drilling data spacing, grade and geological continuity, data integrity, and kriging confidence (slope of regression), where appropriate
	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, quality, quantity and distribution of the data).	The classification considers the relative contributions of geological and data quality and confidence, as well as grade confidence and continuity.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The classification reflects the view of the Competent Person.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	All resource models have been subjected to internal peer reviews.
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 relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC code
	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.	The statement relates to global estimates of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	The in-situ Resource has been compared to historically mined ounces at the Red hill open pit with the depletion volume quantified at 65% of the total mined ounces at Red Hill with a 0.8 g/t cut-off grade. This may be attributable to drill spacing not sufficiently capturing discrete high-grade lodes.

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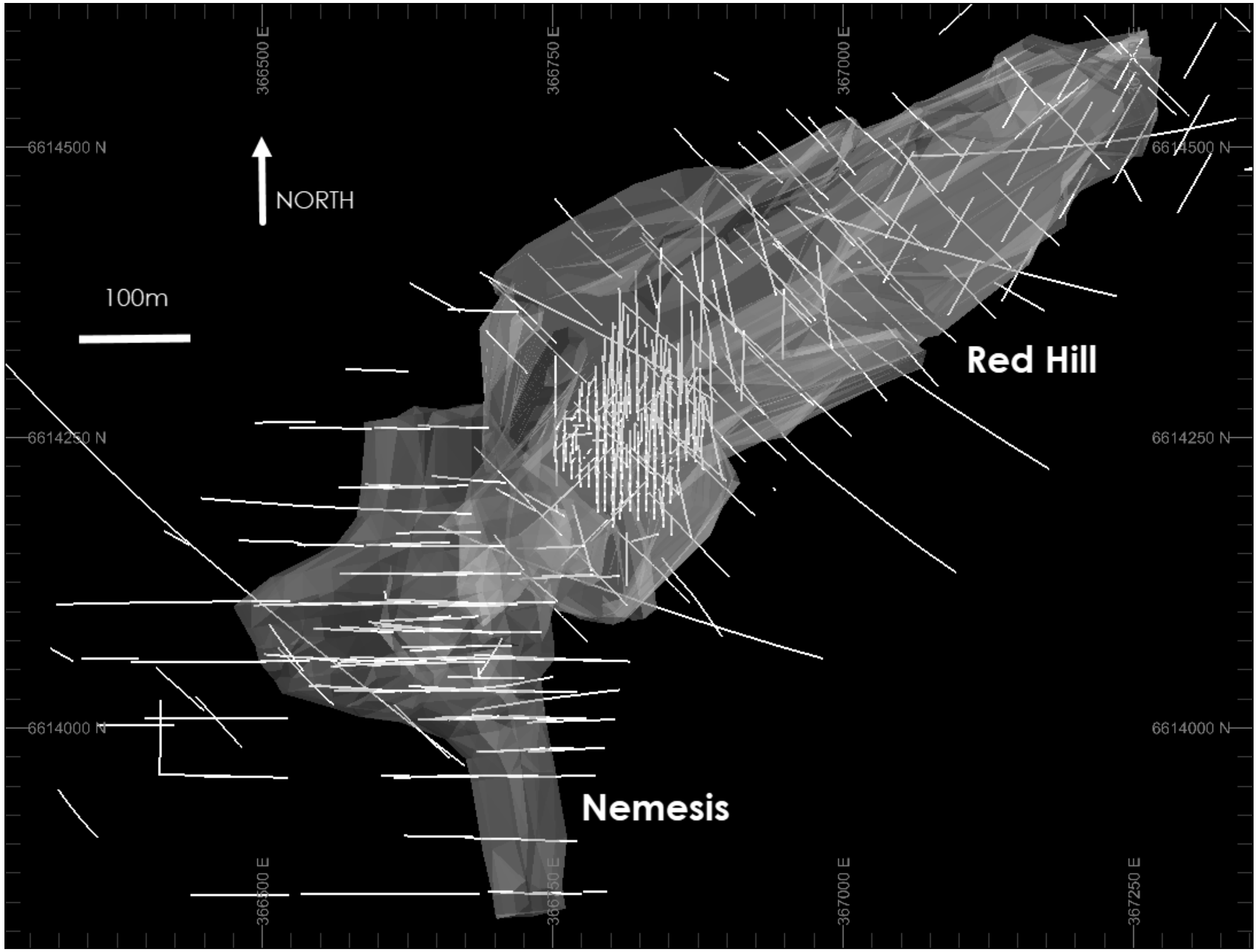

Figure 1. Plan view of Red Hill – Nemesis project and the data used in each resource estimate

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report

Kanowna Belle: Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td>Sampling techniques</td><td>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.</td><td>The sampling database for the Kanowna Belle area has been compiled from information collected by several different companies since initial discovery in 1989. All information collected prior to involvement by Northern Star Resources in 2014 is hereafter referred to as historical data. Only historical data that is deemed as having acceptable and traceable location and assay information has been included in the Mineral Resource estimation datasets for both Kanowna Belle and Velvet.
For Mineral Resource estimation the Kanowna Belle deposits are sampled in majority by diamond drilling (DD) from underground platforms. A relatively minor amount of sampling by reverse circulation (RC) drilling from surface was previously carried out at the Kanowna Belle deposit for delineation of open pit material. Face sampling data (where validated) has been included.
<table>
<tr><th>Hole Type</th><th>No. of Collars</th><th>Total Meters</th><th>No. of Samples</th><th>number of additional collars</th><th>% of additional drillholes</th></tr>
<tr><td>Diamond</td><td>4,741</td><td>741,114</td><td>717,694</td><td>566</td><td>12%</td></tr>
<tr><td>RC</td><td>41</td><td>2,470</td><td>1,690</td><td></td><td></td></tr>
<tr><td>Underground Channels</td><td>223</td><td>1,720</td><td>1,984</td><td>94</td><td>42%</td></tr>
<tr><td>Total Number of Drillholes</td><td>5,005</td><td>745,304</td><td>721,368</td><td>660</td><td>13%</td></tr>
</table></td></tr>
<tr><td></td><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>For DD samples, down hole depth is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geologist during core mark-up prior to logging, to prevent incorrect logging and sampling errors. Sample intervals are then marked on the core by a geologist, to honour geological boundaries. Sample interval lengths vary from 0.3m and 1.3m (NQ). DD core is orientated, measured and then sampled by cutting the core in half longitudinally using an “Almonte” diamond saw. Cutting was along orientation lines. The same half of the core is always selected for each sample interval, placed in numbered calico bags and submitted to the laboratory for analysis. The other half of the core is left in the core tray which was stamped for identification, stored and catalogued. Routine ‘field duplicates’ to assess sample representivity are not performed on diamond core as these are not considered to be true field duplicates.
RC samples were homogenised by riffle splitting prior to sampling and then submitted for assay as either 1m intervals or 2-4m composites. 2-4m composites returning significant assay results were re-assayed by the individual 1m samples. Routine ‘field duplicates’ to assess sample representivity were carried out for most RC programs. Frequency of the duplicates varied from approximately 1:25 to 1:50 due to the historical nature of the majority of the RC data.
Face channel sampling is constrained within geological and mineralised boundaries with a minimum (0.2 m) and maximum (1.3 m) channel sample length. In some cases, smaller samples (0.1 m – 0. 2 m) have been taken to account for smaller structures in the face. The sample is taken across the grade line (1.5m from floor).</td></tr>
<tr><td></td><td>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 30g 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.</td><td>Historical sample preparation and assay procedures are variable due to the duration of historical work and the numerous companies involved. All historical sampling accepted for use in the Mineral Resource estimates are considered to have been collected by acceptable practices.
Current sample preparation and assay procedures employed by Northern Star Resources are considered as following industry standard practice. All assay determinations are conducted by internationally recognised laboratories. The primary laboratory, Bureau Veritas, meets ISO 9001:2000.
Samples are oven dried until a constant mass is achieved. All samples are then processed through an Essa Jaw Crusher or a Boyd Crusher to 90% < 3 mm. The crushed sample is then pulverised for 4 minutes in an LM5 pulveriser for a product of 90% passing < 75 µm. Approximately 250 - 300g of the pulp is retained and a 40g charge weight for fire assay is extracted from the pulp packet. Samples are tested for sulphides and flux adjusted, flux is added at a ratio of 1:4. Samples are fired, hammered and cupelled. Prills placed in tubes, dissolved on hotplates and analysed using AA finish with over range dilutions. Sample preparation for Sulphur determination follows the same process as for Gold, with assaying taking place using the LECO method.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>DD core is mostly NQ diameter with some BQ, HQ and LTK60 diameter core. Where possible diamond core was orientated using a spear, Ballmark™, Ezimark™, or ACE multi electronic tool. For RC holes either 5.5inch or 5.25inch diameter face sampling hammer was used.</td></tr>
<tr><td>Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>For DD, all recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geologist. Any issues are communicated back to the drilling contractor. Recovery is generally very high, in excess of 95%, and there have been no significant sample recovery problems. Historic DD core stored on site shows excellent recovery. For DD drilling, any core loss is recorded on the core block by the driller. This is then captured by the logging geologist and entered as interval into the hole log.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	For DD, drilling contractors adjust the rate of drilling and method if recovery issues arise. Minor loss occurs when drilling through fault zones such as the Fitzroy Fault. Areas of potential lower recovery are generally known before hand and controlled drilling techniques employed to maximise recovery.
	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 specific study has been carried out on recovery and grade. As recoveries are generally very high (95%+) it is assumed that the potential for bias due to variable sample recovery is low.
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 DD core was logged by geologists with lithology, mineralisation, structure, alteration, veining and specific gravity were recorded. Quantitative measures such as structural measurements, intensity of alteration, percentage of mineralisation, thickness of veins and veins per metre were also recorded. Geotechnical measurements on DD core include RQD, Recovery, and Fracture Frequency. For selected holes joint sets, infill, infill thickness and roughness were also geotechnically measured. All mineralised intersections are logged and sampled. Logging is entered in Acquire using a series of drop-down menus which contain the appropriate codes for description of the rock. All underground faces are logged for lithology and mineralisation. Logging is captured on a face sample sheet underground which is then transferred to AcQuire. Faces are then entered into AcQuire using a series of drop-down menus which contain appropriate codes for description of the rock.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Geology logging is qualitative in nature with visual estimates made of mineralisation percentages for core. Structural and geotechnical logging is quantitative in nature. All core is photographed wet as standard practice. Historically some core may have also been photographed dry. All underground faces are logged and sampled to provide both qualitative and quantitative data. All faces are washed down and photographed before sampling is completed.
	The total length and percentage of the relevant intersections logged.	100% of the drill core is logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	DD core is sampled by sawn half-core on intervals controlled by geological domaining represented by mineralisation, alteration and lithology. A selected number of grade control holes were full cored. Mineralized intersections are sampled with a maximum and minimum length of 1.3m and 0.3m, respecting lithological or alteration contacts. The down hole depth of all sample interval extents is recorded.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	Development face samples are chipped directly off the face into a sample bag aiming for sample size of at least 2.5kg. Samples are a maximum of 1.3m in width and honour geological boundaries. Samples are taken horizontally across the mineralisation. All RC samples are split using a rig-mounted cone splitter to collect a sample 3 - 4 kg in size from each 1 m interval. These samples were utilised for any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside known mineralised zones spear samples were taken over a 4 m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Sample preparation follows industry standard practice. Samples are oven dried until a constant mass is achieved. All samples are then processed through an Essa Jaw Crusher or a Boyd Crusher to 90% < 3 mm. The crushed sample is then pulverised for 4 minutes in an LM5 pulveriser for a product of 90% passing < 75 µm. Approximately 250 - 300 g of the pulp is retained and a 40g charge prepared.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Coarse grind checks at the crushing stage (3mm) are carried out at a ratio of 1:25 samples with 90% passing required. Pulp grind checks at the pulverising stage (75 µm) are carried out at a ratio of 1:25 samples with 90% passing required. Laboratory duplicate samples are taken for coarse crush (3mm) and pulverising (75 µm) stages at a ratio of 1:25 samples. Repeat assays are carried out at a ratio of 1:10 on prepared pulp samples.
	Measures taken to ensure that the sampling is representative of the in-situ material collected, including for instance results for field duplicate / second-half sampling.	Quarter core sampling of diamond core is occasionally undertaken for check assays, however routine field duplicates are not performed on diamond core as these are not considered to be true field duplicates. Umpire sampling is performed monthly, where 5% of the samples are sent to the umpire lab for processing.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Grind checks are performed at both the crushing stage (3mm) and pulverising stage (75µm) requiring 90% of material to pass through the relevant size. No specific study has been carried out to determine optimum sub-sample size fractions. These material sizes are assumed to be acceptable for the mineralisation style and material grain size present.
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.	Fire assay analysis is undertaken and this is considered to be a total assay method. Monthly QAQC reports are prepared to check for any bias or trends with conclusions discussed with the laboratory management. Holes that do not pass QAQC are not used for Mineral Resource estimation.

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Criteria	JORC Code explanation	Commentary
	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.	No geophysical tools were used to determine any element concentrations.
	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.	Sampling and assaying QAQC procedures include: - Periodical resubmission of samples to primary and secondary laboratories - Submittal of independent certified reference material - Sieve testing to check grind size - Sample recovery checks. - Unannounced laboratory inspections Standard control samples and blanks purchased from certified commercial suppliers are inserted at a ratio of 1:40. The standard control samples are changed on a 3-month rotation. The results are reviewed on a per batch basis and batches of samples are re-analysed if the result is greater than three standard deviations from the expected result. Any result outside of two standard deviations is flagged for investigation by a geologist and may also be re-assayed. Blanks are inserted into the sample sequence at a nominal ratio of 1:40. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. When visible gold is observed in core, a barren flush is required. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs The QA studies indicate that accuracy and precision are within industry accepted limits.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant and anomalous intersections are verified by a Senior Geologist during the drill hole validation process.
	The use of twinned holes.	No twinned holes were drilled for this data set. Re-drilling of some drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database as an 'A'. Re-drilled holes are sampled whilst the original drill hole is logged but not sampled.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	All data are stored and validated within the site Acquire database. Data import into the database is controlled by documented standard operating procedures, and by a set of validation tools included in Acquire import routines. Hard copies and electronic copies of all primary location, logging and sample results data are filed for each hole. Assay results are received in csv format and loaded directly into the database by the supervising geologist who then checks that the results have inserted correctly. Holes that cannot be accurately validated or do not meet the requirements of Kanowna QAQC are excluded prior to Mineral Resource estimation.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data.
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.	Planned holes are marked up by the mine survey department using a total station survey instrument in the mine grid. All drill hole collar positions were surveyed. All recent DD holes were surveyed down hole by various methods including single shot down hole camera, EMS (Electronic Multi Shot) method or in-rod gyroscopic survey tools. Holes are typically surveyed at 15m and 30m intervals down hole thereafter. Since the 1st of June 2015, a true north seeking gyroscopic tool has been used to line up the rig and record a zero-metre survey. Since May 2019 all DD holes are surveyed down hole only using DeviFlex every 50m and at the end of hole. QAQC is performed on the speed of running, and also on the misclose rate for each gyroscopic survey. Where issues are identified, a single survey run can be chosen as preferred with the remaining data ignored. This data is converted to csv format and imported into the AcQuire database where it is validated by the project geologist. Any poor surveys are re-surveyed and, in some cases, holes have been gyroscope surveyed by ABIMS for non-magnetic affected survey. If survey data was missing or quality was suspect and not replaced by more recent drilling, affected data was not used in estimation.
	Specification of the grid system used.	A local grid system (KBMINE grid) is used. It is rotated anticlockwise 28.43 degrees to the MGA94 grid. Drill hole collars are located by the underground mine surveyors using a Laser system respective to the local mine grid and to the overall property in UTM or Australian grid coordinates.
	Quality and adequacy of topographic control.	Topographic control is not relevant to the underground mine.

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Criteria	JORC Code explanation	Commentary
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing is nominally 60m x 60m down to 20m x 20m in the main zones of mineralisation at the Kanowna Belle and Velvet deposits. Secondary mineralised structures in the hanging wall and footwall of Kanowna Belle are typically narrower and less consistent so have a nominal drill spacing of 15m x 15m.
	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 spacings in the ore lodes at Kanowna Belle are considered sufficient to support the definition of Mineral Resources and Reserves as applied under the 2012 JORC Code. Appropriate geological and grade continuity have been demonstrated during the 20+ years of mining at the Kanowna Belle operations.
	Whether sample compositing has been applied.	No sample compositing has been applied to the database. For grade estimation, the datasets are composited to 1 m intervals prior to grade estimation. This aligns with the most common sample length taken.
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 majority of data is drilled perpendicular to the interpreted strike of the Kanowna Belle ore lodes. Due to the complex overlapping nature of the Mineralized zones actual intersections may be slightly oblique to the intended right angle intersections intended.
	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.	Holes with orientations that are considered likely to introduce sampling bias are flagged during drill hole validation and are excluded from the Mineral Resource estimation datasets.
Sample security	The measures taken to ensure sample security.	All core is kept within the site perimeter fence on the Mining Lease M27/103. Samples are dispatched and/or collected by an offsite delivery service on a regular basis. Each sample batch is accompanied with a: - Job number - Number of Samples - Sample Numbers (including standards and duplicates) - Required analytical methods - A job priority rating A Chain of Custody is demonstrated by both Company and Bureau Veritas in the delivery and receipt of sample materials. Any damage to or loss of samples within each batch (e.g. total loss, spillage or obvious contamination), is reported to the Company in the form of a list of samples affected and detailing the nature of the problem(s).
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	The last external audit was conducted in 2009 with the conclusion that industry best practice was being followed. Standards and procedures have remained largely unchanged since this time. A review of sampling techniques, assay results and data usage were conducted internally by the Companies' Principal Resource Geologist during 2015 with no material issues found.

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 Kanowna Belle mine and associated infrastructure is located on Mining Leases M27/92 and M27/103. Mining lease M27/92 (972.65 ha) was granted on March 14, 1988 and M27/103 (944.25 ha) was granted on January 12, 1989. Both leases were granted for periods of 21 years after which they can be renewed for a further 21 years. The Mining Leases and most of the surrounding tenement holdings are 100% owned by Northern Star (Kanowna) Pty Limited, a wholly owned subsidiary of Northern Star Resources Limited. The mining tenements are either located on vacant crown land or on pastoral leases. The leases containing the deposit are pre-1994 leases so are not subject to Native Title claims.
	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.	No known impediments exist, and the tenements are in good standing.

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Criteria	JORC Code explanation	Commentary
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Kanowna was discovered in 1989 by Delta Gold, open pit mining commenced between 1993 and 1998 resulting in a 220m deep pit. Underground operation began in 1998. In 2002, Delta Gold Limited and Goldfields Limited merged to form Aurion Gold Limited and Placer Dome Inc. (Placer Dome) subsequently acquired Aurion Gold Limited. In 2006 Barrick Gold Corporation acquired Placer Dome and in 2014 Northern Star acquired the operation from Barrick. Exploration drilling is ongoing from underground to extend the known mineral resources.
Geology	Deposit type, geological setting and style of mineralisation.	Kanowna Belle is located within the Kalgoorlie Terrane, one of a number of elongate, broadly NNW-SSE striking structural-stratigraphic late Archaean greenstone terranes of the Eastern Goldfields of Western Australia. The Kanowna Belle gold mine is located close to the centre of the NNW-SSE trending, greenstone-dominated Boorara Domain, the eastern most subdivision of the Kalgoorlie Terrane. The Kanowna Belle deposit can be categorised as a refractory, Archean lode-gold type deposit. The orebody is comprised of several ore shoots, including the large Lowes Shoot, and several smaller lodes including Troy, Hilder, Hangingwall and Footwall shoots controlled by sets of structures of various orientations oblique to Lowes. Lowes contains some 80% of known gold mineralisation and strikes ENE, dips steeply SSW and plunges steeply SW. Lowes shoot has a strike length of 500m, width of 5m to 50m and down-plunge extent greater than 1,250m. The overall steep SE plunge is interpreted to reflect the intersection of D1 (ENE) and D2 (NW) structures. Kanowna Belle is one of the only known refractory pyritic orebodies in the Yilgarn Craton. Gold in the Kanowna Belle deposit occurs mostly as fine-grained (<10 µm) inclusions in pyrite or as very fine-grained gold located in arsenic-rich growth zones in pyrite. Typical ore assemblages contain 0.5% S to 1.5% S and 40 ppm As. The Kanowna Belle deposit is hosted by sedimentary volcanoclastic and conglomeratic rocks which are separated into hangingwall and footwall sequences by a major, steeply SSE dipping zone of structural disruption. This structure represents the product of at least three distinct stages of deformation, comprising the Fitzroy Mylonite, the Fitzroy Shear Zone and the Fitzroy Fault, which have produced clear structural overprinting relations. Importantly, this structure has localised emplacement of the Kanowna Belle porphyry which hosts at least 70% of known mineralisation. Localisation of high-grade mineralisation and most intense alteration around the composite structure emphasises its importance for acting as the major plumbing system for fluids. Formation of the Fitzroy Mylonite and Fitzroy Shear Zone are interpreted to have occurred during regional south-to-north D1 thrusting. A switch in far-field stress axes to the approximately ENE-WSW D2 orientation caused reactivation of the Fitzroy Shear Zone, resulting in sigmoidal folding of pre-existing structures and formation of a shallow lineation associated with sinistral transcurrent shearing. The Kanowna Belle porphyry crosscuts fabrics associated with the D1 Fitzroy Mylonite and Fitzroy Shear Zone and is in turn overprinted by S2.
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: 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.	All of the drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	Exclusion of the drill information will not detract from the understanding of the report.
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2m of barren material between mineralised samples has been permitted in the calculation of these widths.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.
Relationship between mineralisation	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.

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Criteria	JORC Code explanation	Commentary
widths and intercept lengths	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').	Where mineralisation orientations are known, downhole lengths are reported.
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.	Appropriate plans and section have been included in this report.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	No other material exploration data has been collected for this area.
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).	KB Resource: Further mine planning work is planned for this area of the Mineral Resource model. The down dip and hangingwall extensions of the Kanowna Belle Mineral Resource will be drill tested from various underground drilling platforms.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Data used for generating the mineral resource estimates is stored in an Acquire database. The Company employs a database administrator to manage the database. Where possible raw data is loaded directly into the database, with adjustments such as survey transformations occurring within the database so that they are fully traceable. Extensive validation is built into the Acquire database to ensure data integrity and user access logs are maintained for all fields in the dataset. Data validation tools and sign off facilities to record data cross-checking are used.
	Data validation procedures used.	Checks carried out on the imported data include: • Collar details import checks - start and end dates are supplied, collar has location co-ordinate information, actual end of hole depth versus planned end of hole depth is within tolerance, cost code and location code information are supplied. • Survey details import checks – final survey record is within tolerance with respect to end of hole depth, a survey exits at 0 depth, grid transformations have been performed, no duplicate survey points with the same priority exist. • Geology details import checks - final lithology depth is within tolerance with respect to end of hole depth, structural measurement transformations have been performed, alteration/vein/mineralisation logging does not have overlaps and/or gaps. • Samples/Assay import checks – total sample metres match end of hole depth, no duplicate samples with the same priority exist, sample intervals are continuous, no assay values have negative values, dispatch return date is recorded, no 'not sampled' intervals with assay values, QAQC passed. • Geotechnical details import checks – logged information depths are within tolerance with respect to end of hole depth. • Bulk Density/SG details checks – logged information depths are within tolerance with respect to end of hole depth. Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported. This data will not be used in the estimation process. In addition to being Resource Flagged as "Yes" or "No", drill holes are assigned a Data Class, which provides a secondary level of confidence in the data quality. Data Class (DC) values range from 0 to 3, with criteria summarised below: • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR • Recent data; minor issues with data such as QAQC fail but away from the ore zone.

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Criteria	JORC Code explanation	Commentary
		• DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The geological interpretations underpinning these resource models were prepared by geologists working in the mine and in direct, daily contact with the ore body. The estimation of grades was undertaken by the Project Resource Geologists onsite. The Senior Resource Geologist, a competent person for reviewing and signing off on estimations at Kanowna Belle maintained a site presence throughout the process.
	If no site visits have been undertaken indicate why this is the case.	The Competent Person has maintained a presence onsite.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	Open pit and underground mining since 1993 have provided a large database of mapping and drill hole sampling, which has confirmed the geological interpretation to date. The interpretation of all Kanowna Belle ore lode wireframes was conducted using the sectional interpretation method. Sections are commonly 10 m spacing where drill density allows it, with larger spaced polygons required where there is little data. Wireframes were checked for unrealistic volumes and updated where appropriate.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drill holes, underground face channel data, 3D photogrammetry and structural measurements.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	The interpretation within Sims has been updated to follow the HX01 shear zone orientation. This change was based on underground observations. Estimation test work was completed on the original interpretation and compared to the updated interpretation.
	The use of geology in guiding and controlling Mineral Resource estimation.	The underlying geological and structural framework controls gold endowment at the Kanowna Belle deposit. Ore lode interpretations were developed using all available geological data to honour the geological and structural framework and constrain the Mineral Resource estimations.
	The factors affecting continuity both of grade and geology.	Continuity can be affected by changes in lithology, dilation of structures, intersecting structures, vein density and proximity to the main mineralised structures.
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 near-surface weathered portion of the Kanowna Belle deposit shows significant gold depletion to at least 35 m above an undulating supergene "blanket" horizon. This mineralised supergene "blanket" had pre-mining plan dimensions of 600m strike x 250m across strike and a thickness of between 1m and 10m. The main Lowes shoot has a strike length of 500m, width of 5m to 50m, and a down-plunge extent greater than 1,250m. Hanging wall shoots have a maximum strike of 240m, width of 2m to 10m and a current down plunge extent of no more than 800m. Footwall shoots have a maximum strike of 240m, width of 2 to 20m and a current down plunge extent of no more than 700m.
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 for Gold and Sulphur were completed using Datamine Studio RM software. Geostatistical analysis and variography were completed using Snowden's Supervisor v8 software. The Kanowna Belle Resource Model consists of ore lodes, halos and broad subdomains. The halo interpretations include mineralised material that was not captured inside an ore lode (due to low grade or isolated high-grade intercepts). The subdomains estimate everything outside of an ore lode or halo (waste material). Details on the estimation is summarised below: Ore lodes - each ore lode interpretation is considered as being a separate estimation domain for both Kanowna Belle and Velvet estimations. All estimations use hard domain boundaries. Estimations for Gold and Sulphur used Ordinary Kriging, unless otherwise stated (some ore lodes have insufficient number of samples to estimate using Ordinary Kriging, therefore were estimated using Inverse Distance). Estimations use 1m composites with grade capping applied to Gold and Sulphur outlier values. Histograms, log probability plots, mean and variance plots and change in CV of the 1m composites were used to determine capping values on a domain by domain basis. Search ellipse orientation and size were based on variogram rotations and variogram ranges on a domain by domain basis. A multiple-pass estimation strategy was applied for estimations. The Search distance for each lode is ~80% of the distances from the variogram. Minimum and maximum samples are minimum 5 and maximum 10, however each ore lode is optimised individually, which may result in a different minimum and maximum selected. Halo – there are 7 halo interpretations across Kanowna Belle, divided based on the orientation of the main structures. Estimation was a two-stage process, first constructing a grade indicator model, second completing an ordinary kriged estimate based on the domains chosen from the grade indicator test-work. Drill hole data was flagged based on different grade cut-offs (these vary halo to halo depending on the log probability plot and visual observations), creating indicator transformed domains. The high-grade indicator estimate was kept local so as not to project high grade hits beyond geological consistency. Values tested minimum 1 and maximum 3. Probability thresholds were selected for each domain, based on visual observations on whether the blocks were representative of the drill holes. The model was coded with these selected thresholds to create a domain field (waste = 0, low-grade = 1, high-grade = 2). The composite drill holes were then back flagged with the domain values. Histograms, log probability plots, mean and variance plots and change in CV of the 1m composites were used to determine capping values on a domain by domain basis. Search ellipse orientation and size were based on variogram rotations and variogram ranges on a domain by domain basis. A multiple-pass estimation strategy was applied for estimations. Search distance was dependent on the variogram, however for the high-grade domain, the search distance was restricted to ~10 m for direction 1 and 2, and 5 m for direction 3. This was to limit the extent of the influence of high-grade drill holes.

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Criteria	JORC Code explanation	Commentary
		Sub-domains – Kanowna Belle is broadly divided into 4 sub-domains based on the dominant structural orientation in that location. Only 1 search pass was conducted as this is all unclassified waste and minimal data.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Comparison estimations were carried out by Inverse Distance Squared and Nearest Neighbour methods for each model domain alongside the Ordinary Kriged estimates. The final Ordinary Kriged estimates are compared to the previous model estimates and also reconciled to historic production.
	The assumptions made regarding recovery of by-products.	No assumptions are made on recovery of by-products.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	Sulphur can be deleterious to the gold extraction process when it exceeds concentrations of 1.6%. Sulphur is estimated within every ore lode domain, however samples are only sent for assay if the core sample comes back as anything greater than 2 m (true thickness) at 2 g/t, or any sample greater than 10 g/t.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Block sizes varied depending on sample density. Due to the nature of the mineralisation, a 5x5x5m parent block size was used so that the patchy nature of the mineralisation can be represented within the estimate. The subdomains were estimated in 10x10x10m block size due to the lack of drilling. All the varying block sizes are added together after being estimated individually. Search ellipse dimensions were derived from the variogram model ranges.
	Any assumptions behind modelling of selective mining units.	Selective mining units were not used during the estimation process.
	Any assumptions about correlation between variables.	All variables were estimated independently of each other. Density has used estimation parameters based on gold parameters.
	Description of how the geological interpretation was used to control the resource estimates.	Ore lodes and halos were created using sectional interpretation. The ore lodes were used to define the high-grade mineralisation, whilst the halo captures the discontinuous mineralisation outside of the ore lodes. Each lode is considered as being a separate estimation domain. All estimations use hard domain boundaries.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the mean by more than 5% and reducing the coefficient of variation to around 1.2 and vary by domain. The top cut values are applied in several steps, using a technique called influence limitation top capping. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear; this applies to both gold and true thickness (TT) top cutting. For example, where gold requires a top cut, the following variables will be created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) • AU_BC (spatial variable; values present where AU data is top cut) The top-cut and non-top cut values are estimated using search ranges based on the modelled gold variogram, and the *_BC values estimated using very small ranges (e.g. 7 x 7 x 7m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). A hard top cut is applied instead of/as well in the following situations: • If there are extreme outliers within an ore domain • If the area has a history of poor reconciliation (i.e. overcalling)
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	After compositing and grade capping, a series of length and metal checks are completed to ensure the total length of the sample file is maintained and the metal loss due to grade capping can be quantified. Statistics are generated and analysed using Snowden Supervisor software for the raw, composited and capped and composited drill hole files to ensure the nature of the population has not been adversely affected by these processes. Statistical measures of Kriging error, such as Kriging Efficiency and Slope of Regression, are used to assess the quality of the estimation for each domain. Differences between the declustered composite data set and the average model grade must be within 10%. Swath plots comparing declustered composites to block model grades are prepared and visual checks summarising the critical model parameters. Visually, block grades are assessed against drill hole and face data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 2.03 g/t cut off, within 3.0 m minimum mining width MSO's (with no additional dilution), using a $AU1750/oz gold price.

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Criteria	JORC Code explanation	Commentary
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No mining assumptions have been made during the resource wireframing or estimation process.
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.	Metallurgical test work results show that the mineralisation is amendable to processing through the Kanowna Belle treatment plant. Ore processing throughput and recovery parameters were estimated based on historic performance and potential improvements available using current technologies and practices.
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 green fields 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.	A "Licence to Operate" is held by the operation which is issued under the requirement of the "Environmental Protection Act 1986", administered by the Department of Environment (DoE). The licence stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are also regulated by DoE and are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licences and lease conditions. An Environmental Management System is in place to ensure that Northern Star employees and contractors exceed environmental compliance requirements. The Kalgoorlie operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits. Kalgoorlie Operations have been compliant with the International Cyanide Management Code since 2008. Compliance with air quality permits is particularly important at Kanowna because of the roaster operation and because there are three facilities in the Kalgoorlie region emitting SO_2 gas. Kanowna has a management program in place to minimize the impact of SO_2 on regional air quality and ensure compliance with regulatory limits.
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.	A thorough investigation into average density values for the various lithological units at Kanowna Belle and Velvet were completed and the mean densities by lithology were coded into the database. Where there were no measurements for a specific lithology and default of 2.77 (Kanowna Belle) or 2.81 (Velvet) were applied. Density was then estimated by Inverse Distance Squared using the associated gold estimation parameters for that domain. Post estimation, default density values for the oxide and transition zones were applied, based on regional averages.
	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 in-situ competent rock mass does not exhibit significant vughs or pores and is considered solid core.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Assumptions on the average bulk density of individual lithologies, based on 22,000 bulk density measurements at Kanowna Belle. Assumptions were also made based on regional averages, on the default densities applied to oxide (2.1), soil (1.8) and transition (2.52) material, due to lack of measurements in these zones.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: • Geologic grade continuity • Geological confidence • Density of available drilling • Statistical evaluation of the quality of the kriging estimate • Confidence in historical data • The presence of face channel data • Data class of the drill holes
	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, quality, quantity and distribution of the data).	All relevant factors have been given due weighting during the classification process.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resource model methodology is appropriate, and the estimated grades reflect the Competent Persons' view of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	All resource models have been subjected to internal peer reviews. An external review was conducted by Elizabeth Haren of Haren Consulting on estimation approaches within the halo wireframes. Learnings from this review have been applied across Kanowna Belle.

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Criteria	JORC Code explanation	Commentary
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 relative accuracy and confidence of the mineral resource model is reflected in the assigned Mineral Resource classifications.
	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.	The Kanowna Belle is a global estimate.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No reconciliation factors are applied to the resource post-modelling.

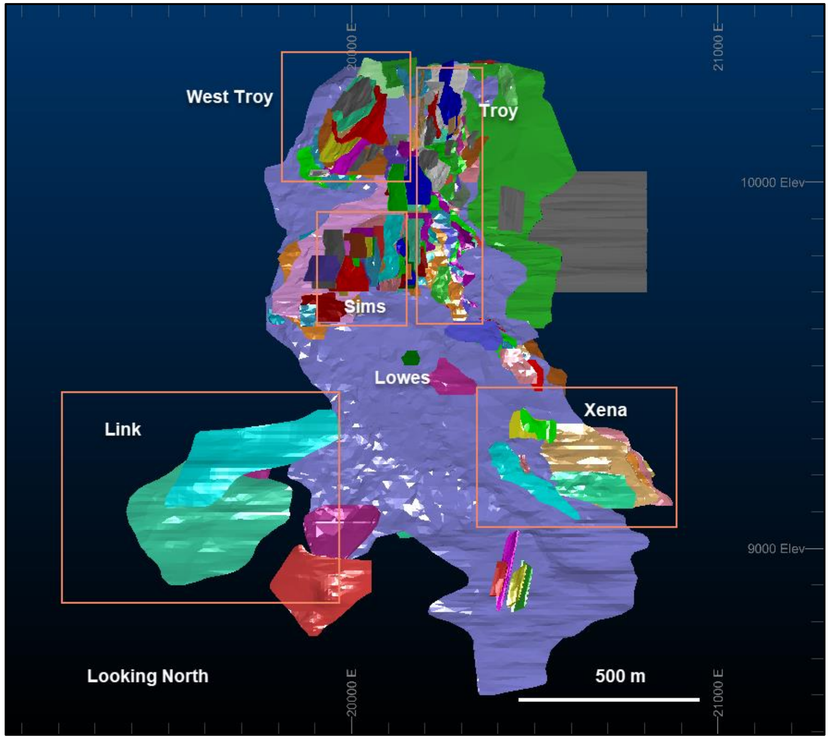

Figure 1. Long section view of the Kanowna Belle deposit

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Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Underground Northern Star Resources Limited (NSR) June 2019 Mineral Resource Open Pit Northern Star Resources Limited June 2017 Mineral Resource compiled by Mining Plus Pty Ltd mining consultants.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been undertaken by the competent person.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	A minimum Pre-Feasibility level study is completed prior to converting an ore zone into ore reserve.
	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.	Underground Ore reserves are re-optimised on a yearly basis taking the most up to date model, gold price and cost forecasts into account. The Ore Reserve methodology at Kanowna Belle is to complete a full mine design built from the latest block model using calculated cut-offs as a guide for designing stopes. Stope shapes are designed around material greater than the stoping cut off and evaluated using the design software. Design of stopes is also carried out beyond the economic limits to ensure that sensitivity results are meaningful. Mine planners are supplied with guidelines for blocking out stopes. These guidelines are to ensure mineable stope shapes. In general, the stope designs will not contain material below the stoping cut off unless there are reasonable grounds to include that material. Exceptions to this include sub-economic material which is encapsulated by payable ore. The stope shapes do not include external dilution. Dilution is applied subsequently, based on historical stope performance. All design work is carried out with the software Studio5D Planner. The existing mine design provides the starting point for the reserves. Planned stope geometry follows geotechnical design guidelines which have been in place for several years. The designs are evaluated for gold, sulphur and tonnes by Mineral Resource category bins. In this way, the Measured and Indicated portions of the design can easily be established. The evaluation results are automatically output to the scheduler software EPS. EPS is used as a flagging and calculation tool in the processing of ore reserves. Factors for dilution and recovery are applied in EPS. All stope shapes are assessed with local financial evaluations to determine if they are profitable. Open Pit: Ore Reserves have been calculated by generating detailed mining shapes for the proposed Kanowna Belle cutback. A series of nested optimised pit shells were generated using Whittle software, an analysis of the shells was completed to select one which was then used to complete a detailed pit design to closely resemble the selected whittle shell. The Whittle optimisation used parameters generated from NSR technical personnel and technical consultants. A detailed mine schedule and cost model has been generated and appropriate ore dilution and recoveries have been applied within the model.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Underground Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. • The applied AUD gold price is supplied by NSR corporate. • Mill recovery factors are based on test work and historical averages. • Various cut-off grades are calculated including a “fully costed” and a “variably costed” stoping cut-off grade. The variably costed stope cut-off is used as the basis for stope design. Kanowna Belle operates at numerous horizons in the mine from as shallow as 170m down to over 1,000m of depth. With depth, come additional costs in terms of haulage and ground support. Cut-off grades take this into account. Cut-off grades are applied on a block by block basis depending on the relative costs. Open Pit: The pit cut-off grade has been calculated based on the key input components (processing, recovery and administration).

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Criteria	JORC Code explanation	Commentary
		Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. • The AUD gold price as per corporate guidance. • Mill recovery factors are based on historical data and metallurgical test work. • Variable treatment costs to open pit mining for processing is a fundamental premise in the evaluation of open pit projects. Variable cut-off grade is used in the evaluation of open pit projects
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).	Mineral Resource is converted to Ore Reserve after completing a detailed mine design complete with a detailed financial assessment. The Mineral Resource block model is the basis for design and evaluation. Open Pit: Ore Reserves have been calculated by generating detailed mining shapes for the proposed cutback. A series of nested optimised pit shells were generated using Whittle software, an analysis of the shells was completed to select one which was then used to complete a detailed pit design to closely resemble the selected whittle shell. The Whittle optimisation used parameters generated from NSR technical personnel and technical consultants.
	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.	Underground Kanowna Belle underground mine is accessed via a portal within the open pit. The ore is accessed on a level spacing of 30m with development of footwall and ore drives to enable long hole open stoping. The mine is subdivided vertically in mining blocks of nominally 150 to 250 vertical metres. Ore is mined from the stopes and tipped into an ore pass system before being loaded into haul trucks to bring to surface. Stopes are nominally 30m vertically and 20m on strike. This may be increased or decreased depending on the local ground conditions. Once stopes are empty, they can be backfilled with paste reticulated from a surface paste plant. Where possible stopes are backfilled with waste to save haulage costs. Open Pit: The selected mining method for the Kanowna Belle cutback are of a bench mining open pit method. The proposed open pit cutback will be mined using conventional open pit mining methods (drill, blast, load and haul) by a mining contractor utilising 120 t class excavators and 90t trucks. This method is used widely in mines across Western Australia and is deemed appropriate given the mature of the ore body.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	The mine design takes geotechnical constraints into account and is reviewed by geotechnical engineers prior to been finalised. Underground operations at Kanowna Belle are subject to mine seismicity. Kanowna Belle has a relatively high stress rock mass and a history of seismic events. The mining environment is controlled by adherence to a geotechnically favourable extraction sequence and by the application of appropriate ground support.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	This Table 1 applies to both underground and open pit mining. And detailed interface review was conducted to ensure separation between underground and open pit Reserve material.
	The mining dilution factors used.	Dilution factors are updated annually and are based on the historical performance of each mining block and evaluation of the geotechnical block model. Average stope dilution is currently 15% for mining shapes with a width greater than 5m and 27% for narrower shapes.
	The mining recovery factors used.	The recovery factor is reviewed and updated annually based on historical recovery at the site. Average stope recovery is currently 88% for mining shapes with a width greater than 5m and 90% for narrower shapes.
	Any minimum mining widths used.	Minimum mining width of 3.0m has been used where the ore is very narrow.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred/unclassified blocks are excluded from the reported Ore Reserve.
	The infrastructure requirements of the selected mining methods.	The Kanowna Belle mine infrastructure is developed and in place and includes mine dewatering pumps, compressed air supply, mine ventilation, and a small shop on the 800 level. The main access ramp connects the mine to an adit in the Kanowna Belle open pit. The ramp is well maintained and is watered to reduce dust generation from the haul trucks. There is a radio communication system throughout the mine.

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Criteria	JORC Code explanation	Commentary
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	The Kanowna Belle plant is made up of crushing, grinding, gravity gold recovery, flotation, roasting, CIL, elution and gold recovery circuits. The milling facilities are designed to process approximately 1.8 million tonnes per annum. The plant has the capability to treat both refractory and free milling ores, through either a flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery) or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plant campaigns both refractory and free milling ores every month. Ore Reserves are calculated using processing plant recovery factors that are based on test work and historical performance.
	Whether the metallurgical process is well-tested technology or novel in nature.	Milling experience gained since 2005, 13 years' continuous operation.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Milling experience gained since 2005, 13 years' continuous operation.
	Any assumptions or allowances made for deleterious elements.	No assumption made.
	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.	Milling experience gained since 2005, 13 years' continuous operation.
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	The Kanowna Belle Mine is operated subject to the requirements of the Western Australian Mining Act 1978 and the Mines (Safety) Act, regulated by the Department of Minerals and Petroleum Resources (DMPR) Mines Inspectorate. The Mining Leases covering the Kanowna Belle operation stipulate environmental conditions for operation, rehabilitation and reporting. A "Licence to Operate" is held by the operation which is issued under the requirements of the "Environmental Protection Act 1986". In late September 2001, DER approval was granted to commence on-site encapsulation and disposal of arsenic trioxide (As_2O_3). In accordance with the licence from the DER, the encapsulated blocks that are disposed of underground are enclosed in backfill generated from the plant tailings.
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.	Access to the Kanowna Belle operation is provided by well-maintained public and private roads. The majority of employees reside in Kalgoorlie and commute to site daily. Normal communication channels satellite and land-based facilities are available. Potable water for the Kanowna Belle operations is pumped from Kalgoorlie to a storage facility on site. Non-potable water requirements are sourced from bore fields up to 10 km away from the mine site. Makeup water for the Kanowna Belle process plant is supplied by pipeline from a bore field located in the Gidgi paleochannel approximately 15 km from the plant site with some water is sourced from abandoned pits. Electricity is provided by the state electricity grid. A 15 km long 33 kV line from Kalgoorlie provides all electricity requirements of the operations. Sources of fuel, such as diesel, gasoline, propane, etc., are readily available at competitive pricing from local suppliers, as there are multiple operating plants in the Kalgoorlie area.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Capital costs are projected through an annual budget process.
	The methodology used to estimate operating costs.	After a design is completed the mining sequence and processing sequence are scheduled. The schedules are costed in detail using a combination of zero-based budgeting system and schedule of rates supplied by the contractor for the underground operation.
	Allowances made for the content of deleterious elements.	No allowances made.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	The gold price is based on internal forecasts.
	The source of exchange rates used in the study.	Internal forecasts.
	Derivation of transportation charges.	Historic performance.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance.
	The allowances made for royalties payable, both Government and private.	State Govt. 2.5% royalty is built into the cost model.

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Criteria	JORC Code explanation	Commentary
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.	A$1,500/oz gold price.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	All product is sold direct at spot market prices.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not applicable.
	Price and volume forecasts and the basis for these forecasts.	Corporate guidance.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not applicable.
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 is used during Pre-Feasibility and Feasibility studies as required. Economic assumptions such as discount rate and estimated inflation are finalised at the time of the study. NPV is not used in the bi-annual reserve optimisation. Cut-off grades, derived from 12 month forward looking unit costs, form the basis of the bi-annual reserve optimisation.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities have been used with gold price ranges of A$1,300 to A$1,700 per ounce.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
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 issues.
	The status of material legal agreements and marketing arrangements.	No issues.
	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.	No issues.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	Classifications of Measured, Indicated and Inferred have been assigned based on data integrity, continuity of mineralisation and geology, drill density and the quality of the grade estimations.
	Whether the result appropriately reflects the Competent Person’s view of the deposit.	The results accurately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Nil.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Ore Reserves reporting processes has been subjected to an internal review by NSR Senior Technical personnel in July 2019.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve Estimate is considered high based on current mine and reconciliation performance.

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Criteria	JORC Code explanation	Commentary
	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.	Estimates are global but will be reasonable accurate on a local scale.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Not applicable.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Reconciliation results from past mining at Kanowna Belle has been considered and factored into the Ore Reserve assumptions where appropriate.

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JORC Code, 2012 Edition – Table 1 Report

Velvet: Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td>Sampling techniques</td><td>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.</td><td>The sampling database for Velvet has been compiled from information collected by several different companies prior to Northern Star Resource in 2014. All information collected prior to involvement by Northern Star Resources is hereafter referred to as historical data. Only historical data that is deemed as having acceptable and traceable location and assay information has been included in the Mineral Resource estimation datasets for Velvet.
For Mineral Resource estimation the Velvet deposit is sampled in majority by diamond drilling (DD) from underground platforms. Face sampling data (where validated) has been included.
<table>
<tr><th>Hole Type</th><th>No. of Collars</th><th>Total Meters</th><th>No. of Samples</th><th>No. of additional collars last 12 month</th><th>% of additional collars last 12 months</th></tr>
<tr><td>Diamond</td><td>715</td><td>87,815</td><td>115,181</td><td>205</td><td>29%</td></tr>
<tr><td>Underground Channels</td><td>321</td><td>2,238</td><td>2,897</td><td>321</td><td>100%</td></tr>
<tr><td>Total Number of Drillholes</td><td>1,036</td><td>90,053</td><td>118,078</td><td>526</td><td>50%</td></tr>
</table></td></tr>
<tr><td></td><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>For DD samples, drill string depths are recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geologist during core mark-up prior to logging to prevent incorrect logging and sampling errors. Sample intervals are then marked on the core by a geologist, to honour geological boundaries. Sample interval lengths vary from 0.3m and 1.3m (NQ). DD core was orientated, measured and then sampled by cutting the core in half longitudinally using an “Almonte” diamond saw. Cutting was along orientation lines. The same half of the core is always selected for each sample interval, placed in numbered calico bags and submitted to the laboratory for analysis. The other half of the core is left in the core tray which was stamped for identification, stored and catalogued. Routine ‘field duplicates’ to assess sample representivity are not performed on diamond core as these are not considered to be true field duplicates.
Face channel sampling is constrained within geological and mineralised boundaries with a minimum (0.2 m) and maximum (1.3 m) channel sample length. In some cases, smaller samples (0.1 m – 0. 2 m) have been taken to account for smaller structures in the face. The sample is taken across the grade line (1.5m from floor).</td></tr>
<tr><td></td><td>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 30g 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.</td><td>Historical sample preparation and assay procedures are variable due to the duration of historical work and the numerous companies involved. All historical sampling accepted for use in the Mineral Resource estimates are considered to have been collected by acceptable practices.
Current sample preparation and assay procedures employed by Northern Star Resources are considered as following industry standard practice. All assay determinations are conducted by internationally recognised laboratories. The primary laboratory, Bureau Veritas, meets ISO 9001:2000.
For preparation samples are oven dried until a constant mass is achieved. All samples are then processed through an Essa Jaw Crusher or a Boyd Crusher to 90% < 3 mm. The crushed sample is then pulverised for 4 minutes in an LM5 pulveriser for a product of 90% passing < 75 µm. Approximately 250 - 300g of the pulp is retained and a 40g charge weight for fire assay is extracted from the pulp packet. Samples are tested for sulphides and flux adjusted, flux is added at a ratio of 1:4. Samples are fired, hammered and cupelled. Prills placed in tubes, dissolved on hotplates and analysed using AA finish with over range dilutions. Sample preparation for Sulphur determination follows the same process as for Gold, with assaying taking place using the LECO method.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>DD core is mostly NQ diameter with some BQ, HQ and LTK60 diameter core. Where possible diamond core was orientated using a spear, Ballmark™, Ezimark™, or ACE multi electronic tool.</td></tr>
<tr><td>Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>For DD, all recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geologist. Any issues are communicated back to the drilling contractor. Recovery is generally high, in excess of 95%, but this will vary between areas based on the presence of faulting. Overall there have been no significant sample recovery problems for Velvet. For DD drilling, any core loss is recorded on the core block by the driller. This is then captured by the logging geologist and entered as interval into the hole log.</td></tr>
<tr><td></td><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>For DD, drilling contractors adjust the rate of drilling and method if recovery issues arise. Minor loss occurs when drilling through fault zones such as the Fitzroy Fault or Panglo Unconformity. Areas of potential lower recovery are generally known before hand and controlled drilling techniques employed to maximise recovery.</td></tr>
<tr><td></td><td>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.</td><td>No specific study has been carried out on recovery and grade. As recoveries are generally high it is assumed that the potential for bias due to variable sample recovery is low.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
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 DD core was logged by geologists with lithology, mineralisation, structure, alteration, veining and specific gravity were recorded. Quantitative measures such as structural measurements, intensity of alteration, percentage of mineralisation, thickness of veins and veins per metre were also recorded. Geotechnical measurements on DD core include RQD, Recovery, and Fracture Frequency. For selected holes joint sets, infill, infill thickness and roughness were also geotechnically measured. All mineralised intersections are logged and sampled. Logging is entered in Acquire using a series of drop-down menus which contain the appropriate codes for description of the rock. All underground faces are logged for lithology and mineralisation. Logging is captured on a face sample sheet underground which is then transferred to AcQuire. Faces are then entered into AcQuire using a series of drop-down menus which contain appropriate codes for description of the rock.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Geology logging is qualitative in nature with visual estimates made of mineralisation percentages for core. Structural and geotechnical logging is quantitative in nature. All core is photographed wet as standard practice. Historically some core may have also been photographed dry. All underground faces are logged and sampled to provide both qualitative and quantitative data. All faces are washed down and photographed before sampling is completed.
	The total length and percentage of the relevant intersections logged.	100% of the drill core is logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	DD core is sampled by sawn, half-core, on intervals controlled by geological domaining represented by mineralisation, alteration and lithology. A selected number of grade control holes were full cored. Mineralized intersections are sampled with a maximum and minimum length of 1.3m and 0.3m, respecting lithological or alteration contacts. The down hole depth of all sample interval extents is recorded.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	Development face samples are chipped directly off the face into a sample bag aiming for sample size of at least 2.5kg. Samples are a maximum of 1.3m in width and honour geological boundaries. Samples are taken horizontally across the mineralisation.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Sample preparation follows industry standard practice. Samples are oven dried until a constant mass is achieved. All samples are then processed through an Essa Jaw Crusher or a Boyd Crusher to 90% < 3 mm. The crushed sample is then pulverised for 4 minutes in an LM5 pulveriser for a product of 90% passing < 75 µm. Approximately 250 - 300 g of the pulp is retained and a 40g charge prepared.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Coarse grind checks at the crushing stage (3mm) are carried out at a ratio of 1:25 samples with 90% passing required. Pulp grind checks at the pulverising stage (75 µm) are carried out at a ratio of 1:25 samples with 90% passing required. Laboratory duplicate samples are taken for coarse crush (3mm) and pulverising (75 µm) stages at a ratio of 1:25 samples. Repeat assays are carried out at a ratio of 1:10 on prepared pulp samples.
	Measures taken to ensure that the sampling is representative of the in-situ material collected, including for instance results for field duplicate / second-half sampling.	Quarter core sampling of diamond core is occasionally undertaken for check assays, however routine field duplicates are not performed on diamond core as these are not considered to be true field duplicates. Umpire sampling is performed monthly, where 5% of the samples are sent to the umpire lab for processing.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Grind checks are performed at both the crushing stage (3mm) and pulverising stage (75µm) requiring 90% of material to pass through the relevant size. No specific study has been carried out to determine optimum sub-sample size fractions. These material sizes are assumed to be acceptable for the mineralisation style and material grain size present.
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.	Fire assay analysis is used and this is considered to be a total assay method. Monthly QAQC reports are prepared to check for any bias or trends with conclusions discussed with the laboratory management. Holes that do not pass QAQC are not used for Mineral Resource estimation.
	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.	No geophysical tools were used to determine any element concentrations.

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Criteria	JORC Code explanation	Commentary
	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.	Sampling and assaying QAQC procedures include: - Periodical resubmission of samples to primary and secondary laboratories - Submittal of independent certified reference material - Sieve testing to check grind size - Sample recovery checks. - Unannounced laboratory inspections Standard control samples and blanks purchased from certified commercial suppliers are inserted at a ratio of 1:40. The standard control samples are changed on a 3-month rotation. The results are reviewed on a per batch basis and batches of samples are re-analysed if the result is greater than three standard deviations from the expected result. Any result outside of two standard deviations is flagged for investigation by a geologist and may also be re-assayed. Blanks are inserted into the sample sequence at a nominal ratio of 1:40. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. When visible gold is observed in core, a barren flush is required. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs The QA studies indicate that accuracy and precision are within industry accepted limits.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant and anomalous intersections are verified by a Senior Geologist during the drill hole validation process.
	The use of twinned holes.	No twinned holes were drilled for this data set. Re-drilling of some drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database as an ‘A’. Re-drilled holes are sampled whilst the original drill hole is logged but not sampled.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	All data are stored and validated within the site Acquire database. Data import into the database is controlled by documented standard operating procedures, and by a set of validation tools included in Acquire import routines. Hard copies and electronic copies of all primary location, logging and sample results data are filed for each hole. Assay results are received in csv format and loaded directly into the database by the supervising geologist who then checks that the results have inserted correctly. Holes that cannot be accurately validated or do not meet the requirements of Kanowna QAQC are excluded prior to Mineral Resource estimation.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data.
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.	Planned holes are marked up by the mine survey department using a total station survey instrument in the mine grid. All drill hole collar positions were surveyed. All recent DD holes were surveyed down hole by various methods including single shot down hole camera, EMS (Electronic Multi Shot) method or in-rod gyroscopic survey tools. Holes are typically surveyed at 15m and 30m intervals down hole thereafter. Since the 1st of June 2015, a true north seeking gyroscopic tool has been used to line up the rig and record a zero-metre survey. Since May 2019 all DD holes are surveyed down hole only using DeviFlex every 50m and at the end of hole. QAQC is performed on the speed of running, and also on the misclose rate for each gyroscopic survey. Where issues are identified, a single survey run can be chosen as preferred with the remaining data ignored. This data is converted to csv format and imported into the AcQuire database where it is validated by the project geologist. Any poor surveys are re-surveyed and in some cases holes have been gyroscope surveyed by ABIMS for non-magnetic affected survey. If survey data was missing or quality was suspect and not replaced by more recent drilling, affected data was not used in estimation.
	Specification of the grid system used.	A local grid system (KBMINE grid) is used. It is rotated anticlockwise 28.43 degrees to the MGA94 grid. Drill hole collars are located by the underground mine surveyors using a Laser system respective to the local mine grid and to the overall property in UTM or Australian grid coordinates.
	Quality and adequacy of topographic control.	Topographic control is not relevant to the underground mine.
	Data spacing for reporting of Exploration Results.	Drill hole spacing is nominally 60m x 60m down to 20m x 20m in the main zones of mineralisation at Velvet. Channel samples are generally 4-5 m spaced, where present.

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Criteria	JORC Code explanation	Commentary
Data spacing and distribution	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 spacings in the ore lodes at Velvet is considered sufficient to support the definition of Mineral Resources and Reserves as applied under the 2012 JORC Code.
	Whether sample compositing has been applied.	No sample compositing has been applied. The datasets were composited to 1 m intervals prior to grade estimation. This aligns with the most common sample length taken.
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 majority of data is drilled perpendicular to the interpreted strike of the main Velvet lode (VM01). However, at depth, the drill angle is more oblique due to lack of drill platforms.
	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.	Holes with orientations that are considered likely to introduce sampling bias are flagged during drill hole validation and are excluded from the Mineral Resource estimation datasets.
Sample security	The measures taken to ensure sample security.	All core is kept within the site perimeter fence on the Mining Lease M27/103. Samples are dispatched and/or collected by an offsite delivery service on a regular basis. Each sample batch is accompanied with a: - Job number - Number of Samples - Sample Numbers (including standards and duplicates) - Required analytical methods - A job priority rating A Chain of Custody is demonstrated by both Company and Bureau Veritas in the delivery and receipt of sample materials. Any damage to or loss of samples within each batch (e.g. total loss, spillage or obvious contamination), is reported to the Company in the form of a list of samples affected and detailing the nature of the problem(s).
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	The last external audit was conducted in 2009 with the conclusion that industry best practice was being followed. Standards and procedures have remained largely unchanged since this time. A review of sampling techniques, assay results and data usage were conducted internally by the Companies' Principal Resource Geologist during 2015 with no material issues found.

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 Velvet and Kanowna Belle mine and associated infrastructure is located on Mining Leases M27/92 and M27/103. Mining lease M27/92 (972.65 ha) was granted on March 14, 1988 and M27/103 (944.25 ha) was granted on January 12, 1989. Both leases were granted for periods of 21 years after which they can be renewed for a further 21 years. The Mining Leases and most of the surrounding tenement holdings are 100% owned by Northern Star (Kanowna) Pty Limited, a wholly owned subsidiary of Northern Star Resources Limited. The mining tenements are either located on vacant crown land or on pastoral leases. The leases containing the deposit are pre-1994 leases so are not subject to Native Title claims.
	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.	No known impediments exist, and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Kanowna was discovered in 1989 by Delta Gold, open pit mining commenced between 1993 and 1998 resulting in a 220m deep pit. Underground operation began in 1998. In 2002, Delta Gold Limited and Goldfields Limited merged to form Aurion Gold Limited and Placer Dome Inc. (Placer Dome) subsequently acquired Aurion Gold Limited. In 2006 Barrick Gold Corporation acquired Placer Dome and in 2014 Northern Star acquired the operation from Barrick. Exploration drilling is ongoing from underground to extend the known mineral resources.

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Criteria	JORC Code explanation	Commentary
Geology	Deposit type, geological setting and style of mineralisation.	The Velvet orebody is located approximately 600 m west of the Kanowna Belle deposit at a vertical depth of 700 m below surface. The currently defined mineral resource is contained within a northwest-dipping main lode and 12 secondary lodes, developing in the hanging wall of the main lode. Velvet main lode VM01 is open at depth, with current dimensions of 454m (dip) by 355m (strike); the secondary, oblique lodes are open along strike. The Velvet deposit is interpreted to be part of the Kanowna Belle gold mineralised system. The geology and mineralisation of the Velvet deposit is dominated by the intersection of the Fitzroy Shear Zone and the Velvet Mylonite, a hanging wall splay off the Fitzroy Shear Zone. The Velvet Mylonite is characterized by a well-developed porphyroclastic fabric and is separated from the Fitzroy shear Zone by a zone of massive dolomite breccia. The Fitzroy Shear Zone separates the local stratigraphy into distinct footwall and hanging wall lithological domains. A succession of thick-bedded, dacitic volcaniclastic breccia (Grave Dam Grit) is the dominant lithology in the hanging wall domain, with a moderately southwest-dipping sequence of clast-supported polymictic conglomerate and fine-grained felsic volcaniclastic rocks (Golden Valley Conglomerate) occupying the footwall domain. The Grave Dam Grit and Golden Valley Conglomerate have maximum depositional ages of 2668 ± 9 Ma and 2669 ± 7 Ma respectively. The Grave Dam Grit has been intruded by a suite of fractionated felsic to intermediate intrusions which can be locally distinguished by subtle differences in texture and geochemical composition. Five types of intrusion have been identified at Velvet: two types with Kanowna Belle Porphyry-like compositions, the Panglo Porphyry, hornblende porphyry and a lamprophyre dyke of intermediate composition. The latter is the principal host to gold mineralisation, although late quartz-calcite veins containing coarse-grained visible gold occur sporadically in all hanging wall lithologies. The lamprophyre host rock is typically massive, aphyric and comprises fine-grained clinopyroxene microphenocrysts in a very fine-grained groundmass of plagioclase, ferromagnesian minerals and minor Fe-Ti oxide crystals. It and the earliest gold mineralisation phase are crosscut by all other intrusions. Both lithological domains and the hanging wall intrusions are truncated to the west by an erosional unconformity at the base of the Panglo Basin. Polymictic conglomerate and coarse-grained lithic arenite units of the Panglo Basin are correlated with the ~2650 Ma Kurrawang Formation.
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: 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.	All of the drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report. A summary can be found above.
	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.	The exclusion of data is not considered material
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2m of barren material between mineralised samples has been permitted in the calculation of these widths.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	Where mineralisation orientations are known, downhole lengths are reported, else they rare noted as "downhole length".
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.	Appropriate plans and section have been included in this report.

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Criteria	JORC Code explanation	Commentary
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	No other material exploration data has been collected for this area.
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).	Further mine planning work is planned for this area of the Mineral Resource model. The down dip and hangingwall extensions of the Velvet Mineral Resource will be drill tested from various underground drilling platforms.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Data used for generating the mineral resource estimates is stored in an Acquire database. The Company employs a database administrator to manage the database. Where possible raw data is loaded directly into the database, with adjustments such as survey transformations occurring within the database so that they are fully traceable. Extensive validation is built into the Acquire database to ensure data integrity and user access logs are maintained for all fields in the dataset. Data validation tools and sign off facilities to record data cross-checking are used.
	Data validation procedures used.	Checks carried out on the imported data include: • Collar details import checks - start and end dates are supplied, collar has location co-ordinate information, actual end of hole depth versus planned end of hole depth is within tolerance, cost code and location code information are supplied. • Survey details import checks – final survey record is within tolerance with respect to end of hole depth, a survey exits at 0 depth, grid transformations have been performed, no duplicate survey points with the same priority exist. • Geology details import checks - final lithology depth is within tolerance with respect to end of hole depth, structural measurement transformations have been performed, alteration/vein/mineralisation logging does not have overlaps and/or gaps. • Samples/Assay import checks – total sample metres match end of hole depth, no duplicate samples with the same priority exist, sample intervals are continuous, no assay values have negative values, dispatch return date is recorded, no 'not sampled' intervals with assay values, QAQC passed. • Geotechnical details import checks – logged information depths are within tolerance with respect to end of hole depth. • Bulk Density/SG details checks – logged information depths are within tolerance with respect to end of hole depth. In addition to being Resource Flagged as "Yes" or "No", drill holes are assigned a Data Class, which provides a secondary level of confidence in the data quality. Data Class (DC) values range from 0 to 3, with criteria summarised below: • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR • Recent data; minor issues with data such as QAQC fail but away from the ore zone. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The geological interpretations underpinning these resource models were prepared by geologists working in the mine and in direct, daily contact with the ore body. The estimation of grades was undertaken by the Project Resource Geologists onsite. The Senior Resource Geologist, a competent person for reviewing and signing off on estimations at Kanowna Belle maintained a site presence throughout the process.
	If no site visits have been undertaken indicate why this is the case.	The Competent Person has maintained a presence onsite.

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Criteria	JORC Code explanation	Commentary
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	Open pit and underground mining since 1993 have provided a large database of mapping and drill hole sampling, which has confirmed the geological interpretation to date. The interpretation of all Velvet ore lode wireframes was conducted using the sectional interpretation method. Sections are commonly 10 m spacing where drill density allows it, with larger spaced polygons required where there is little data. Wireframes were checked for unrealistic volumes and updated where appropriate.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drill holes, underground face channel data, 3D photogrammetry and structural measurements.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	The interpretation of VM01 was updated at depth. Multiple estimation approaches within VM01 were conducted, including with and without channels.
	The use of geology in guiding and controlling Mineral Resource estimation.	The underlying geological and structural framework controls gold endowment at the Kanowna Belle deposit. Ore lode interpretations were developed using all available geological data to honour the geological and structural framework and constrain the Mineral Resource estimations.
	The factors affecting continuity both of grade and geology.	Continuity can be affected by changes in lithology, dilation of structures, intersecting structures, vein density and proximity to the main mineralised structures.
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 main VM01 ore lode in Velvet has a strike length of 50-400m, width of 2-30m, and a down-plunge extent of greater than 500m.
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 for Gold and Sulphur were completed using Datamine Studio RM software. Geostatistical analysis and variography were completed using Snowden's Supervisor v8 software. The Velvet Resource Model consists of ore lodes, halo and a broad subdomain. The halo interpretation includes mineralised material that was not captured inside an ore lode (due to low grade or isolated high-grade intercepts). The subdomains estimate everything outside of an ore lode or halo (waste material). Details on the estimation is summarised below: Ore lodes - each ore lode interpretation is considered as being a separate estimation domain for both Kanowna Belle and Velvet estimations. All estimations use hard domain boundaries. Estimations for Gold and Sulphur used Ordinary Kriging, unless otherwise stated (some ore lodes have insufficient number of samples to estimate using Ordinary Kriging, therefore were estimated using Inverse Distance). Estimations use 1m composites with grade capping applied to Gold and Sulphur outlier values. Histograms, log probability plots, mean and variance plots and change in CV of the 1m composites were used to determine capping values on a domain by domain basis. Search ellipse orientation and size were based on variogram rotations and variogram ranges on a domain by domain basis. A multiple-pass estimation strategy was applied for estimations. The Search distance for each lode is ~80% of the distances from the variogram. Minimum and maximum samples are minimum 5 and maximum 10, however each ore lode is optimised individually, which may result in a different minimum and maximum selected. VM01 – the main Velvet lode was estimated as follows. Firstly, Dynamic Anisotropy was applied to the ore lode. Secondly, VM01 was subdomained into 3 portions based on geological confidence in the interpretation and data density. The indicator model was constructed using semi-soft boundaries (30 m) between subdomains, assigning three grade bins to each subdomain: low-grade (<0.9 g/t), medium-grade (0.9-3 g/t) and high-grade (>3 g/t). Probability thresholds were selected for each domain, based on visual observations on whether the blocks were representative of the drill holes. The model was coded with these selected thresholds to create a domain field (0, 1 or 2). The composite drill holes were then back flagged with the domain values. Subdomain 1 was then estimated using Ordinary Kriging with an anisotropic search and using DA with a forced plunge. Subdomain 2 was estimated using Inverse Distance with an isotropic search and DA with no forced plunge. Subdomain 3 was estimated the same as Subdomain 2, however with a larger block size (10x10x10) as the drill hole spacing is wider at depth. Halo – there is 1 halo interpretation within Velvet. Estimation was a two-stage process, first constructing a grade indicator model, second completing an ordinary kriged estimate based on the domains chosen from the grade indicator test-work. Drill hole data was flagged based on different grade cut-offs (these vary halo to halo depending on the log probability plot and visual observations), creating indicator transformed domains. The high-grade indicator estimate was kept local so as not to project high grade hits too far. Values tested minimum 1 and maximum 3. Probability thresholds were selected for each domain, based on visual observations on whether the blocks were representative of the drill holes. The model was coded with these selected thresholds to create a domain field (waste = 0, low-grade = 1, high-grade = 2). The composite drill holes were then back flagged with the domain values. Histograms, log probability plots, mean and variance plots and change in CV of the 1m composites were used to determine capping values on a domain by domain basis. Search ellipse orientation and size were based on variogram rotations and variogram ranges on a domain by domain basis. A multiple-pass estimation strategy was applied for estimations. Search distance was dependent on the variogram, however for the high-grade domain, the search distance was restricted to ~10 m for direction 1 and 2, and 5 m for direction 3. This was to limit the extent of the influence of high-grade drill holes. Sub-domains – Velvet is separated from Kanowna Belle by a sub-domain based on the dominant structural orientation in that location. Only 1 search pass was conducted as this is all unclassified waste and minimal data.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Comparison estimations were carried out by Inverse Distance Squared and Nearest Neighbour methods for each model domain alongside the Ordinary Kriged estimates. The final Ordinary Kriged estimates are compared to the previous model estimates and also reconciled to historic production.
	The assumptions made regarding recovery of by-products.	No assumptions are made on recovery of by-products.

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Criteria	JORC Code explanation	Commentary
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	Sulphur can be deleterious to the gold extraction process when it exceeds concentrations of 1.6%. Sulphur is estimated within every ore lode domain, however samples are only sent for assay if the core sample comes back as anything greater than 2 m (true thickness) at 2 g/t, or any sample greater than 10 g/t.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Block sizes varied depending on sample density. Due to the nature of the mineralisation, a 5x5x5m parent block size was used so that the patchy nature of the mineralisation can be represented within the estimate. The subdomains were estimated in 10x10x10m block size due to the lack of drilling. All the varying block sizes are added together after being estimated individually. Search ellipse dimensions were derived from the variogram model ranges.
	Any assumptions behind modelling of selective mining units.	Selective mining units were not used during the estimation process.
	Any assumptions about correlation between variables.	All variables were estimated independently of each other. Density has used estimation parameters based on gold
	Description of how the geological interpretation was used to control the resource estimates.	Ore lodes and halos were created using sectional interpretation. The ore lodes were used to define the high-grade mineralisation, whilst the halo captures the discontinuous mineralisation outside of the ore lodes. Each lode is considered as being a separate estimation domain. All estimations use hard domain boundaries.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the mean by more than 5% and reducing the coefficient of variation to around 1.2 and vary by domain. The top cut values are applied in several steps, using a technique called influence limitation top capping. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear; this applies to both gold and true thickness (TT) top cutting. For example, where gold requires a top cut, the following variables will be created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) • AU_BC (spatial variable; values present where AU data is top cut) The top-cut and non-top cut values are estimated using search ranges based on the modelled gold variogram, and the *_BC values estimated using very small ranges (e.g. 7 x 7 x 7m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). A hard top cut is applied in the following situations: • If there are extreme outliers within an ore domain • If the area has a history of poor reconciliation (i.e. overcalling)
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	After compositing and grade capping, a series of length and metal checks are completed to ensure the total length of the sample file is maintained and the metal loss due to grade capping can be quantified. Statistics are generated and analysed using Snowden Supervisor software for the raw, composited and capped and composited drill hole files to ensure the nature of the population has not been adversely affected by these processes. Statistical measures of Kriging error, such as Kriging Efficiency and Slope of Regression, are used to assess the quality of the estimation for each domain. Differences between the declustered composite data set and the average model grade must be within 10%. Swath plots comparing declustered composites to block model grades are prepared and visual checks summarising the critical model parameters. Visually, block grades are assessed against drill hole and face data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 2.03 g/t cut off within 3.0 m minimum mining width MSO's (without additional dilution) using a $AU1750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No mining assumptions have been made during the resource wireframing or estimation process.

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Criteria	JORC Code explanation	Commentary
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.	Metallurgical test work results show that the mineralisation is amendable to processing through the Kanowna Belle treatment plant. Ore processing throughput and recovery parameters were estimated based on historic performance and potential improvements available using current technologies and practices.
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 green fields 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.	A "Licence to Operate" is held by the operation which is issued under the requirement of the "Environmental Protection Act 1986", administered by the Department of Environment (DoE). The licence stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are also regulated by DoE and are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licences and lease conditions. An Environmental Management System is in place to ensure that Northern Star employees and contractors exceed environmental compliance requirements. The Kalgoorlie operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits. Kalgoorlie Operations have been compliant with the International Cyanide Management Code since 2008. Compliance with air quality permits is particularly important at Kanowna because of the roaster operation and because there are three facilities in the Kalgoorlie region emitting SO_2 gas. Kanowna has a management program in place to minimize the impact of SO_2 on regional air quality and ensure compliance with regulatory limits.
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.	A thorough investigation into average density values for the various lithological units at Kanowna Belle and Velvet were completed and the mean densities by lithology were coded into the database. Where there were no measurements for a specific lithology and default of 2.77 (Kanowna Belle) or 2.81 (Velvet) were applied. Density was then estimated by Ordinary Kriging using the associated gold estimation parameters for that domain. Post estimation, default density values for the oxide and transition zones were applied, based on regional averages.
	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 in-situ competent rock mass does not exhibit significant vughs or pores and is considered solid core.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Assumptions on the average bulk density of individual lithologies, based on 22,000 bulk density measurements at Kanowna Belle.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: • Geological confidence • Geologic grade continuity • Density of available drilling • Statistical evaluation of the quality of the kriging estimate • Confidence in historical data • Data class of drill holes • Presence of face channel data
	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, quality, quantity and distribution of the data).	All relevant factors have been given due weighting during the classification process.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resource model methodology is appropriate, and the estimated grades reflect the Competent Persons' view of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	All resource models have been subjected to internal peer reviews. An external review was conducted by SRK Consulting in December 2018 on the current estimation approach and provided recommendations for estimating VM01. Further review was conducted in May-June 2019 by Haren Consulting, as recent reconciliation results suggested a different approach is required. Recommendations from this were incorporated into the Resource model.
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	The relative accuracy and confidence of the mineral resource model is reflected in the assigned Mineral Resource classifications.

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Criteria	JORC Code explanation	Commentary
	qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.	
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.	Velvet is a global estimate.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No reconciliation factors are applied to the resource post-modelling.

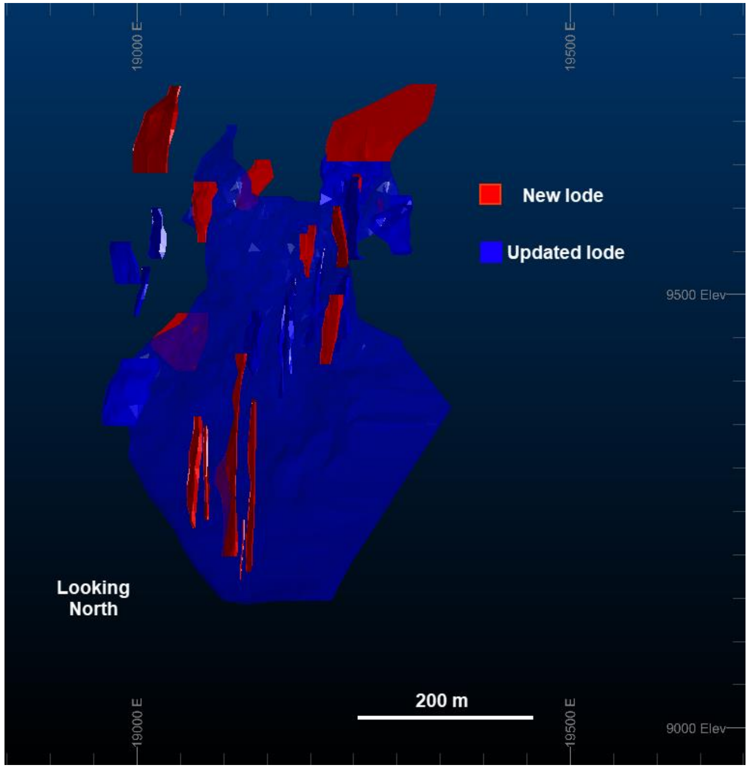

Figure 1. Long Section of the Velvet deposit

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Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star Resources Limited (NSR) June 2019 Mineral Resource
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been undertaken by the competent person.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	A minimum Pre-Feasibility level study is completed prior to converting an ore zone into ore reserve.
	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.	Ore reserves are re-optimised on a yearly basis taking the most up to date model, gold price and cost forecasts into account. The Ore Reserve methodology at Kanowna Belle is to complete a full mine design built from the latest block model using calculated cut-offs as a guide for designing stopes. Stope shapes are designed around material greater than the stoping cut off and evaluated using the design software. Design of stopes is also carried out beyond the economic limits to ensure that sensitivity results are meaningful. Mine planners are supplied with guidelines for blocking out stopes. These guidelines are to ensure mineable stope shapes. In general, the stope designs will not contain material below the stoping cut off unless there are reasonable grounds to include that material. Exceptions to this include sub-economic material which is encapsulated by payable ore. The stope shapes do not include external dilution. Dilution is applied subsequently, based on historical stope performance. All design work is carried out with the software Studio5D Planner. The existing mine design provides the starting point for the reserves. Planned stope geometry follows geotechnical design guidelines which have been in place for several years. The designs are evaluated for gold, sulphur and tonnes by Mineral Resource category bins. In this way, the Measured and Indicated portions of the design can easily be established. The evaluation results are automatically output to the scheduler software EPS. EPS is used as a flagging and calculation tool in the processing of ore reserves. Factors for dilution and recovery are applied in EPS. All stope shapes are assessed with local financial evaluations to determine if they are profitable.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. • The applied AUD gold price is supplied by NSR corporate. • Mill recovery factors are based on test work and historical averages. • Various cut-off grades are calculated including a "fully costed" and a "variably costed" stoping cut-off grade. The variably costed stope cut-off is used as the basis for stope design. Kanowna Belle operates at numerous horizons in the mine from as shallow as 170m down to over 1,000m of depth. With depth, come additional costs in terms of haulage and ground support. Cut-off grades take this into account. Cut-off grades are applied on a block by block basis depending on the relative costs.
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).	Mineral Resource is converted to Ore Reserve after completing a detailed mine design complete with a detailed financial assessment. The Mineral Resource block model is the basis for design and evaluation.
	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.	Kanowna Belle underground mine is accessed via a portal within the open pit. The ore is accessed on a level spacing of 30m with development of footwall and ore drives to enable long hole open stoping. The mine is subdivided vertically in mining blocks of nominally 150 to 250 vertical metres. Ore is mined from the stopes and tipped into an ore pass system before being loaded into haul trucks to bring to surface. Stopes are nominally 30m vertically and 20m on strike. This may be increased or decreased depending on the local ground conditions. Once stopes are empty, they can be backfilled with paste reticulated from a surface paste plant. Where possible stopes are backfilled with waste to save haulage costs.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	The mine design takes geotechnical constraints into account and is reviewed by geotechnical engineers prior to been finalised. Underground operations at Kanowna Belle are subject to mine seismicity. Kanowna Belle has a relatively high stress rock mass and a history of seismic events. The mining environment is controlled by adherence to a geotechnically favourable extraction sequence and by the application of appropriate ground support.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	This Table 1 applies to both underground and open pit mining. And detailed interface review was conducted to ensure separation between underground and open pit Reserve material.

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Criteria	JORC Code explanation	Commentary
	The mining dilution factors used.	Dilution factors are updated annually and are based on the historical performance of each mining block and evaluation of the geotechnical block model. Average stope dilution is currently 15% for mining shapes with a width greater than 5m and 27% for narrower shapes.
	The mining recovery factors used.	The recovery factor is reviewed and updated annually based on historical recovery at the site. Average stope recovery is currently 88% for mining shapes with a width greater than 5m and 90% for narrower shapes.
	Any minimum mining widths used.	Minimum mining width of 3.0m has been used where the ore is very narrow.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred/unclassified blocks are excluded from the reported Ore Reserve.
	The infrastructure requirements of the selected mining methods.	The Kanowna Belle mine infrastructure is developed and in place and includes mine dewatering pumps, compressed air supply, mine ventilation, and a small shop on the 800 level. The main access ramp connects the mine to an adit in the Kanowna Belle open pit. The ramp is well maintained and is watered to reduce dust generation from the haul trucks. There is a radio communication system throughout the mine.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	The Kanowna Belle plant is made up of crushing, grinding, gravity gold recovery, flotation, roasting, CIL, elution and gold recovery circuits. The milling facilities are designed to process approximately 1.8 million tonnes per annum. The plant has the capability to treat both refractory and free milling ores, through either a flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery) or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plant campaigns both refractory and free milling ores every month. Ore Reserves are calculated using processing plant recovery factors that are based on test work and historical performance.
	Whether the metallurgical process is well-tested technology or novel in nature.	Milling experience gained since 2005, 13 years' continuous operation.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Milling experience gained since 2005, 13 years' continuous operation.
	Any assumptions or allowances made for deleterious elements.	No assumption made.
	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.	Milling experience gained since 2005, 13 years' continuous operation.
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	The Kanowna Belle Mine is operated subject to the requirements of the Western Australian Mining Act 1978 and the Mines (Safety) Act, regulated by the Department of Minerals and Petroleum Resources (DMPR) Mines Inspectorate. The Mining Leases covering the Kanowna Belle operation stipulate environmental conditions for operation, rehabilitation and reporting. A "Licence to Operate" is held by the operation which is issued under the requirements of the "Environmental Protection Act 1986". In late September 2001, DER approval was granted to commence on-site encapsulation and disposal of arsenic trioxide (As_2O_3). In accordance with the licence from the DER, the encapsulated blocks that are disposed of underground are enclosed in backfill generated from the plant tailings.
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.	Access to the Kanowna Belle operation is provided by well-maintained public and private roads. The majority of employees reside in Kalgoorlie and commute to site daily. Normal communication channels satellite and land-based facilities are available. Potable water for the Kanowna Belle operations is pumped from Kalgoorlie to a storage facility on site. Non-potable water requirements are sourced from bore fields up to 10 km away from the mine site. Makeup water for the Kanowna Belle process plant is supplied by pipeline from a bore field located in the Gidgi paleochannel approximately 15 km from the plant site with some water is sourced from abandoned pits. Electricity is provided by the state electricity grid. A 15 km long 33 kV line from Kalgoorlie provides all electricity requirements of the operations. Sources of fuel, such as diesel, gasoline, propane, etc., are readily available at competitive pricing from local suppliers, as there are multiple operating plants in the Kalgoorlie area.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Capital costs are projected through an annual budget process.
	The methodology used to estimate operating costs.	After a design is completed the mining sequence and processing sequence are scheduled. The schedules are costed in detail using a combination of zero-based budgeting system and schedule of rates supplied by the contractor for the underground operation.
	Allowances made for the content of deleterious elements.	No allowances made.

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Criteria	JORC Code explanation	Commentary
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	The gold price is based on internal forecasts.
	The source of exchange rates used in the study.	Internal forecasts.
	Derivation of transportation charges.	Historic performance.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance.
	The allowances made for royalties payable, both Government and private.	State Govt. 2.5% royalty is built into the cost model.
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.	A$1,500/oz gold price.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	All product is sold direct at spot market prices.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not applicable.
	Price and volume forecasts and the basis for these forecasts.	Corporate guidance.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not applicable.
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 is used during Pre-Feasibility and Feasibility studies as required. Economic assumptions such as discount rate and estimated inflation are finalised at the time of the study. NPV is not used in the bi-annual reserve optimisation. Cut-off grades, derived from 12 month forward looking unit costs, form the basis of the bi-annual reserve optimisation.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities have been used with gold price ranges of A$1,300 to A$1,700 per ounce.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
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 issues.
	The status of material legal agreements and marketing arrangements.	No issues.
	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.	No issues.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	Classifications of Measured, Indicated and Inferred have been assigned based on data integrity, continuity of mineralisation and geology, drill density and the quality of the grade estimations.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results accurately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Nil.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Ore Reserves reporting processes has been subjected to an internal review by NSR Senior Technical personnel in July 2019.

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Criteria	JORC Code explanation	Commentary
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve Estimate is considered high based on current mine and reconciliation performance.
	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.	Estimates are global but will be reasonable accurate on a local scale.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Not applicable.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Reconciliation results from past mining at Kanowna Belle has been considered and factored into the Ore Reserve assumptions where appropriate.

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JORC Code, 2012 Edition – Table 1 Report

Moonbeam: Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td>Sampling techniques</td><td>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.</td><td>A combination of sample types was used to collect material for analysis surface diamond drilling (DD), surface reverse circulation drilling RC and surface RC drilling with diamond tails RC_DD. RAB holes were excluded from the estimate and where sufficient diamond drill holes were present, RC holes were also excluded.
<table>
<tr><th></th><th colspan="3">Moonbeam</th></tr>
<tr><th></th><th># of Holes</th><th>Total m's</th><th># of Samples</th></tr>
<tr><td>DD</td><td>62</td><td>17,681</td><td>6,734</td></tr>
<tr><td>FS</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>RC</td><td>67</td><td>5,051</td><td>3,404</td></tr>
<tr><td>RC_DD</td><td>23</td><td>7,599</td><td>4,093</td></tr>
<tr><td>Total</td><td>152</td><td>30,331</td><td>14,231</td></tr>
</table>
</td></tr>
<tr><td></td><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>DD drilling is sampled within geological boundaries with a minimum (0.3 m) and maximum (1.0 m) sample length.</td></tr>
<tr><td></td><td>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 30g 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.</td><td>DD drill core was nominated for either half core or full core sampling. Core designated for half core was cut in half using an automated core saw. The mass of material collected will depend on the drill hole diameter and sampling interval selected. Core designated for full core was broken with a rock hammer if sample segments were too large to fit into sample bags.
All samples were delivered to a commercial laboratory where they were dried, crushed to 95% passing 3 mm if required, at this point large samples may be split using a rotary splitter, pulverisation to 90% passing 75 µm, a 50 g charge was selected for fire assay</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both RC and Diamond Drilling techniques were used to drill the Moonbeam deposit.
Surface diamond drill holes were completed using HQ2 (63.5 mm) coring.
Historically, core was orientated using the Reflex ACT Core orientation system. Currently, core is orientated using the Boart Longyear Trucore Core Orientation system.
RC Drilling was completed using a 5.75” drill bit, downsized to 5.25” at depth.
In many cases RC pre-collars were drilled followed by diamond tails. Pre-collar depth was determined in the drill design phase depending on the target been drilled and production constraints.</td></tr>
<tr><td>Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>For DD drilling, any core loss is recorded on the core blocks by the driller. This is then captured by the logging geologist and entered as interval into the hole log.</td></tr>
<tr><td></td><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>For diamond drilling the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.</td></tr>
<tr><td></td><td>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.</td><td>Recovery was excellent for diamond core and no relationship between grade and recovery was observed. Average recovery across the Kundana camp is at 99%.</td></tr>
<tr><td>Logging</td><td>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.</td><td>All diamond core is logged for lithology, veining, alteration, mineralisation and structural. Structural measurements of specific features are also taken through oriented zones.
Logging is entered in Acquire using a series of drop-down menus which contain the appropriate codes for description of the rock.</td></tr>
<tr><td></td><td>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.</td><td>All core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet.</td></tr>
<tr><td></td><td>The total length and percentage of the relevant intersections logged.</td><td>For all drill holes, the entire length of the hole was logged.</td></tr>
</table>

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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.	Diamond core is cut using an automated core saw. Depending on the type of drilling, determines the level of sampling/cutting completed. Half core is taken for Resource targeting (RT) drilling and some Resource Definition drilling (RSD). However, most RSD holes have been whole core sampled due to production pressures. Whole core samples are also utilized in areas where the ground conditions result in very broken core and cutting the core is not practical.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	For previous RC drilling, all RC samples are split using a rig-mounted cone splitter to collect a sample 3 - 4 kg in size from each 1 m interval. These samples were utilised for any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside known mineralised zones spear samples were taken over a 4 m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Preparation of NSR resource definition samples was conducted at MinAnalytical Kalgoorlie, while surface exploration drilling was sent to Genalysis. Sample preparation commenced with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3 kg (typically 1.5 kg) at a nominal <3 mm particle size. The entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% passing 75 µm, using a Labtechnics LM5 bowl pulveriser. 400 g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets. The sample preparation is considered appropriate for the deposit.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are utilised to guide the selection of sample material in the field. Standard procedures are used for all processes within the laboratory. Grind checks are performed at the pulverising stage requiring at least 90% of material to pass below 75 um.
	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.	Umpire sampling selection is conducted on all of the Kundana core samples as an entire batch. A minimum of 3% of the samples processed each month are selected to be sent to the ALS Perth check lab.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Samples sizes collected are considered appropriate for the material sampled.
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.	A 50-gm fire assay charge is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine and element concentrations.
	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 materials (CRMs) are inserted into the sample sequence at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a nominal rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t if received are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades at the pulverising stage. No field duplicates were submitted for diamond core. Pulp duplicates are requested after any ore zone. These are indicated on the sample sheet and submission sheet. When visible gold is observed in core, a quartz flush is requested after the sample. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs The QA studies indicate that accuracy and precision are within industry accepted limits.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off.
	The use of twinned holes.	No twinned holes were drilled for this data set. Re-drilling of some of the drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database as an 'A'. Re-drilled holes are sampled whilst the original drill hole is logged but not sampled.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging and sampling are directly recorded into AcQuire. Assay files are received in csv, pdf and sif formats. The csv's are loaded directly into the database using an AcQuire importer object. Assays are then processed through a form in AcQuire for QAQC checks. Noneditable electronic copies of these are stored.

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Criteria	JORC Code explanation	Commentary
	Discuss any adjustment to assay data.	No adjustments are made to this assay data. If there are issues with the results files received, amended versions are requested from the lab.
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.	Planned holes are marked up by the mine survey department using a total station survey instrument in mine grid (Kundana 10). The actual hole position is then located by the mine survey department once drilling is completed. In some cases, drill hole collar points are measured off survey stations if a mark-up cannot be completed. This is only used for Grade Control drilling due to their frequent occurrence. Holes are lined up on the collar point using the DHS Minnovare Azimuth Aligner. Planned azimuths and dips of the holes are downloaded to the aligner which is then placed on the rod string to align the hole for drilling. During drilling, single shot surveys are conducted every 30 m to track the deviation of the hole and to ensure it stays close to design. This is performed using the Devishot camera which measures the gravitational dip and magnetic azimuth. Results are uploaded from the Devishot software into a csv format which is then imported into the Acquire database. At the completion of the hole, a Multishot Devi flex survey is completed taking measurements every 3 m to ensure accuracy of the hole. The is relative change survey which is then referenced back to the Azimuth aligner to provide an accurate, continuous nonmagnetic survey. This is also converted to csv format and imported into the Acquire database.
	Specification of the grid system used.	Collar coordinates are recorded in mine grid (Kundana 10) and transformed into MGA94_51
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups of holes over the last 15 years.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing varies across the deposit. For resource targeting drilling spacing was typically a minimum of 80 m x 80 m. This allowed for infill drilling at 40 m x 40 m spacing known as resource definition. Grade control drilling was drilled on a level by level as required basis with drill spacing at 20 m x 20 m and down to 10 m x 10 m.
	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 spacing and distribution is considered sufficient to support the resource and reserve estimates.
	Whether sample compositing has been applied.	No sample compositing has been applied.
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.	Majority of the mineralisation in the Moonbeam deposit dips steeply (76°) to the WSW. Diamond drilling was designed to target the orebodies perpendicular to this orientation to allow for an ideal intersection angle. Instances where this was not achievable (mostly due to drill platform location), drilling was not completed or re-designed once a suitable platform became available. Drill holes with low intersection angles will be excluded from resource estimation where more suitable data is available.
	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.	No sampling bias is considered to have been introduced by the drilling orientation. Where drill holes have been particularly oblique, they have been flagged as unsuitable for resource estimation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits have been undertaken of the data and sampling practices at this stage.

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.	All holes mentioned in this report are located within the, M15/993, M16/157, M16/309 tenements, which are owned by KUNDANA GOLD PTY LTD a wholly owned subsidiary of Northern Star Resources. There are no private royalty agreements applicable to this tenement.
	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.	No known impediments exist, and the tenements are in good standing.

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Criteria	JORC Code explanation	Commentary
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Early exploration was completed in the 1980's by Kalbara Minerals with the development and operation of South Pit. Modern mining continued in late 1980's with the Kundana North and Strzelecki Open pits. Mining continued through to 1999 when the Centenary Underground ceased operations. Exploration continued over the camp through various companies including Placer Dome and Barrick Gold. Early 2014 saw Northern Star Resources purchase the Kundana camp from Barrick Gold and mining recommenced in March 2014. Millennium was discovered in the same year and commenced mining in 2015.
Geology	Deposit type, geological setting and style of mineralisation.	The Kundana camp is situated within the Norseman-Wiluna Greenstone Belt, in an area dominated by the Zuleika shear zone, which separates the Coolgardie domain from the Ora Banda domain. K2-style mineralisation consists of narrow vein deposits hosted by shear zones located along steeply dipping overturned lithological contacts. The K2 structure is present along the contact between a black shale unit (Centenary shale) and intermediate volcaniclastics (Black Flag Group). Moonbeam is a continuation of the Pope John K2 trend. The deposit starts from the Lucifer Fault which offsets Moonbeam from the Pope John deposit, by approximately 200m. The Moonbeam deposit continues to 18574n where the K2 trend becomes classified as Drake. The K2 mineralisation is typical of the area with a high-grade laminated quartz vein being the primary gold hosting unit with minor halo grade disseminated around this structure in the Centenary shale and Black Flag volcaniclastics.
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length.	A summary of the data present in the Moonbeam deposit can be found above. The collar locations are presented in plots contained in the NSR 2018 resource report. Drill holes vary in survey dip from +50° to -80°, with hole depths ranging from 30 m to 625 m, with an average depth of 200 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All validated drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report,
	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.	The exclusion of information is not material
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2 m of barren material (considered < 1 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 1.0 g/t are considered significant, however, where low grades are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	It is known and has been reported as such
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.	Appropriate plans and section have been included at the end of this Table and in the NSR 2019 resource report.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.

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Criteria	JORC Code explanation	Commentary
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.	No other material exploration data has been collected for this area.
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).	Drilling will continue in various parts of the mine with the intention of extending areas of known mineralisation. Areas of focus will be to extend the K2 structure both down dip and along strike to the north. Drilling will also focus on infilling areas of the resource to improve confidence. As Well as grade control drilling in certain areas to build of data collected from development face sampling and assist in production.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are either recorded on paper and manually entered into a database system or is captured digitally via a logging laptop and directly loaded into the database system. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly into the database from laboratory and survey derived files. Northern Star personnel have validated the database during the interpretation of the mineralisation, with any drill holes containing dubious data excluded from the MRE. Northern Star provided a list of holes to be excluded from the MRE and the reasons behind those exclusions.
	Data validation procedures used.	The database has further checks performed to back -up those performed in section 2. The complete exported data base including drill and face samples is brought into Datamine RM and checked visually for any apparent errors i.e. holes or faces sitting between levels or not on surface DTM's. Multiple checks are then made on numerical data including: • Empty table checks to ensure all relevant fields are populated • Unique collar location check, • Distances between consecutive surveys is no more than 50 m for drill-holes • Differences in azimuth and dip between consecutive surveys of no more than 0.3 degrees • The end of hole extrapolation from the last surveyed shot is no more than 30 m • Underground face sample lines are not greater than +\- 5 degrees from horizontal Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported. This data will not be used in the estimation process. In addition to being validated, drill holes are assigned a Data Class, which provides a secondary level of confidence in the quality of the data. Data Class (DC) values from 0-3 assigned, criteria summarised below: • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR • Recent data; minor issues with data such as QAQC fail but away from the ore zone. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The geological interpretations underpinning these resource models have been prepared by geologists working in adjacent mines and in direct, daily contact with similar ore bodies. The estimation of grades was undertaken by personnel familiar with the orebody and the general style of mineralisation encountered. The Senior Resource Geologist, a competent person for reviewing and signing off on estimations of the Moonbeam lode maintained a presence throughout the process.

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Criteria	JORC Code explanation	Commentary
	If no site visits have been undertaken indicate why this is the case.	The Competent Person has maintained a presence onsite.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the Moonbeam deposit has been carried out using a systematic approach to ensure continuity of the geology and estimated mineral resource. The confidence in the geological interpretation is high and is supported with information acquired during open pit mining as well as from drilling. The interpretation of the Moonbeam mineralisation wireframe was conducted using the sectional interpretation method. Vertical sections at approximately 30-40 m spacing were created using the drilling data. Wireframes were checked for unrealistic volumes and updated where appropriate. The oxide mineralisation lodes have been created using closed, cross-sectional interpretation strings at approximately 10 m spacing.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including pit mapping, drill holes and structural data.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Due to the nature of the deposit, the consistency of the structure and data from the recent open pit mining, no alternative interpretations have been considered.
	The use of geology in guiding and controlling Mineral Resource estimation.	The interpretation of the main Moonbeam K2 structure is based on the presence of quartz veining and its relative position around the Centenary shale unit. Termination of these structures is controlled by the Lucifer fault in the north.
	The factors affecting continuity both of grade and geology.	The K2 structure is reasonably continuous over the length of the deposit with either quartz veining, the shear or the controlling structure used to guide this interpretation. The Lucifer fault controls the extent of mineralisation at the northern end of the deposit and is interpreted to be post mineralisation. Continuity is affected by the orientation of the K2 and K2E structures as well as the thickness of the Centenary shale unit. The Pope John K2 is the northern extension of the Moonbeam K2 offset along the Lucifer fault. The K2 composites from the Pope John deposit have been transformed to line up with the Moonbeam deposit and have been used as a soft boundary. The southern extension is the Drake K2, these composites have been used have also been used as a soft boundary for estimation. The K2E orebody is a narrow lode in the hangingwall of the K2 on the contact between the Victorious Basalt and Centenary Shale and comprises quartz veining and intense biotite alteration and is continuous. The K2E mineralisation terminates at the Lucifer fault in the north.
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 strike length of the Moonbeam K2 structure is approximately 750 m and the down dip extents up to 750 m. The K2 mineralisation occurs in a major regional shear system extending over 10s of kilometres. Moonbeam K2 is ~ 0.5-2 m wide and can be over 2 m wide with a minimum width of ~ 0.1 m. The K2E orebody has a strike length of 320 m and approx. 340 m down dip but is open in all directions. There are three flat lying oxide lodes interpreted near the surface, two in the hangingwall and one in the footwall. The hangingwall lodes have a strike length of approximately 200 m and the footwall lode 150 m, with an approximate down dip extent of 100 m. Mineralisation is known to occur from the base of cover to around 600 m below surface.

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Criteria	JORC Code explanation	Commentary
Estimation and modelling techniques	The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.	The Moonbeam K2, K2E and Oxide mineralisation used 1.0 m composites with direct grade estimation. The footwall (FW) and hangingwall (HW) halo zones used 1.0 m composites with direct grade estimation. The gold grade estimation has been completed using Ordinary Kriging (OK), utilising a three-pass search strategy using Datamine Studio RM v 1.4 software. Details of the estimation parameters for each mineralisation zone are summarised below. K2 - divided into two subdomains north and south, with each of these further divided based on data density; high data density (where drill spacing is less than 30 m x 30 m) and low drill data density (drill spacing greater than 30 m x 30 m). The drill hole data was analysed and top cut separately. A top cut of 80 g/t Au was applied to the north domain and no top cut applied to the south domain. Variography was completed on the composite files for both domains, indicating the greatest grade continuity to be down dip for both the north and the south domains. The north domain data had a search range of ~150 m in direction 1 and 130 m in direction 2, the south domain had a search range of 150 m in direction 1 and 150 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of 12 samples and a maximum of 17 samples for both the north and south subdomains. The second pass doubled the ranges, decreasing the minimum number of samples to 7 and decreasing the max number of samples to 15. The third pass increased the search range by 3 times the original ranges, decreasing the minimum number of samples to 4 and kept the max number of samples at 15. Estimation was completed using a soft boundary between the north and south subdomains. Pope John K2 data was transformed and combined with the Moonbeam composites for estimation and also used as a soft boundary. The Drake K2 dataset was also combined with the Moonbeam composites for estimation and used as a soft boundary. No restrictions by drill hole or drill hole type have been applied. K2E was estimated using OK, with a three pass search strategy, using an isotropic search ellipse, 60 m by 60 m by 60 m. The composite file was analysed and top cut to 5 g/t Au. The minimum number of samples used for the first pass was 6 and the maximum number 12. The second pass was two times the original ellipse ranges with a minimum of 4 and maximum of 10 samples. The third pass was 3 times the original range, with a minimum of 10 samples and a maximum of 22 samples. No restrictions by drill hole or drill hole type have been applied. HW Halo/FW Halo were both estimated using OK and a three pass estimation strategy. The haloes were reviewed as per the same sub domaining strategy as the K2, however no discernible difference was found between the north and south subdomains, so they were combined. The drill hole data was analysed, the same top cut was applied to both subdomains (high and low density data); 12 g/t Au for the HW halo and 8 g/t Au for the FW halo. The top cut, subdomain composite files were combined for variography. For both the HW and FW halos and both subdomains (high and low density data) within them, the first search pass used an ellipse 150 m by 100 m by 50 m with a minimum of 7 samples and maximum of 12 samples. The second pass increased the search ellipse ranges by 2 times the original range and kept a minimum of 7 samples, increasing the maximum to 15. The third pass increased the search range by 3 times the original range and reduced the minimum to 4 samples with a maximum of 15. No restrictions by drill hole or drill hole type have been applied. For both FW and HW halos, estimation was completed using a soft boundary between the high and low-density subdomains. HW1OX was estimated using OK, with a three pass search strategy, using a search ellipse, 60 m by 60 m by 30 m. The composite file was analysed and a top cut of 10 g/t Au applied. Variography was completed on the composite file. The minimum number of samples used for the first pass was 6 and the maximum number 12. The second pass was two times the original ellipse ranges with a minimum of 4 and maximum of 10 samples. The third pass was 3 times the original range, with a minimum of 10 samples and a maximum of 22 samples. No restrictions by drill hole or drill hole type have been applied. HW2OX was estimated using OK, with a three pass search strategy, using a search ellipse, 60 m by 60 m by 30 m. The composite file was analysed and a top cut of 2 g/t Au applied. Variography was completed on the composite file. The minimum number of samples used for the first pass was 6 and the maximum number 12. The second pass was two times the original ellipse ranges with a minimum of 4 and maximum of 10 samples. The third pass was 3 times the original range, with a minimum of 10 samples and a maximum of 22 samples. No restrictions by drill hole or drill hole type have been applied. FW1OX was estimated using OK, with a three pass search strategy, using a search ellipse, 50 m by 50 m by 30 m. The composite file was analysed and a top cut of 10 g/t Au applied. Variography was completed on the composite file. The minimum number of samples used for the first pass was 6 and the maximum number 12. The second pass was two times the original ellipse ranges with a minimum of 4 and maximum of 10 samples. The third pass was 3 times the original range, with a minimum of 10 samples and a maximum of 22 samples. No restrictions by drill hole or drill hole type have been applied
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	All Moonbeam mineralisation zones had check estimates using Inverse Distance power of 2 (ID2) and Nearest Neighbour (NN) completed as a comparison. Estimates using a soft and semi-soft boundary (with the Pope John and Drake composites) have also been compared and reviewed. All estimates have been compared to the previous MRE.
	The assumptions made regarding recovery of by-products.	No assumptions have been made regarding recovery of any by-products.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements have been considered and therefore estimated for this deposit.

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Criteria	JORC Code explanation	Commentary
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The data spacing varies considerably within the deposit ranging from near-surface drilling at approximately 20 m x 20 m spacing to drill hole intercepts up to 80 m x 80 m along strike and down dip at depth. As such, the block sizes varied depending on sample density. In areas of comparatively high density 10 m x 10 m x 10 m block size was chosen. For lower density drilling (areas where the drill spacing was greater than 30 m x 30 m), block sizes of 20 m x 20 m x 10 m or 20 x 20 x 20 m were chosen. All the varying block sizes are added together after being estimated individually. Search ellipse dimensions were derived from the variogram model ranges.
	Any assumptions behind modelling of selective mining units.	No selective mining units are assumed in this estimate.
	Any assumptions about correlation between variables.	No other elements other than gold have been estimated.
	Description of how the geological interpretation was used to control the resource estimates.	Hangingwall and footwall wireframe surfaces were created using sectional interpretation. These were used to define the Moonbeam K2 and hangingwall and footwall halo mineralised zones based on the shearing, veins and gold grade. K2 (Moonbeam) steeply dipping structure with quartz veining evident from drilling. Footwall/Hangingwall halo (Moonbeam) - Steeply dipping sheared structure with minor quartz stringers in the hangingwall and footwall of the K2 evident from drilling. Oxide mineralisation lodes (HW1OX, HW2OX, FW1OX) have been created from closed sectional interpretation strings creating a solid wireframe representing each lode. For mine planning purposes a waste model is created by projecting the hangingwall and footwall surfaces 15 m either side or the mineralisation. A default grade of 0.1 g/t is assigned and the same resource classification as the adjacent ore lode is applied.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the mean by more than 5% and reducing the coefficient of variation to around 1.2, and vary by domain (ranging from 1.5 to 80 g/t for individual domains) The top cut values are applied in several steps, using a technique called influence limitation top cutting. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, where gold requires a top cut, the following variables will be created and estimated: • AU (top cut gold) • AU_NC (non- top cut gold) • AU_BC (populated with AU_NC value when (AU_NC > AU) The top cut and non-top cut values are estimated using search ranges based on the variogram, and the *_BC values estimated using very small ranges (5 m x 5 m x 5 m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). The application of the top cuts has not resulted in a significant decrease in the mean grade from the un-cut to top cut data.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Statistical measures of Kriging error, such as the Slope of Regression, are used to assess the quality of the estimation for each domain. Differences in the global grade of the declustered composite data set and the average model grade must be within 10%. Swath plots comparing composites to block model grades are prepared and reviewed. Plots are also prepared summarising the critical model parameters. Visually, block grades are assessed against drill hole data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	The tonnes have been estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 1.73 g/t cut off within 2.5 m minimum mining width including no dilution MSO's using a $AU1750/oz gold price.

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Criteria	JORC Code explanation	Commentary
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No mining assumptions have been made during the resource wireframing or estimation process.
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.	Metallurgical test work results show that the mineralisation is amendable to processing through the Kanowna Belle treatment plant. Ore processing throughput and recovery parameters were estimated based on historic performance and potential improvements available using current technologies and practices.
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 green fields 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.	A "Licence to Operate" is held by the operation which is issued under the requirement of the "Environmental Protection Act 1986", administered by the Department of Environment (DoE). The licence stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are also regulated by DoE and are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licences and lease conditions. An Environmental Management System is in place to ensure that Northern Star employees and contractors exceed environmental compliance requirements. The Kalgoorlie operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits. Kalgoorlie Operations have been compliant with the International Cyanide Management Code since 2008. Compliance with air quality permits is particularly important at Kanowna because of the roaster operation and because there are three facilities in the Kalgoorlie region emitting SO2 gas. Kanowna has a management program in place to minimize the impact of SO2 on regional air quality and ensure compliance with regulatory limits.
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.	Density values for the various lithological units at Moonbeam were reviewed, there were 8 in total, not enough for detailed evaluation. Bulk density is assumed and comparable to neighbouring deposits at Kundana. Bulk densities from neighbouring deposits were determined from surface DD holes with intervals taken from mineralised and non-mineralised zones within the project area. The bulk densities are derived from wet and dry weighting of core no greater than 30cm total length, with core samples selected by changes in lithology/alteration or every 30-40 m where no change is evident. The average density values for the various lithological units at Moonbeam were coded into the database. Where there were no measurements for a specific lithology a default of 2.8 was applied. Density was then estimated by Ordinary Kriging using the associated gold estimation parameters for that domain. Post estimation, default density values for the oxide and transition zones were applied, based on regional averages, 1.8 for Oxide material and 2.3 for Transitional material.
	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.	No/minimal voids are encountered in the ore zones and underground environment
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Assumptions on the average bulk density of individual lithologies, based on 1399 bulk density measurements at neighbouring Kundana deposits. Assumptions were also made based on regional averages, on the default density applied to transitional (2.3) material, due to lack of data in this area.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: • Geologic grade continuity • Density of available drilling • Statistical evaluation of the quality of the kriging estimate • Confidence in historical data, based on the new Data Class system
	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, quality, quantity and distribution of the data).	All relevant factors have been given due weighting during the classification process.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resource model methodology is appropriate, and the estimated grades reflect the Competent Persons view of the deposit.

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Criteria	JORC Code explanation	Commentary
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The Resource model has been subjected to internal peer reviews.
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 mineral resource estimate is considered robust and representative of the Moonbeam style of the K2 mineralisation. The application of geostatistical methods has helped to increase the confidence of the model and quantify the relative accuracy of the resource.
	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.	This resource report relates to the Moonbeam ore zone. The model will show local variability even though the global estimate reflects the total average tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No reconciliation factors are applied to the resource post-modelling.

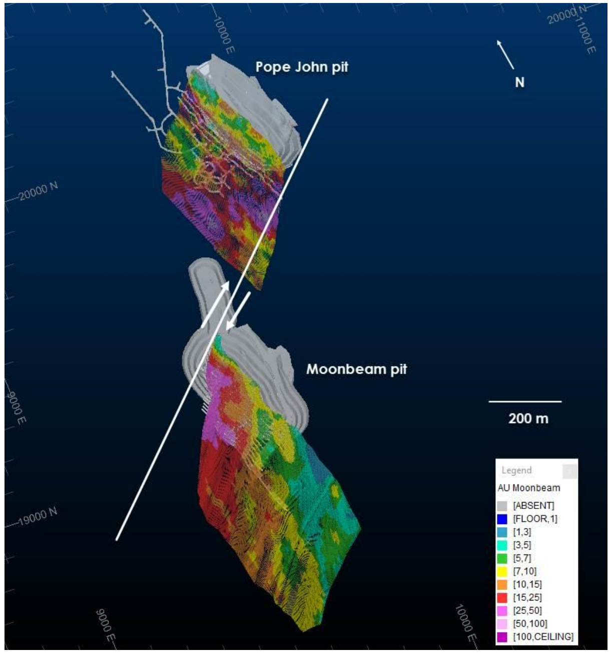

Figure 1. Overview showing the offset between Pope John K2 and Moonbeam K2 along the Lucifer fault

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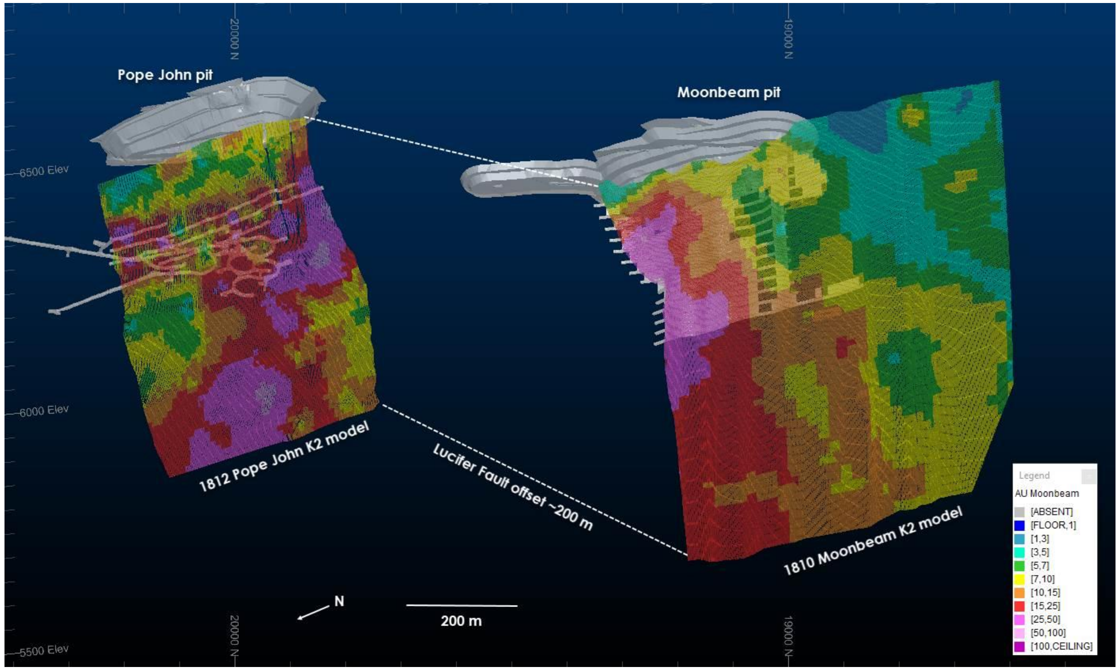

Figure 2. Offset of Pope John K2 and Moonbeam K2 along the Lucifer fault, looking south-east

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star Resources Limited June 2019 Mineral Resource
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been undertaken by the competent person.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	A minimum Pre-Feasibility level study has been completed.
	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.	Upgrade of previous Ore Reserve

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Criteria	JORC Code explanation	Commentary
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. • The assumed AUD gold price is at a conservative assumption of $1,500/oz • Mill recovery factors are based on test work and historical averages from the region. Various cut-off grades are calculated including a break-even cut-off grade (BCOG), Variable cut-off grade (VCOG) and Mill cut-off grade (MCOG). The VCOG is used as the basis for stope design, though any areas which are marginal or require significant development are assessed by a more detailed financial analysis to confirm their profitability.
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).	Indicated Resources were converted to Probable Ore Reserves subject to mine design physicals and an economic evaluation. Stockpiled material was considered as proven
	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 Moonbeam underground mine will be accessed via a portal within the open pit as well as a link drive from Pope John underground. The ore is accessed from the Hanging wall from levels at 20m spacing. A combination of top down open stoping, top down paste filled and bottom up CRF fill mining methods are applied and the levels are broken into selectively sized stoping blocks to maximise production. The selected mining method was evaluated during the initial Pre-Feasibility study and was deemed the most appropriate. A similar mining method is used by Northern Star for areas of the nearby Pegasus mine.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	The mine design considers well established geotechnical constraints and is reviewed by geotechnical engineers prior to being finalised. Historical geological and geotechnical information is gathered from the nearby operations including Barkers, Strzelecki and Centenary, and still in operation, Raleigh, Rubicon, Hornet and Pegasus, and learnings from this are applied to the geotechnical parameters used. Grade control is to be carried out through resource definition drilling and face sampling of all ore drives.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	This Table 1 applies to underground mining only
	The mining dilution factors used.	0.5m hanging wall and 0.5m footwall dilution has been applied to all stopes. No additional mining dilution factor has been applied.
	The mining recovery factors used.	90% recovery is applied to CRF filled stopes. A calculated 70% recovery is applied to unfilled up hole stopes to account for pillar requirements.
	Any minimum mining widths used.	A minimum stope mining width of 3.0m has been used. This considers a minimum stope width of 2.0m +0.5m dilution in the Hangingwall and +0.5m dilution in the Footwall
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred blocks are excluded from the reported Ore Reserve. No ounces have been included from Inferred material.
	The infrastructure requirements of the selected mining methods.	Site surface infrastructure requirements for the mining method include: - Dewatering Moonbeam Pit and Portal establishment Underground infrastructure requirements include - Primary Ventilation for Moonbeam; - Primary ventilation fans for Moonbeam; - Power and pumping infrastructure with mine extension; and - Historical void dewatering infrastructure. All other underground infrastructure was completed in FY18-19.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	NSR own and operate the Kanowna Belle and South Kalgoorlie milling and processing facilities. Both plants are located within 100km of the Kundana Operations. These facilities are designed to process in excess of 3.0 million tonnes per annum. Both plants have the capability to treat free milling ores with additional capacity at the Kanowna Belle facility to treat refractory material. Ore is treated either using the flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery) or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plants campaign both refractory and free milling ores every month.
	Whether the metallurgical process is well-tested technology or novel in nature.	Milling experience gained since 2005, 13 years' continuous operation

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Criteria	JORC Code explanation	Commentary
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Milling experience gained since 2005, 13 years' continuous operation
	Any assumptions or allowances made for deleterious elements.	No assumptions made
	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.	Milling experience gained since 2005, 13 years' continuous operation
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Millennium, Centenary and Pope John are currently compliant with all legal and regulatory requirements. Moonbeam is in the process of being granted. All government permits and licenses and statutory approvals are either granted or in the process of being granted.
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.	All current site infrastructure is suitable to the proposed mining plan.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mine development capital cost based on historical performance on site and life-of-mine forward planning. Plant and equipment capital are based on site experience and the LOM plan
	The methodology used to estimate operating costs.	All overhead costs and operational costs are projected forward on an AUD $/t based on historical data.
	Allowances made for the content of deleterious elements.	No allowances made.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Single commodity pricing for gold only, using a long-term gold price of AUD $1,500/oz, 2.5% WA state Government Royalty, as per NSR corporate guidance
	The source of exchange rates used in the study.	All rates considered in Australian Dollars (AUD) as per NSR corporate guidance
	Derivation of transportation charges.	Historic performance
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance
	The allowances made for royalties payable, both Government and private.	All State Govt. and third-party royalties are built into the cost model.
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.	All revenue based on a gold price of AUD $1,500/oz.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	All product is sold direct at spot market prices.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not relevant for gold.
	Price and volume forecasts and the basis for these forecasts.	Not relevant for gold.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not relevant for gold.

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Criteria	JORC Code explanation	Commentary
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.	All costs assumptions are made based on historical performance from the mine and current economic forecast seen as representative of current market conditions.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities assessed at varying gold prices.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	No issues foreseen.
	Any identified material naturally occurring risks.	No issues foreseen.
	The status of material legal agreements and marketing arrangements.	No issues foreseen.
	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.	No issues foreseen.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	All Ore Reserves include Proved and Probable classifications. These classifications are based on Mineral Resource classifications as modified by subsequent grade control drilling and face sampling results.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results appropriately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	None.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	This ore reserve has been prepared and peer reviewed internally within Northern Star Resources. There have been no external reviews of this Ore Reserve estimate.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve is considered high based on nearby Northern Star operated mines along the same ore bearing structures and the previous 12 months development and stope performance at the Millennium Operation.
	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.	Ore reserves are best reflected as global estimates.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Other than dilution and recovery factors described above, no additional modifying factors applied. There is high confidence in these models as the areas are well known and well drilled.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Reconciliation results from past mining at Centenary, Millennium and Pope John reflect estimates in the Ore Reserve estimates.

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JORC Code, 2012 Edition – Table 1 Report

Barkers Underground Resource - 30 June 2019

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.	Sampling was completed using a combination of Reverse Circulation (RC) and Diamond Drilling (DD). Face samples were taken underground at the heading using a rock pick. Diamond core was transferred to core trays for logging and sampling. Half core samples were nominated by the geologist and based upon geological and ore-zone boundaries, with the remaining sampled on metre intervals.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Diamond core was transferred to core trays for logging and sampling. Half core samples were nominated by the geologist from both NQ2 and HQ2 diamond core with a minimum sample width of either 20cm (HQ2) or 30cm (NQ2). RC samples were split using a rig-mounted cone splitter on 1m intervals to obtain a sample for assay. 4m composite spear samples were collected for each hole with 1m samples submitted for areas of known mineralisation or anomalism.
	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 30g 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 drill seven pre-collars these ranged in depths from 40m-99m. RC samples were split using a rig-mounted cone splitter on one metre intervals to obtain a sample for assay. The RC drilling does not affect sampling of the Barkers Main Vein.
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.).	Both RC and Diamond Drilling techniques were used at the Barkers deposit. DD holes completed pre-2011 were predominantly NQ2 (50.5mm). All Resource definition holes completed post-2011 were drilled using HQ (63.5mm) diameter core. Core was orientated using the Reflex ACT Core orientation system. RC Drilling was completed using a 5.75" drill bit, downsized to 5.25" at depth. RC Pre-collar depth was restricted to 180m or less if approaching known mineralisation.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	RC drilling contractors adjust their drilling approach to specific conditions to maximise sample recovery. Moisture content and sample recovery is recorded for each RC sample. No recovery issues were identified during RC drilling. Recovery is often poor at the very beginning of each hole, as is normal for this type of drilling in overburden.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	For diamond drilling, the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.
	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.	Recovery is excellent for diamond core and no relationship between grade and recovery was observed. For RC drilling, pre-collars were ended before known zones of mineralisation and recovery was very good through any anomalous zones
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 is logged for regolith, lithology, veining, alteration, mineralisation and structure. Structural measurements of specific features are also taken through oriented zones.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All logging is quantitative where possible and qualitative elsewhere. A photograph is taken of every core tray.
	The total length and percentage of the relevant intersections logged.	RC chips are logged in 1m intervals for the entire length of each hole. Regolith, lithology, alteration, veining and mineralisation are all recorded.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Resource definition DD drill core is cut and half the core is taken for sampling. The remaining half is stored for later use. Whole core sampling may be used for production and grade control drilling.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	All RC samples are split using a rig-mounted cone splitter to collect a 1m sample 3-4kg in size. These samples were submitted to the lab from any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside of mineralised zones spear samples were taken over a 4m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	The sample preparation is considered appropriate.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Field duplicates were taken for RC samples at a rate of 1 in 20.

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Criteria	JORC Code explanation	Commentary
	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.	Exploration sample preparation was conducted at Genalysis Kalgoorlie. Resource Development sample preparation was conducted at MinAnalytical Kalgoorlie. Both facilities undertake a similar process commencing with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6mm particle size. If the sample is greater than 3kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3kg (typically 1.5kg) at a nominal <3mm particle size. The entire crushed sample (if less than 3kg) or sub-sample is then pulverised to 90% passing 75µm, using a Labtechnics LM5 bowl pulveriser. 300g pulp subsamples are then taken with an aluminium or plastic scoop and stored in labelled pulp packets.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Grind checks are performed at both the crushing stage(3mm) and pulverising stage (75µm), requiring 90% of material to pass through the relevant size.
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.	A 50g fire assay charge is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO_3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine any element concentrations.
	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 materials (CRMs) are inserted into the sample sequence randomly at a rate of 1 per 20 samples to test the analysis process. Any values outside of 3 standard deviations are re-assayed with a new CRM. blanks are inserted into the sample sequence at a rate of 1 per 20 samples. This is random, except where high grade mineralisation is expected. Here, a Blank is inserted after the high-grade sample to test for contamination. Failures above 0.2gpt are followed up, and re-assayed. New pulps are prepared if failures remain. Field duplicates are taken for all RC samples (1 in 20 sample). No field duplicates are submitted for diamond core. Regular audits of laboratory facilities are undertaken by Northern Star personnel.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent Person to be signed off.
	The use of twinned holes.	No twinned holes were drilled for this data set
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging is directly entered into an Acquire database. Assay files are received in csv format and loaded directly into the database by the project's responsible geologist with an Acquire importer object. Hardcopy and electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data.
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.	A planned hole is pegged using a Differential GPS by the field assistants. The final collar is picked up after hole completion by Cardno Survey with a Differential GPS in the MGA 94_51 grid. During drilling, single-shot surveys are every 30m to ensure the hole remains close to design. This is performed using the Reflex Ez-Trac system which measures the gravitational dip and magnetic azimuth results are uploaded directly from the Reflex software export into the Acquire database.
	Specification of the grid system used.	The final collar position for surface holes is measured after hole completion by Differential GPS in the MGA94_51 grid.
	Quality and adequacy of topographic control.	The Differential GPS returns reliable elevation data which has been confirmed against a high-resolution Digital Terrain Model survey performed by Arvista in 2015.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing across the area varies. For the Resource definition drilling, spacing was typically 40m x 40m, to allow the Resource to be upgraded to indicated.
	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.	Resource definition drilling spacing was typically 40m x 40m, to allow the Resource to be upgraded to indicated. Surrounding exploration drilling can be spaced up to 200m apart.
	Whether sample compositing has been applied.	No compositing has been applied to these exploration results, although composite intersections are 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.	The majority of the structures in the Kundana camp dip steeply (80°) to WSW. To target these orientations, the drill hole dips of 60-70° towards ~060° achieve high angle intersections on all structures.
	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.	No sampling bias is considered to have been introduced by the drilling orientation.

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Criteria	JORC Code explanation	Commentary
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound and tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits or reviews have recently been conducted on sampling techniques.

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.	All holes mentioned in this report are located within Mining Lease M16/72 and M16/97 which is owned by Kundana Gold Pty Ltd, a wholly owned subsidiary of Northern Star Resources Limited. There are no private royalty agreements applicable to this tenement. The deposits lie within vacant crown land.
	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.	No known impediments exist and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	All drilling and exploration of the Barkers Resource was conducted by previous owners of the tenements (including Pancontinental Gold, Aurion Gold, Placer Dome Inc, Barrick Gold) prior to the acquisition by Northern Star Resources.
Geology	Deposit type, geological setting and style of mineralisation.	The Kundana camp is situated within the Norseman-Wiluna Greenstone Belt, in an area dominated by major mineralised shear zones. Barkers-style mineralisation consists of narrow vein deposits (0.20m to 1.0m thick) hosted by shear zones located along steeply dipping overturned lithological contacts. The footwall stratigraphy of Barkers consists of several different units of the Powder Sill Gabbro, a thick stratigraphy-parallel differentiated mafic intrusive. The volcanoclastic sedimentary rocks of the hanging-wall consist of a sequence of interbedded siltstones, felspathic sandstones, felspathic-lithic wackes and felspathic-lithic rhyolites.
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: 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.	All holes and relevant information for the estimation are too numerous to list. Face samples used in the estimate are also too numerous to list.
	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.	Exclusion of the drill information will not detract from the understanding of the report.
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.	Exploration results not reported in this release.
	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.	Exploration results not reported in this release.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	Exploration results not reported in this release.
Relationship between mineralisation	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.

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Criteria	JORC Code explanation	Commentary
widths and intercept lengths	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').	Downhole widths are reported.
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.	Appropriate plans and section have been included in this report.
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.	All valid drill holes within the estimated area have been reported with some holes in the area excluded. Holes were not excluded based on grade or width of the mineralised zone, only on the basis of confidence in the data. Excluded holes consist only of poorly geo-located holes as indicated by discontinuity the position of mineralisation or known geological contacts.
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.	No other material has been collected.
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).	Further work will continue in 2018/2019 to extend the Indicated Resource deeper by additional drilling and identify new mineralised shoots on the K2 structure.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	See below.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Northern Star personnel have validated the database during the interpretation of the mineralisation, with any drill holes containing dubious data excluded from the MRE. Northern Star provided a list of holes to be excluded from the MRE and the reasons behind those exclusions.
	Data validation procedures used.	Data validation processes are in place and run upon import into the database to be used for the MRE in Datamine Studio RM v1.2 by Mining Plus.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The CP has not visited this site.
	If no site visits have been undertaken indicate why this is the case.	The Resource process has been closely overseen by company personnel who have visited the site. The competent person has reviewed the inputs and outcomes of the work, including engagement with persons familiar with the site.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The geological interpretation is considered robust due to the nature of the mineralisation and that portions of the deposit have been developed along and mined. The level plans and other maps have been used to guide the sub-domaining process.
	Nature of the data used and of any assumptions made.	Underground development mapping and sampling along with diamond drill core lithology, structure, alteration and mineralisation logs have been used to generate the mineralisation model. The primary assumption is that the mineralisation is hosted within structurally controlled quartz veins, which is considered robust.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Due to the close spaced nature of the data from the historic mining and the consistency of the structure conveyed by this dataset, no alternative interpretations have been considered.
	The use of geology in guiding and controlling Mineral Resource estimation.	The mineralisation interpretation is based on a combination of logged quartz percentage or structure and assays.
	The factors affecting continuity both of grade and geology.	The structure is considered to be continuous over the length of the deposit with either quartz or the controlling structure used to guide this interpretation. The grade continuity is not as consistent and as such, the mineralisation has been sub-domained based on consistent grade zones, with these sub-domains used as hard boundaries during the estimation.
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 Barkers deposit is hosted within the one mineralised structure which strikes NW to NNW over a length of 900 m and dips steeply to the W with the down-dip extents in excess of 1,100 m. The Barkers North deposit is separated from the Barkers Deposit by a late stage structure. The mineralisation for this portion of the deposit has been

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
		defined by drilling intercepts to be more than 500 m along strike (340°) with steeply W-dipping extents of 400 m. Internal HG shoots have been identified in the Barkers deposit with two main plunge orientations defined to date – the first being a steep north plunge as defined by both development mapping and sampling and drill hole intercepts and the second being a moderate to steep southerly plunge.
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 of accumulated gold and true width has been completed using Ordinary Kriging (OK) deposit into 6 gold domains using Datamine Studio RM v1.2 software. Variogram orientations are largely controlled by the strike and dip of the mineralisation, with the plunge of the higher grade mineralisation evident in long section being effectively replicated during the continuity analysis. Variography has been leant to the Barkers North domain, which had too few intercept composites.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	This MRE represents an update following a drilling programme and re-interpretation and modelling work completed by Northern Star. A comparison to the previous MRE for the Barkers Deposit (excluding Barkers North which has not been re-estimated), completed in December 2016 shows that: The combined Indicated and Inferred Mineral Resource Inventory has increased from 542,000t @ 14.0gpt gold for 260,300 ounces in February 2017 to 596,900@ 14.0gpt gold for 268,200 ounces of gold in May 2017.
	The assumptions made regarding recovery of by-products.	No assumptions have been made regarding recovery of any by-products.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements have been considered and therefore estimated for this deposit.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The data spacing varies considerably within the deposit ranging from underground development samples taken approximately every 3 m along strike and at 25 m vertically spaced intervals to drill hole intercepts which varied from close spaced 20 m (along strike) to 25 m (down dip) spacings through to 75 m (along strike) to 100 m (down dip) spacings. A seam model has been created which has been rotated into the strike of the mineralisation. Blocks are variable in the across-strike direction, 10m in the along strike direction and 10m in elevation. Pass 1 estimations have been undertaken using a minimum of 5 and a maximum of 15 samples into a search ellipse set below a quarter to a third of the variogram range for all domains, with a maximum of two samples from each drill hole allowed. Pass 2 estimations have been undertaken using a minimum of 3 and a maximum of 15 samples into a search ellipse set at the generally just below half of the variogram range for all domains with a maximum of two samples from each drill hole allowed. Pass 3 estimations have been undertaken using a minimum of 1 and a maximum of 15 samples into a search ellipse set just below the variogram range. The seam model and intercept composites have been flattened to a mid-easting location for the purposes of estimation.
	Any assumptions behind modelling of selective mining units.	No selective mining units are assumed in this estimate.
	Any assumptions about correlation between variables.	No other elements other than gold have been estimated.
	Description of how the geological interpretation was used to control the Resource estimates.	The mineralisation wireframes supplied by Northern Star have been sub-domained in consultation with Northern Star based on orientation and grade, with these sub-domains used to flag the drill hole intercepts in the database. These flagged intercepts have then been used to create intercept composites in Datamine Studio RM v1.2.
	Discussion of basis for using or not using grade cutting or capping.	The influence of extreme sample distribution outliers in the composited data has been reduced by top-cutting where required. The top-cut levels have been determined using a combination of histograms, log probability and mean variance plots. Top-cuts have been reviewed and applied for the grouped estimation domains. The application of the top-cuts has not resulted in a significant decrease in the mean grade from the un-cut to top-cut data.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Model validation has been carried out, including visual comparison between de-clustered composites and estimated blocks; check for negative or absent grades; statistical comparison against the input drill hole data and graphical plots.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	The tonnes have been estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	For Mineral Resources, the cut-off grade (COG) is generated using an A$1,750 gold price. Costs incorporated in the COG are built from first principals, based either on actual cost history or budgeted estimates. For Resources in active mine areas, a variable COG has been used for the Resource estimate. The Variable costing is defined as all directly incurred costs involved in the development and extraction of the ore panel (e.g., drill & blast, haulage, processing, refining and royalties on sales.). The variable COG does not include capital development or fixed costs (i.e., costs not directly associated with extraction, processing and selling gold) that would be absorbed by the existing Reserve base.

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Criteria	JORC Code explanation	Commentary
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	The interpretation of mineralisation is independent of mining considerations. After modelling, the software 'Mineable Shape Optimiser' is used to generate optimal mining shape based on a 2m minimum mining width, and variable costing Cut-off grade at the A$1,750 gold price. Any isolated MSO shapes unlikely to be economic are removed from the estimated Resource. The Resource reported is the Measured, Indicated & Inferred material within the MSO shape generated.
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.	No metallurgical or recovery assumptions have been made during the MRE. Historic production of Barkers ore in the 2000's demonstrates that the material is amenable to conventional CIL processing.
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 green fields 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.	No environmental assumptions have been made during the MRE.
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 values have been applied based on the degree of weathering which has been coded into the model. The values used have been obtained from a previous MRE for the Barkers Deposit.
	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.	Bulk density vales have been derived through both surface sampling and comparison to tonnage estimates from material mined historically.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Densities were assigned based on weathering state (oxide, transitional and fresh rock) and domains.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The Resource classification has been applied to the MR estimate based on the drilling data spacing, grade and geological continuity, and data integrity.
	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, quality, quantity and distribution of the data).	The classification considers the relative contributions of geological and data quality and confidence, as well as grade confidence and continuity.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The classification reflects the view of the Competent Person.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	This Mineral Resource estimate for the combined Barkers deposit has not been audited by an external party.
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 relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC Code.
	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.	The statement relates to global estimates of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No production records have been supplied as part of the scope of works, so no comparison or reconciliation has been made.

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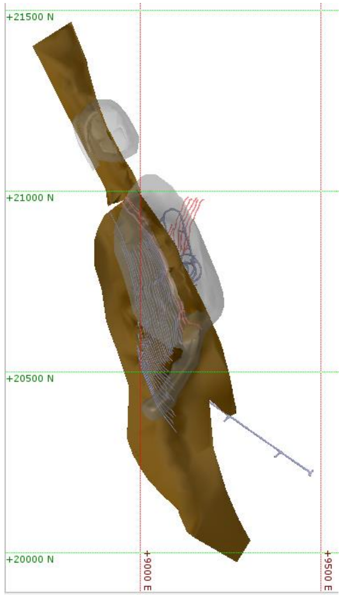
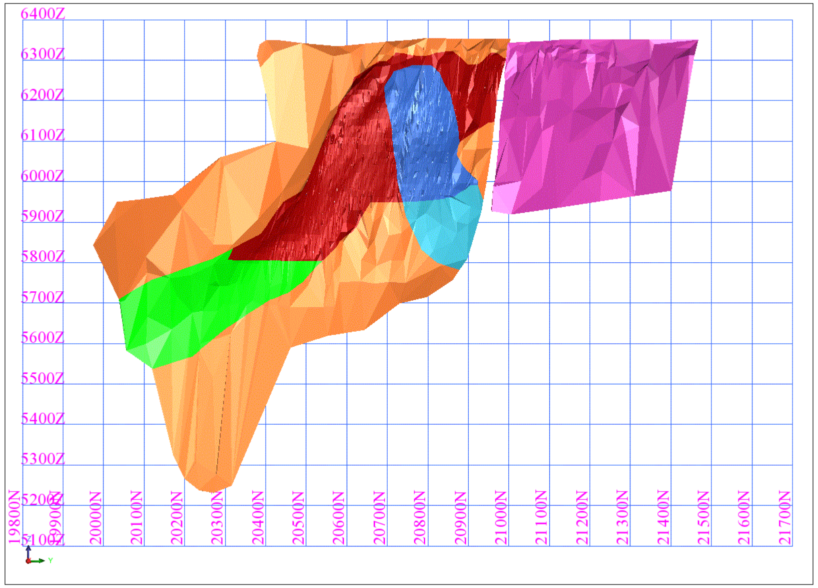
BARKERS PLAN & LONG SECTION DIAGRAMS

Plan View of the BARKERS deposit



LONG SECTION of BARKERS deposit



Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star Resources Limited June 2019 Mineral Resource.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The competent person has conducted multiple sites visits and has been involved in the operation from feasibility study to mine development.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	A minimum Pre-Feasibility level study has been completed.
	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.	Upgrade of previous Ore Reserve.

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Criteria	JORC Code explanation	Commentary
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. The assumed AUD gold price is at a conservative assumption of $1,500/oz. Mill recovery factors are based on test work and historical averages from the region. Various cut-off grades are calculated including a fully costed cut-off grade (COG), variable cut-off grade (VCOG) and Mill cut-off grade (MCOG). The VCOG is used as the basis for stope design, though any areas which are marginal or require significant development are assessed by a more detailed financial analysis to confirm their profitability.
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).	Indicated Resources were converted to Probable Ore Reserves subject to mine design physicals and an economic evaluation. Stockpiled material was considered as Proved Reserve.
	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.	Ore is accessed from a decline located in the hangingwall through levels at 20m vertical spacing. A bottom up CRF fill mining method is applied and the levels are broken into selectively sized stoping blocks to maximise production. The selected mining method was evaluated during the initial Pre-Feasibility study and was deemed the most appropriate. The mining method is similarly used at Northern Star for areas of the nearby Pegasus mine.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	The mine design considers well established geotechnical constraints and is reviewed by geotechnical engineers prior to being finalised. Independent geotechnical reviews were conducted for the Barkers and Strzelecki mines to provide guidance on pillar locations and extraction sequences. Historical geological and geotechnical information is gathered from the nearby operations that operated previously, including Barkers, Strzelecki and Centenary, and still in operation, Raleigh, Rubicon, Hornet and Pegasus, and learnings from this are applied to the geotechnical parameters used. Grade control is carried out through Resource definition drilling and face sampling of all ore drives.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	This Table 1 applies to underground mining only.
	The mining dilution factors used.	5% dilution is applied to CRF filled stopes to account for CRF dilution on the stopes. 10% dilution is applied to unfilled up hole stopes.
	The mining recovery factors used.	95% recovery is applied to CRF filled stopes. A calculated 74% recovery is applied to unfilled up hole stopes to account for pillar requirements.
	Any minimum mining widths used.	A minimum stope mining width of 2.8m has been used. This considers a minimum stope width of 2m +0.4m dilution in the Hangingwall and +0.4m dilution in the Footwall.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred blocks are excluded from the reported Ore Reserve. No ounces have been included from Inferred material.
	The infrastructure requirements of the selected mining methods.	Remaining Site surface infrastructure requirements for the mining method include: CRF Batch Plants for Barkers All other surface infrastructure was completed in FY16-17. Underground infrastructure requirements include • Ventilation rises for Pope John and Moonbeam, and ventilation extensions on Millennium; • Primary ventilation fans for Pope John and Strzelecki; • Escapeway systems and extensions for Millennium and Pope John; • Power and pumping infrastructure with mine extension; • Historical void dewatering infrastructure; and, • Underground Magazines. All other underground infrastructure was completed in FY16-17.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	All Kundana ore is treated at the Kanowna Belle milling facilities. The plant is made up of crushing, grinding, gravity gold recovery, flotation, roasting, CIL, elution and gold recovery circuits. These facilities are designed to handle approximately 1.8 million tonnes of feed per annum. The plant has the capability to treat both refractory and free milling ores, through either using the flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery), or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plant campaigns both refractory and free milling ores every month.

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Criteria	JORC Code explanation	Commentary
	Whether the metallurgical process is well-tested technology or novel in nature.	Plus 10 years milling experience with Kundana ores.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Plus 10 years milling experience with Kundana ores.
	Any assumptions or allowances made for deleterious elements.	No assumptions made.
	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.	Plus 10 years milling experience with Kundana ores.
	For minerals that are defined by a specification, has the ore Reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Millennium, Centenary and Pope John are currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are either granted or in the process of being granted. Operational expansions to Barkers are subject to new / amended applications. Based on the locations of these operations and considering historical activities, the Competent Person does not view this as presenting significant risk to the extraction of these ore bodies.
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.	All current site infrastructure is suitable to the proposed mining plan.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mine development capital cost based on historical performance on site and life-of-mine forward planning. Plant and equipment capital also based on site experience and the LOM plan.
	The methodology used to estimate operating costs.	All overhead costs and operational costs are projected forward on an AUD $/t based on historical data.
	Allowances made for the content of deleterious elements.	No allowances made.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Single commodity pricing for gold only, using a long-term gold price of AUD $1,500/oz., 2.5% WA state Government Royalty, as per NSR corporate guidance.
	The source of exchange rates used in the study.	All rates considered in Australian Dollars (AUD) as per NSR corporate guidance.
	Derivation of transportation charges.	Historic performance.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance.
	The allowances made for royalties payable, both Government and private.	All State Govt. and third-party royalties are built into the cost model.
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.	All revenue based on a gold price of AUD $1,500/oz.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	All product is sold direct at spot market prices.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not relevant for gold.
	Price and volume forecasts and the basis for these forecasts.	Not relevant for gold.

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Criteria	JORC Code explanation	Commentary
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not relevant for gold.
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.	All costs assumptions are made based on historical performance from the mine and current economic forecast seen as representative of current market conditions.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities assessed at varying gold prices.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	No issues foreseen.
	Any identified material naturally occurring risks.	No issues foreseen.
	The status of material legal agreements and marketing arrangements.	No issues foreseen.
	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.	No issues foreseen.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	All Ore Reserves include Proved (if any) and Probable classifications. These classifications are based on Mineral Resource classifications as modified by subsequent grade control drilling and face sampling results.
	Whether the result appropriately reflects the Competent Person’s view of the deposit.	The results appropriately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	None.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	This ore Reserve has been prepared and peer reviewed internally within Northern Star Resources. There have been no external reviews of this Ore Reserve estimate.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the Reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve is considered high based on nearby Northern Star operated mines along the same ore bearing structures.
	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.	Ore Reserves are best reflected as global estimates.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Other than dilution and recovery factors described above, no additional modifying factors applied. There is high confidence in these models as the areas is well known and well drilled.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Reconciliation results from past mining at Centenary, Millennium, Barkers and Strzelecki reflect estimates in the Ore Reserve estimates.

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JORC Code, 2012 Edition – Table 1 Report

Millennium, Centenary Crown and Centenary South: Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="3">Sampling techniques</td><td>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.</td><td>A combination of sample types was used to collect material for analysis including underground diamond drilling (DD), surface diamond drilling (RC) and face channel (FC) sampling. RAB holes were excluded from the estimate and where sufficient diamond drill holes were present, RC holes were also excluded.
<table>
<tr><th></th><th colspan="3">Millennium</th><th colspan="3">Centenary Crown</th><th colspan="3">Centenary South</th></tr>
<tr><td></td><td># of Holes</td><td>Total m's</td><td># of Samples</td><td># of Holes</td><td>Total m's</td><td># of Samples</td><td># of Holes</td><td>Total m's</td><td># of Samples</td></tr>
<tr><td>DD</td><td>357</td><td>74,728</td><td>36,770</td><td>49</td><td>29,907</td><td>168</td><td>57</td><td>16,139</td><td>89</td></tr>
<tr><td>FS</td><td>1,015</td><td>4,784</td><td>8,030</td><td>836</td><td>4,055</td><td>1,403</td><td>463</td><td>1,621</td><td>556</td></tr>
<tr><td>RC</td><td>98</td><td>11,266</td><td>7,072</td><td>104</td><td>23,409</td><td>321</td><td>18</td><td>1,987</td><td>28</td></tr>
<tr><td>RC_DD</td><td>4</td><td>1,208</td><td>715</td><td>1</td><td>194</td><td>1</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>1,474</td><td>91,986</td><td>52,587</td><td>990</td><td>57,565</td><td>1,893</td><td>538</td><td>19,747</td><td>673</td></tr>
</table></td></tr>
<tr><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>DD drilling is sampled within geological boundaries with a minimum (0.3 m) and maximum (1.0 m) sample length. Face channel sampling is constrained within geological and mineralised boundaries with a minimum (0.2 m) and maximum (1.0 m) channel sample length.</td></tr>
<tr><td>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 30g 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.</td><td>DD drill core was nominated for either half core or full core sampling. Core designated for half core was cut in half using an automated core saw. The mass of material collected will depend on the drill hole diameter and sampling interval selected. Core designated for full core was broken with a rock hammer if sample segments were too large to fit into sample bags.
A sample size of at least 3 kg of material was targeted for each face sample interval.
All samples were delivered to a commercial laboratory where they were dried, crushed to 95% passing 3 mm if required, at this point large samples may be split using a rotary splitter, pulverisation to 90% passing 75 µm, a 40 g charge was selected for fire assay.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both RC and Diamond Drilling techniques were used to drill the Kundana deposits.
Surface diamond drill holes were completed using HQ2 (63.5 mm) coring whilst underground diamond drill holes where completed using NQ2 (50.5mm) coring.
Historically, core was orientated using the Reflex ACT Core orientation system. Currently, core is orientated using the Boart Longyear Trucore Core Orientation system.
RC Drilling was completed using a 5.75” drill bit, downsized to 5.25” at depth.
In many cases RC pre-collars were drilled followed by diamond tails. Pre-collar depth was determined in the drill design phase depending on the target been drilled and production constraints.</td></tr>
<tr><td rowspan="3">Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>For DD drilling, any core loss is recorded on the core blocks by the driller. This is then captured by the logging geologist and entered as interval into the hole log.</td></tr>
<tr><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>For diamond drilling the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.</td></tr>
<tr><td>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.</td><td>Recovery was excellent for diamond core and no relationship between grade and recovery was observed. Average recovery across the Kundana camp is at 99%.</td></tr>
<tr><td rowspan="2">Logging</td><td>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.</td><td>All diamond core is logged for lithology, veining, alteration, mineralisation and structural. Structural measurements of specific features are also taken through oriented zones.
Logging is entered in Acquire using a series of drop-down menus which contain the appropriate codes for description of the rock.
The majority of underground faces are logged for lithology and mineralisation. Logging is captured on a face sample sheet underground which is then transferred to Acquire. Faces are then input into Acquire using a series of drop-down menus which contain appropriate codes for description of the rock.</td></tr>
<tr><td>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.</td><td>All core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet.
All underground faces are logged and sampled to provide both qualitative and quantitative data. All faces are washed down and photographed before sampling is completed.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
	The total length and percentage of the relevant intersections logged.	For all drill holes, the entire length of the hole was logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core is cut using an automated core saw. Depending on the type of drilling, determines the level of sampling/cutting completed. Half core is taken for Resource targeting (RT) drilling and some Resource Definition drilling (RSD). However, most RSD holes have been whole core sampled due to production pressures. Grade Control drilling (GC) is almost always whole core sampled, earlier campaigns were half cored due to the lack of data present in the Millennium deposit. In the case of half core sampling, half the core is taken with the remaining half being stored for later reference. Whole core samples are also utilized in areas where the ground conditions result in very broken core and cutting the core is not practical.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	For previous RC drilling, all RC samples are split using a rig-mounted cone splitter to collect a sample 3 - 4 kg in size from each 1 m interval. These samples were utilised for any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside known mineralised zones spear samples were taken over a 4 m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Preparation of NSR samples was conducted at Bureau Veritas Kalgoorlie and Perth preparation facilities, while surface exploration drilling was sent to Genalysis. Sample preparation commenced with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3 kg (typically 1.5 kg) at a nominal <3 mm particle size. The entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% passing 75 µm, using a Labtechnics LM5 bowl pulveriser. 400 g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets. The sample preparation is considered appropriate for the deposit.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are utilised to guide the selection of sample material in the field. Standard procedures are used for all processes within the laboratory. Grind checks are performed at the pulverising stage requiring at least 90% of material to pass below 75 um
	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.	Umpire sampling is performed monthly, where 3% of the samples are sent to the umpire lab (ALS Perth) for processing. In the last year there was an insertion rate of 0.22% for Millennium umpire samples, which resulted in a correlation of 99%. These umpire samples were picked and submitted together for the whole Kundana region.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material been sampled.
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.	A 40gm fire assay charge is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO_3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine any element concentrations.
	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 materials (CRMs) are inserted into the sample sequence at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a nominal rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t if received are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades at the pulverising stage. No field duplicates were submitted for diamond core. Pulp duplicates are requested after any ore zone. These are indicated on the sample sheet and submission sheet. When visible gold is observed in core, a quartz flush is requested after the sample. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs The QA studies indicate that accuracy and precision are within industry accepted limits.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off.
	The use of twinned holes.	No twinned holes were drilled for this data set. Re-drilling of some of the drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database as an 'A'. Re-drilled holes are sampled whilst the original drill hole is logged but not sampled.

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Criteria	JORC Code explanation	Commentary
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging and sampling are directly recorded into AcQuire. Assay files are received in csv, pdf and sif formats. The csv's are loaded directly into the database using an AcQuire importer object. Assays are then processed through a form in AcQuire for QAQC checks. Noneditable electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data. If there are issues with the results files received, amended versions are requested from the lab.
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.	Planned holes are marked up by the mine survey department using a total station survey instrument in mine grid (Kundana 10). The actual hole position is then located by the mine survey department once drilling is completed. In some cases, drill hole collar points are measured off survey stations if a mark-up cannot be completed. This is only used for Grade Control drilling due to their frequent occurrence. Holes are lined up on the collar point using the DHS Minnovare Azimuth Aligner. Planned azimuths and dips of the holes are downloaded to the aligner which is then placed on the rod string to align the hole for drilling. During drilling, single shot surveys are conducted every 30 m to track the deviation of the hole and to ensure it stays close to design. This is performed using the Devishot camera which measures the gravitational dip and magnetic azimuth. Results are uploaded from the Devishot software into a csv format which is then imported into the Acquire database. At the completion of the hole, a Multishot Devi flex survey is completed taking measurements every 3 m to ensure accuracy of the hole. The is relative change survey which is then referenced back to the Azimuth aligner to provide an accurate, continuous nonmagnetic survey. This is also converted to csv format and imported into the Acquire database.
	Specification of the grid system used.	Collar coordinates are recorded in mine grid (Kundana 10) and transformed into MGA94_51.
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups of holes over the last 15 years.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing varies across the deposit. For resource targeting drilling spacing was typically a minimum of 80 m x 80 m. This allowed for infill drilling at 40 m x 40 m spacing known as resource definition. Grade control drilling was drilled on a level by level basis with drill spacing at 20 m x 20 m.
	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 spacing and distribution is considered sufficient to support the resource and reserve estimates.
	Whether sample compositing has been applied.	No sample compositing has been applied.
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.	Majority of the mineralisation in the Kundana area dips steeply (80°) to the WSW. Diamond drilling was designed to target the orebodies perpendicular to this orientation to allow for an ideal intersection angle. Instances where this was not achievable (mostly due to drill platform location), drilling was not completed or re-designed once a suitable platform became available. Drill holes with low intersection angles will be excluded from resource estimation where more suitable data is available.
	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.	No sampling bias is considered to have been introduced by the drilling orientation. Where drill holes have been particularly oblique, they have been flagged as unsuitable for resource estimation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits have been undertaken of the data and sampling practices at this stage.

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.	All holes mentioned in this report are located within the M16/87, M16/72, M16/97 tenements, which are owned by KUNDANA GOLD PTY LTD a wholly owned subsidiary of Northern Star Resources. There are no private royalty agreements applicable to this tenement.

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Criteria	JORC Code explanation	Commentary
	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.	No known impediments exist, and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Early exploration was completed in the 1980's by Kalbara Minerals with the development and operation of South Pit. Modern mining continued in late 1980's with the Kundana North and Strzelecki Open pits. Mining continued through to 1999 when the Centenary Underground ceased operations. Exploration continued over the camp through various companies including Placer Dome and Barrick Gold. Early 2014 saw Northern Star Resources purchase the Kundana camp from Barrick Gold and mining recommenced in March 2014. Millennium was discovered in the same year and commenced mining in 2015.
Geology	Deposit type, geological setting and style of mineralisation.	The Kundana camp is situated within the Norseman-Wiluna Greenstone Belt, in an area dominated by the Zuleika shear zone, which separates the Coolgardie domain from the Ora Banda domain. K2-style mineralisation consists of narrow vein deposits hosted by shear zones located along steeply dipping overturned lithological contacts. The K2 structure is present along the contact between a black shale unit (Centenary shale) and intermediate volcaniclastics (Black Flag Group). Early indications from the diamond drilling of this report indicate a late generation of shearing overprinting largely focussed along the earlier K2 structure. At this stage, it is unclear if this later generation of shearing is associated with an additional mineralising event.
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: 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.	A summary of the data present in the Millennium deposit can be found above. The collar locations are presented in plots contained in the NSR 2018 resource report. Drill holes vary in survey dip from +59 to -90, with hole depths ranging from 68 m to 498 m, with an average depth of 317 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All validated drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	The exclusion of information is not material
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2 m of barren material (considered < 1 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 1.0 g/t are considered significant, however, where low grades are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	It is known and has been reported as such
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.	Appropriate plans and section have been included at the end of this Table and in the NSR 2019 resource report.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.

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Criteria	JORC Code explanation	Commentary
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.	No other material exploration data has been collected for this area.
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).	Drilling will continue in various parts of the mine with the intention of extending areas of known mineralisation. Areas of focus will be to extend the K2 structure both down dip and along strike to the north. Drilling will also focus on infilling areas of the resource to improve confidence.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are either recorded on paper and manually entered into a database system or is captured digitally via a logging laptop and directly loaded into the database system. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly into the database from laboratory and survey derived files.
	Data validation procedures used.	The database has further checks performed to back -up those performed in section 2. The complete exported data base including drill and face samples is brought into Datamine and checked visually for any apparent errors i.e. holes or faces sitting between levels or not on surface DTM's. Multiple checks are then made on numerical data. This includes: • Empty table checks to ensure all relevant fields are populated • Unique collar location check, • Distances between consecutive surveys is no more than 60m for drill-holes • Differences in azimuth and dip between consecutive surveys of no more than 0.3 degrees • The end of hole extrapolation from the last surveyed shot is no more than 30 m • Underground face sample lines are not greater than +\- 5 degrees from horizontal Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported. This data will not be used in the estimation process. Several drilling programs completed between 2014 and 2016 had erroneous metre depths recorded by the drillers. This resulted in multiple drill-holes recording the intersection of the K2 several metres earlier than expected. Until underground development had progressed to these elevations, this was not possible to determine. Unfortunately, there is not a uniform translation that can be applied; therefore, these drill-holes have been omitted from the ore wireframe interpretations and flagged as invalid. However, where there were no QAQC issue with the assays, the correct intervals have been recorded, the translation in the easting direction required for them to be in the 'correct' location (based on development above and below) applied and these intervals were appended to the data set before compositing. In addition to being Resource Flagged as "Yes" or "No", drill holes are assigned a Data Class, which provides a secondary level of confidence in the data quality. Data Class (DC) values range from 0 to 3, with criteria summarised below: • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR • Recent data; minor issues with data such as QAQC fail but away from the ore zone. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The geological interpretations underpinning these resource models were prepared by geologists working in the mine and in direct, daily contact with the ore body. The estimation of grades was undertaken by personnel familiar with the ore body and the general style of mineralisation encountered. The Senior Resource Geologist, a competent person for reviewing and signing off on estimations of the multiple Millennium/Centenary lodes maintained a site presence throughout the process.

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Criteria	JORC Code explanation	Commentary
	If no site visits have been undertaken indicate why this is the case.	The Competent Person has maintained a presence onsite.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the Millennium, Centenary Crown and Centenary South deposits were carried out using a systematic approach to ensure continuity of the geology and estimated mineral resource. The confidence in the geological interpretation is high and is supported with information acquired during ore development as well as from drilling. The interpretation of all the Millennium, Centenary Crown and Centenary South mineralisation wireframes were conducted using the sectional interpretation method. Where development levels were present sectional interpretation was completed in plan view at approximately 5 m spacing to allow for a better constrained and geologically realistic wireframe. Where only drilling data was present sectional interpretation was completed at approximately 10 - 20 m spacing. Wireframes were checked for unrealistic volumes and updated where appropriate.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drill holes, underground face channel data and structural models.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No other interpretations have been tested.
	The use of geology in guiding and controlling Mineral Resource estimation.	The interpretation of the main Millennium and Centenary structures is based on the presence of quartz veining/shearing and continuity between sections of these structures and adjacent mineralised structures.
	The factors affecting continuity both of grade and geology.	Within the Century Main Vein (K2) structure at Millennium/Centenary, grade continuity is affected when the percentage of quartz decreases and only a sheared structure remains. This results in lower grade in areas where only shear is present and higher grade where quartz is evident. Within Millennium North, the shear opens up in width and the mineralisation is present as stockwork veins within the shear. Significant dextral offsetting fault structures (Yellowbird fault and Emu fault) affect the continuity of the K2 structure at Millennium. These faults are interpreted to be post mineralisation and offset the ore between 1 and 20 m. The dilation and silicification of shale in the hanging-wall halo zone of the K2 structure controls grade immediately next to the K2.
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 strike length of the Millennium K2 structure is approximately 875 m. The strike length of the Centenary K2 structure is approximately 600 m. The individual ore bodies occur in a major regional shear system extending over 10s of kilometres. Millennium K2 is ~ 1.2 m wide and can be up to 8 m in Millennium North, while Centenary K2 is ~ 0.6 m wide and can be up to 3 m wide. Both have a minimum width of ~ 0.1 m. Mineralisation is known to occur from the base of cover to around 900 m below surface.
Estimation and modelling techniques	The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.	The Millennium K2 mineralisation used 1m composites with direct grade estimation. The Centenary South and Centenary Crown K2 mineralisation used full length composites with indirect grade estimation for consistency with previous estimates. The Centenary Deeps model has not been updated. K2V (Millennium K2) – comprised of higher grade quartz vein material in the K2; divided into two grade subdomains based on data density; high density around development levels and lower density distant to development. Each subdomain was analysed separately for top cuts. Variography was completed on both subdomains combined and indicates grade continuity in the NW plunge direction. Both subdomains have a search range of ~220 m in direction 1 and 130 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 3 - 4 samples and a maximum of 8 samples for both the high and low-density subdomains. Estimation was completed using a soft boundary between the high and low-density subdomains and a semi-soft boundary between adjacent K2 domains e.g. K2S and K2NTH. K2S (Millennium K2) – comprised of lower grade sheared material at the southern extent of the K2; divided into two grade subdomains based on data density; high density around development levels and lower density distant to development. Each subdomain was analysed separately for top cuts. Variography was completed on both subdomains combined and indicates grade continuity in the NW plunge direction. Both subdomains have a search range of ~165 m in direction 1 and 75 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 3 - 4 samples and a maximum of 7-10 samples for both the high and low-density subdomains. Estimation was completed using a soft boundary between the high and low-density subdomains and a semi-soft boundary between adjacent K2 domains e.g. K2V and K2NTH. K2NTH (Millennium K2) – comprised of quartz vein stockwork material within sheared shale in the north of the K2; divided into two grade subdomains based on data density; high density around development levels and lower density distant to development. Each subdomain was analysed separately for top cuts. Variography was completed on both subdomains combined and indicates grade continuity in the SSE plunge direction. The high-density subdomain has a search range of ~170 m in direction 1 and 60 m in direction 2. The low-density subdomain has a search range of ~200 m for direction 1 and 100 m for direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 3 - 4 samples and a maximum of 6-8 samples for both the high and low-density subdomains. Estimation was completed using a soft boundary between the high and low-density subdomains and a semi-soft boundary between adjacent K2 domains e.g. K2V and K2S. HWNTH/FWNTH/HW/FW (Millennium)- hanging wall (HWNTH) and foot wall (FWNTH) grade halos for the northern portion of K2,d hanging wall (HW) and foot wall (FW) grade halos for the remainder of K2; All domains were divided into two grade subdomains based on data density; high density around development levels and lower density

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Criteria	JORC Code explanation	Commentary
		distant to development. Top cut analysis and variography was completed on HWNTH/HW combined and FWNTH/FW combined. Variography indicates grade continuity in the NW plunge direction. HWNTH/FWNTH/FW domains all had a search range of ~150 m in direction 1 and 60 m in direction 2 for both high and low-density subdomains. The HW domain had a search range of ~80 m in direction 1 and 60 m in direction 2 for both high and low subdomains. Three passes were used for estimation with distances based on variography. The first pass had a minimum of 7 samples and a maximum of 10 samples for all domains and subdomains. Estimation was completed using a soft boundary between the high and low-density subdomains. K2 (Centenary South) - divided into two grade subdomains based on data density; high density around development levels and lower density distant to development. Each subdomain was analysed separately for top cuts. Variography was completed on both subdomains combined and indicates grade continuity in the NW plunge direction. Both subdomains have a search range of ~80 m in direction 1 and 50 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 3 - 5 samples and a maximum of 7-10 samples for both the high and low-density subdomains. Estimation was completed using a soft boundary between the high and low-density subdomains. K2 (Centenary Crown) - divided into two grade subdomains based on data density; high density around development levels and lower density distant to development. Each subdomain was analysed separately for top cuts. Variography was completed on both subdomains combined and indicates grade continuity in the NW plunge direction. The high-density subdomain has a search range of ~200 m in direction 1 and 125 m in direction 2. The low-density subdomain has a search range of ~150 m for direction 1 and 100 m for direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 4 - 5 samples and a maximum of 8-10 samples for both the high and low-density subdomains. Estimation was completed using a soft boundary between the high and low-density subdomains. HW/FW Halo (Centenary/ Centenary Crown) - divided into two grade subdomains based on data density; high density around development levels and lower density distant to development. Each subdomain was analysed separately for top cuts. Variography was completed on both subdomains combined and indicates grade continuity in the S plunge direction. All domains and subdomains had a search range of ~80 m in direction 1 and ~40 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 4-5 samples and a maximum of 8-10 samples for all domains and subdomains. Estimation was completed using a soft boundary between the high and low-density subdomains.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	An Inverse Distance Squared and Nearest Neighbour estimate is run for comparison.
	The assumptions made regarding recovery of by-products.	No assumptions are made and only gold is defined for estimation.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Block sizes varied depending on sample density. In areas of high-density underground face samples with average spacing of 3 - 4 m a 5 x 5 x 5 m block size was chosen. Medium density drill spacing is approximately 30 – 40 m with a 10 x 10 x 10 m block size was chosen. For low density drilling with larger spacing greater than 40 m a block size of 10 x 20 x 10 m was chosen. All the varying block sizes are added together after being estimated individually. Search ellipse dimensions were derived from the variogram model ranges.
	Any assumptions behind modelling of selective mining units.	Selective mining units were not used during the estimation process.
	Any assumptions about correlation between variables.	No assumptions have been made.
	Description of how the geological interpretation was used to control the resource estimates.	Hanging-wall and foot-wall wireframe surfaces were created using sectional interpretation. These were used to define the Millennium/Centenary K2 and hangingwall and footwall halo mineralised zones based on the shearing, veins and gold grade. K2 (Millennium/Centenary) steeply dipping structure with quartz veining evident from drilling and development. Footwall/Hanging-wall halo (Millennium/Centenary)- Steeply dipping sheared structure with minor quartz stringers in the hanging-wall and footwall of the K2 evident from drilling and development. For mine planning purposes a waste model is created by projecting the hanging wall and footwall surfaces 5 m either side. A default grade of 0.1 g/t is assigned and the same resource classification as the adjacent ore lode is applied.

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Criteria	JORC Code explanation	Commentary
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the mean by more than 5% and reducing the coefficient of variation to around 1.2, and vary by domain (ranging from 20 to 150 g/t for individual domains and deposits) The top cut values are applied in several steps, using a technique called influence limitation top cupping. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear; this applies to both gold and true thickness (TT) top cutting. For example, where true thickness and gold both require a top cut, the following variables will be created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) The top-cut and non-top cut values are estimated using search ranges based on the variogram, and the *_BC values estimated using very small ranges (e.g. 5 x 5 x 5m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU).
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Statistical measures of Kriging error, such as Kriging Efficiency and Slope of Regression, are used to assess the quality of the estimation for each domain. Differences between the declustered composite data set and the average model grade must be within 10%. Swath plots comparing composites to block model grades are prepared and plots are prepared summarising the critical model parameters. Visually, block grades are assessed against drill hole and face data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 1.73 g/t cut off within 2.5 m minimum mining width (excluding dilution) MSO's using a $AU1750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No mining assumptions have been made during the resource wireframing or estimation process.
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.	Metallurgical test work was completed in April 2016 for the Feasibility Study. It indicated overall recovery of 92.8%, gravity recovery of 43.8%, low arsenic, Bond Ball Mill work index of 15.7 – 16.2 kWh/tonnes and no preg-robbing characteristics. Additional metallurgical samples have been collected for test work but results are still pending.
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 green fields 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.	A "Licence to Operate" is held by the operation which is issued under the requirement of the "Environmental Protection Act 1986", administered by the Department of Environment (DoE). The licence stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are also regulated by DoE and are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licences and lease conditions. An Environmental Management System is in place to ensure that Northern Star employees and contractors exceed environmental compliance requirements. The Kalgoorlie operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits. Kalgoorlie Operations have been compliant with the International Cyanide Management Code since 2008. Compliance with air quality permits is particularly important at Kanowna because of the roaster operation and because there are three facilities in the Kalgoorlie region emitting SO_2 gas. Kanowna has a management program in place to minimize the impact of SO_2 on regional air quality and ensure compliance with regulatory limits.
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.	A thorough investigation into average density values for the various lithological units at Millennium/Centenary Crown/Centenary South was completed and the mean densities by lithology were coded into the database. Where there were no measurements for a specific lithology and default of 2.8 was applied. Density was then estimated by Ordinary Kriging using the associated gold estimation parameters for that domain. Post estimation, default density values for the oxide and transition zones were applied, based on regional averages.

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
	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.	No/minimal voids are encountered in the ore zones and underground environment.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Assumptions on the average bulk density of individual lithologies, based on 331 bulk density measurements at Millennium/Centenary. Assumptions were also made based on regional averages, on the default densities applied to oxide (1.9) and transition (2.3) material, due to lack of data in these areas.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: • Geologic grade continuity • Density of available drilling • Statistical evaluation of the quality of the kriging estimate • Confidence in historical data
	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, quality, quantity and distribution of the data).	All relevant factors have been given due weighting during the classification process.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resource model methodology is appropriate, and the estimated grades reflect the Competent Persons view of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	All resource models have been subjected to internal peer reviews.
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.	These mineral resource estimates are considered robust and representative of the Millennium and Centenary style of mineralisation. The application of geostatistical methods has helped to increase the confidence of the model and quantify the relative accuracy of the resource.
	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.	This resource report relates to the Millennium, Centenary Crown and Centenary South ore zones. The Centenary Deeps area has had no additional drilling or underground development and the previous resource estimate has been retained for Resource and Reserve reporting. Each of these will show local variability even though the global estimate reflects the total average tonnes and grade
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No reconciliation factors are applied to the resource post-modelling.

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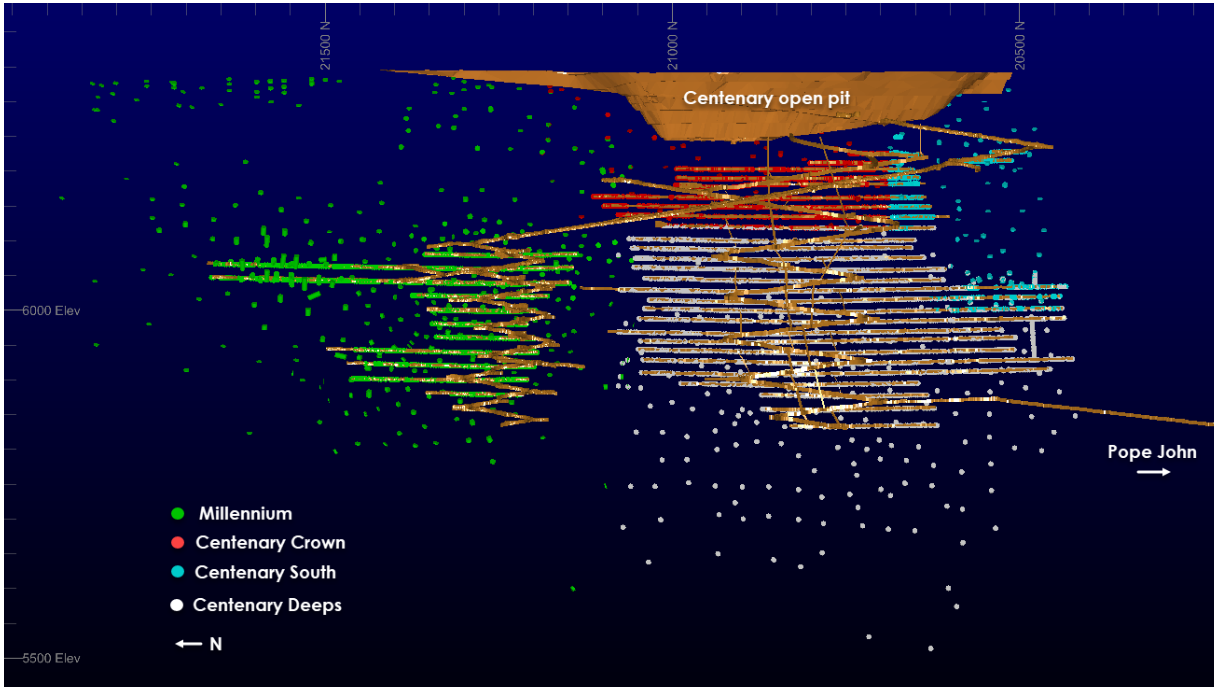

Figure 1. Long section view of the Millennium-Centenary deposits and the data used in each resource estimate

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star Resources Limited June 2019 Mineral Resource
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been undertaken by the competent person.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	A minimum Pre-Feasibility level study has been completed.
	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	Upgrade of previous Ore Reserve

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
	mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.	
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. • The assumed AUD gold price is at a conservative assumption of $1,500/oz • Mill recovery factors are based on test work and historical averages from the region. Various cut-off grades are calculated including a break-even cut-off grade (BCOG), Variable cut-off grade (VCOG) and Mill cut-off grade (MCOG). The VCOG is used as the basis for stope design, though any areas which are marginal or require significant development are assessed by a more detailed financial analysis to confirm their profitability.
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).	Indicated Resources were converted to Probable Ore Reserves subject to mine design physicals and an economic evaluation. Stockpiled material was considered as proven
	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 Millennium underground mine (incorporating Millennium, Centenary, Pope John, Moonbeam and Christmas) is accessed via a portal within the open pit. The ore is accessed from the Hanging wall from levels at 20m spacing (25m in Millennium North). A combination of top down open stoping, top down paste filled and bottom up CRF fill mining methods are applied and the levels are broken into selectively sized stoping blocks to maximise production. The selected mining method was evaluated during the initial Pre-Feasibility study and was deemed the most appropriate. A similar mining method is used by Northern Star for areas of the nearby Pegasus mine.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	The mine design considers well established geotechnical constraints and is reviewed by geotechnical engineers prior to being finalised. Historical geological and geotechnical information is gathered from the nearby operations including Barkers, Strzelecki and Centenary, and still in operation, Raleigh, Rubicon, Hornet and Pegasus, and learnings from this are applied to the geotechnical parameters used. Grade control is carried out through resource definition drilling and face sampling of all ore drives.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	This Table 1 applies to underground mining only
	The mining dilution factors used.	0.5m hanging wall and 0.5m footwall dilution has been applied to all stopes. No additional mining dilution factor has been applied.
	The mining recovery factors used.	90% recovery is applied to CRF filled stopes. A calculated 70% recovery is applied to unfilled up hole stopes to account for pillar requirements.
	Any minimum mining widths used.	A minimum stope mining width of 3.0m has been used. This considers a minimum stope width of 2.0m +0.5m dilution in the Hangingwall and +0.5m dilution in the Footwall
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred blocks are excluded from the reported Ore Reserve. No ounces have been included from Inferred material.
	The infrastructure requirements of the selected mining methods.	Remaining Site surface infrastructure requirements for the mining method include: - Pope John Pit dewatering system - Dewatering Moonbeam Pit and Portal establishment Underground infrastructure requirements include - Primary Ventilation for Moonbeam and ventilation extensions in Pope John; - Primary ventilation fans for Moonbeam; - Escapeway extensions for Pope John; - Power and pumping infrastructure with mine extension; and - Historical void dewatering infrastructure. All other underground infrastructure was completed in FY18-19.
	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	NSR own and operate the Kanowna Belle and South Kalgoorlie milling and processing facilities. Both plants are located within 100km of the Kundana Operations.

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Criteria	JORC Code explanation	Commentary
Metallurgical factors or assumptions		These facilities are designed to process in excess of 3.0 million tonnes per annum. Both plants have the capability to treat free milling ores with additional capacity at the Kanowna Belle facility to treat refractory material. Ore is treated either using the flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery) or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plants campaign both refractory and free milling ores every month.
	Whether the metallurgical process is well-tested technology or novel in nature.	Milling experience gained since 2005, 14 years' continuous operation
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Milling experience gained since 2005, 14 years' continuous operation
	Any assumptions or allowances made for deleterious elements.	No assumptions made
	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.	Milling experience gained since 2005, 14 years' continuous operation
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Millennium, Centenary and Pope John are currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are either granted or in the process of being granted.
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.	All current site infrastructure is suitable to the proposed mining plan.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mine development capital cost based on historical performance on site and life-of-mine forward planning. Plant and equipment capital are based on site experience and the LOM plan
	The methodology used to estimate operating costs.	All overhead costs and operational costs are projected forward on an AUD $/t based on historical data.
	Allowances made for the content of deleterious elements.	No allowances made.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Single commodity pricing for gold only, using a long-term gold price of AUD $1,500/oz, 2.5% WA state Government Royalty, as per NSR corporate guidance
	The source of exchange rates used in the study.	All rates considered in Australian Dollars (AUD) as per NSR corporate guidance
	Derivation of transportation charges.	Historic performance
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance
	The allowances made for royalties payable, both Government and private.	All State Govt. and third-party royalties are built into the cost model.
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.	All revenue based on a gold price of AUD $1,500/oz.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	All product is sold direct at spot market prices.

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Criteria	JORC Code explanation	Commentary
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not relevant for gold.
	Price and volume forecasts and the basis for these forecasts.	Not relevant for gold.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not relevant for gold.
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.	All costs assumptions are made based on historical performance from the mine and current economic forecast seen as representative of current market conditions.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities assessed at varying gold prices.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	No issues foreseen.
	Any identified material naturally occurring risks.	No issues foreseen.
	The status of material legal agreements and marketing arrangements.	No issues foreseen.
	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.	No issues foreseen.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	All Ore Reserves include Proved and Probable classifications. These classifications are based on Mineral Resource classifications as modified by subsequent grade control drilling and face sampling results.
	Whether the result appropriately reflects the Competent Person’s view of the deposit.	The results appropriately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	None.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	This ore reserve has been prepared and peer reviewed internally within Northern Star Resources. There have been no external reviews of this Ore Reserve estimate.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve is considered high based on nearby Northern Star operated mines along the same ore bearing structures and the previous 12 months development and stope performance at the Millennium Operation.
	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.	Ore reserves are best reflected as global estimates.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Other than dilution and recovery factors described above, no additional modifying factors applied. There is high confidence in these models as the areas are well known and well drilled.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Reconciliation results from past mining at Centenary, Millennium and Pope John reflect estimates in the Ore Reserve estimates.

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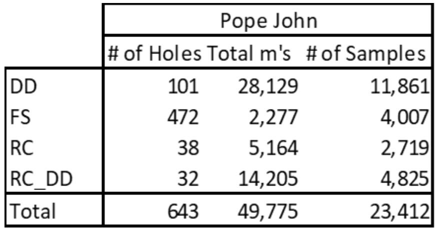
JORC Code, 2012 Edition – Table 1 Report

Pope John: Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="3">Sampling techniques</td><td>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.</td><td>A combination of sample types was used to collect material for analysis including underground diamond drilling (DD), surface diamond drilling (RC) and face channel (FC) sampling. RAB holes were excluded from the estimate.

<table>
<tr><th></th><th colspan="3">Pope John</th></tr>
<tr><th></th><th># of Holes</th><th>Total m's</th><th># of Samples</th></tr>
<tr><td>DD</td><td>101</td><td>28,129</td><td>11,861</td></tr>
<tr><td>FS</td><td>472</td><td>2,277</td><td>4,007</td></tr>
<tr><td>RC</td><td>38</td><td>5,164</td><td>2,719</td></tr>
<tr><td>RC_DD</td><td>32</td><td>14,205</td><td>4,825</td></tr>
<tr><td>Total</td><td>643</td><td>49,775</td><td>23,412</td></tr>
</table></td></tr>
<tr><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>DD drilling is sampled within geological boundaries with a minimum (0.3 m) and maximum (1.0 m) sample length. Face channel sampling is constrained within geological and mineralised boundaries with a minimum (0.2 m) and maximum (1.0 m) channel sample length.</td></tr>
<tr><td>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 30g 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.</td><td>DD drill core was nominated for either half core or full core sampling. Core designated for half core was cut in half using an automated core saw. The mass of material collected will depend on the drill hole diameter and sampling interval selected. Core designated for full core was broken with a rock hammer if sample segments were too large to fit into sample bags.
A sample size of at least 3 kg of material was targeted for each face sample interval.
All samples were delivered to a commercial laboratory where they were dried, crushed to 95% passing 3 mm if required, at this point large samples may be split using a rotary splitter, pulverisation to 950% passing 75 µm, a 40 g charge was selected for fire assay.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both RC and Diamond Drilling techniques were used to drill the Pope John deposit.
Surface diamond drill holes were completed using HQ2 (63.5 mm) coring whilst underground diamond drill holes where completed using NQ2 (50.5mm) coring.
Historically, core was orientated using the Reflex ACT Core orientation system. Currently, core is orientated using the Boart Longyear Trucore Core Orientation system.
RC Drilling was completed using a 5.75" drill bit, downsized to 5.25" at depth.
In many cases RC pre-collars were drilled followed by diamond tails. Pre-collar depth was determined in the drill design phase depending on the target been drilled and production constraints.</td></tr>
<tr><td rowspan="3">Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>For DD drilling, any core loss is recorded on the core blocks by the driller. This is then captured by the logging geologist and entered as intervals into the drill hole log.</td></tr>
<tr><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>For diamond drilling the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.</td></tr>
<tr><td>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.</td><td>Recovery was excellent for diamond core and no relationship between grade and recovery was observed. Average recovery across the Kundana camp is at 99%.</td></tr>
<tr><td>Logging</td><td>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.</td><td>All diamond core is logged for lithology, veining, alteration, mineralisation and structural. Structural measurements of specific features are also taken through oriented zones.
Logging is entered in Acquire using a series of drop-down menus which contain the appropriate codes for description of the rock.
The majority of underground faces are logged for lithology and mineralisation. Logging is captured on a face sample sheet underground which is then transferred to Acquire. Faces are then input into Acquire using a series of drop-down menus which contain appropriate codes for description of the rock.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet. All underground faces are logged and sampled to provide both qualitative and quantitative data. All faces are washed down and photographed before sampling is completed.
	The total length and percentage of the relevant intersections logged.	For all drill holes, the entire length of the hole was logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core is cut using an automated core saw. Depending on the type of drilling, determines the level of sampling/cutting completed. Half core is taken for Resource targeting (RT) drilling and some Resource Definition drilling (RSD). However, most RSD holes have been whole core sampled due to production pressures. Grade Control drilling (GC) is almost always whole core sampled. In the case of half core sampling, half the core is taken with the remaining half being stored for later reference. Whole core samples are also utilized in areas where the ground conditions result in very broken core and cutting the core is not practical.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	For previous RC drilling, all RC samples are split using a rig-mounted cone splitter to collect a sample 3 - 4 kg in size from each 1 m interval. These samples were utilised for any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside known mineralised zones spear samples were taken over a 4 m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Preparation of NSR samples was conducted at Bureau Veritas Kalgoorlie and Perth preparation facilities, while surface exploration drilling was sent to Genalysis. Sample preparation commenced with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3 kg (typically 1.5 kg) at a nominal <3 mm particle size. The entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% passing 75 µm, using a Labtechnics LM5 bowl pulveriser. 400 g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets. The sample preparation is considered appropriate for the deposit.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are utilised to guide the selection of sample material in the field. Standard procedures are used for all processes within the laboratory. Grind checks are performed at the pulverising stage requiring at least 90% of material to pass below 75 um.
	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.	Umpire sampling selection is conducted on all of the Kundana core samples as an entire batch. A minimum of 3% of the samples processed each month are selected to be sent to the ALS Perth check lab.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Sample sizes collected are considered appropriate for the material sampled.
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.	A 40-gm fire assay charge is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine and element concentrations.
	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 materials (CRMs) are inserted into the sample sequence at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a nominal rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t if received are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades at the pulverising stage. No field duplicates were submitted for diamond core. Pulp duplicates are requested after any ore zone. These are indicated on the sample sheet and submission sheet. When visible gold is observed in core, a quartz flush is requested after the sample. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs The QA studies indicate that accuracy and precision are within industry accepted limits.
	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off.

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Criteria	JORC Code explanation	Commentary
Verification of sampling and assaying	The use of twinned holes.	No twinned holes were drilled for this data set. Re-drilling of some of the drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database as an ‘A’. Re-drilled holes are sampled whilst the original drill hole is logged but not sampled.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging and sampling are directly recorded into AcQuire. Assay files are received in csv, pdf and sif formats. The csv’s are loaded directly into the database using an AcQuire importer object. Assays are then processed through a form in AcQuire for QAQC checks. Noneditable electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data. If there are issues with the results files received, amended versions are requested from the lab.
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.	Planned holes are marked up by the mine survey department using a total station survey instrument in mine grid (Kundana 10). The actual hole position is then located by the mine survey department once drilling is completed. In some cases, drill hole collar points are measured off survey stations if a mark-up cannot be completed. This is only used for Grade Control drilling due to their frequent occurrence. Holes are lined up on the collar point using the DHS Minnovare Azimuth Aligner. Planned azimuths and dips of the holes are downloaded to the aligner which is then placed on the rod string to align the hole for drilling. During drilling, single shot surveys are conducted every 30 m to track the deviation of the hole and to ensure it stays close to design. This is performed using the Devishot camera which measures the gravitational dip and magnetic azimuth. Results are uploaded from the Devishot software into a csv format which is then imported into the Acquire database. At the completion of the hole, a Multishot Devi flex survey is completed taking measurements every 3 m to ensure accuracy of the hole. The is relative change survey which is then referenced back to the Azimuth aligner to provide an accurate, continuous nonmagnetic survey. This is also converted to csv format and imported into the Acquire database.
	Specification of the grid system used.	Collar coordinates are recorded in mine grid (Kundana 10) and transformed into MGA94_51
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups of holes over the last 15 years.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing varies across the deposit. For resource targeting drilling spacing was typically a minimum of 80 m x 80 m. This allowed for infill drilling at 40 m x 40 m spacing known as resource definition. Grade control drilling was drilled on a level by level as required basis with drill spacing at 20 m x 20 m and down to 10 m x 10 m.
	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 spacing and distribution is considered sufficient to support the resource and reserve estimates.
	Whether sample compositing has been applied.	No sample compositing has been applied.
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.	Majority of the mineralisation in the Pope John deposit dips steeply (71°) to the WSW. Diamond drilling was designed to target the orebodies perpendicular to this orientation to allow for an ideal intersection angle. Instances where this was not achievable (mostly due to drill platform location), drilling was not completed or re-designed once a suitable platform became available. Drill holes with low intersection angles will be excluded from resource estimation where more suitable data is available
	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.	No sampling bias is considered to have been introduced by the drilling orientation. Where drill holes have been particularly oblique, they have been flagged as unsuitable for resource estimation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits have been undertaken of the data and sampling practices at this stage.

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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.	All holes mentioned in this report are located within the M16/87, M16/72, M16/157 tenements, which are owned by KUNDANA GOLD PTY LTD a wholly owned subsidiary of Northern Star Resources. There are no private royalty agreements applicable to this tenement.
	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.	No known impediments exist, and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Early exploration was completed in the 1980's by Kalbara Minerals with the development and operation of South Pit. Modern mining continued in late 1980's with the Kundana North and Strzelecki Open pits. Mining continued through to 1999 when the Centenary Underground ceased operations. Exploration continued over the camp through various companies including Placer Dome and Barrick Gold. Early 2014 saw Northern Star Resources purchase the Kundana camp from Barrick Gold and mining recommenced in March 2014. Millennium was discovered in the same year and commenced mining in 2015.
Geology	Deposit type, geological setting and style of mineralisation.	The Kundana camp is situated within the Norseman-Wiluna Greenstone Belt, in an area dominated by the Zuleika shear zone, which separates the Coolgardie domain from the Ora Banda domain. K2-style mineralisation consists of narrow vein deposits hosted by shear zones located along steeply dipping overturned lithological contacts. The K2 structure is present along the contact between a black shale unit (Centenary shale) and intermediate volcaniclastics (Black Flag Group). Pope John is a continuation of the Centenary K2 trend. Starting in the north from the Pope John Fault which separates Pope John and Centenary, offsetting the Pope John K2 lode approximately 80 to the south west. The deposit extends south through to the Lucifer Fault. At the Lucifer Fault it is offset approximately 200m to the south west and becomes the Moonbeam deposit. The Pope John lode is offset by a number of smaller mine scale faults in between the 2 larger regional faults. The K2 mineralisation is typical of the area with a high-grade laminated quartz vein being the primary gold hosting unit with minor halo grade disseminated around this structure in the Centenary Shale and Black Flag volcaniclastics.
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: 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.	A summary of the data present in the Pope John deposit can be found above. The collar locations are presented in plots contained in the NSR 2019 resource report. Drill holes vary in survey dip from +29° to -84°, with hole depths ranging from 80 m to 702 m, with an average depth of 278 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All validated drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	The exclusion of information is not material
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2 m of barren material (considered < 1 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 1.0 g/t are considered significant, however, where low grades are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.
Relationship between mineralisation	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.

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Criteria	JORC Code explanation	Commentary
widths and intercept lengths	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').	It is known and has been reported as such
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.	Appropriate plans and section have been included at the end of this Table and in the NSR 2019 resource report.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	No other material exploration data has been collected for this area.
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).	Drilling will continue in various parts of the mine with the intention of extending areas of known mineralisation. Areas of focus will be to extend the K2 structure both down dip and along strike to the north. Drilling will also focus on infilling areas of the resource to improve confidence. As Well as grade control drilling in certain areas to build of data collected from development face sampling and assist in production.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are either recorded on paper and manually entered into a database system or is captured digitally via a logging laptop and directly loaded into the database system. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly into the database from laboratory and survey derived files. Northern Star personnel have validated the database during the interpretation of the mineralisation, with any drill holes containing dubious data excluded from the MRE. Northern Star provided a list of holes to be excluded from the MRE and the reasons behind those exclusions.
	Data validation procedures used.	The database has further checks performed to back -up those performed in section 2. The complete exported data base including drill and face samples is brought into Datamine RM and checked visually for any apparent errors i.e. holes or faces sitting between levels or not on surface DTM's. Multiple checks are then made on numerical data including: Empty table checks to ensure all relevant fields are populated • Unique collar location check, • Distances between consecutive surveys is no more than 50m for drill-holes • Differences in azimuth and dip between consecutive surveys of no more than 0.3 degrees • The end of hole extrapolation from the last surveyed shot is no more than 30 m • Underground face sample lines are not greater than +\- 5 degrees from horizontal Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported. This data will not be used in the estimation process. In addition to being validated, drill holes are assigned a Data Class, which provides a secondary level of confidence in the quality of the data. A review of all the historic data for Pope John was undertaken in 2018 and Data Class (DC) values from 0-3 assigned, criteria summarised below:

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Criteria	JORC Code explanation	Commentary
		DC 3 = Recent data; all data high quality, validated and all original data available. DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification. DC 2 = Recent data; minor issues with data such as QAQC fail but not proximal to the ore zone. DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or too dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The geological interpretations underpinning these resource models have been prepared by geologists working in the mine and in direct, daily contact with the ore body. The estimation of grades was undertaken by personnel familiar with the ore body and the general style of mineralisation encountered. The Senior Resource Geologist, a competent person for reviewing and signing off on estimations of the Pope John lode maintained a site presence throughout the process.
	If no site visits have been undertaken indicate why this is the case.	The Competent Person has maintained a presence onsite.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the Pope John deposit has been carried out using a systematic approach to ensure continuity of the geology and estimated mineral resource. The confidence in the geological interpretation is high and is supported with information acquired during ore development as well as from drilling. The interpretation of the Pope John mineralisation wireframe was conducted using the sectional interpretation method in Datamine RM software. Where development levels were present sectional interpretation was completed in plan view at approximately 5 - 10 m spacing to allow for a better constrained and geologically realistic wireframe. Where only drilling data was present sectional interpretation was completed at approximately 20 m spacing. Wireframes were checked for unrealistic volumes and updated where appropriate.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drill holes, underground face channel data and structural models.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Due to the close spaced nature of the data from the recent mining and the consistency of the structure conveyed by this dataset, no alternative interpretations have been considered.
	The use of geology in guiding and controlling Mineral Resource estimation.	The interpretation of the main Pope John structure is based on the presence of quartz veining/shearing and continuity between sections of these structures and adjacent mineralised structures.
	The factors affecting continuity both of grade and geology.	The structure is considered to be reasonably continuous over the length of the deposit with either quartz veining, the shear or the controlling structure used to guide this interpretation. At the southern end of the deposit, significant dextral offsetting fault structures (Dante, Leo and Francis faults) affect the continuity of the K2 structure at Pope John. These faults are interpreted to be post mineralisation and offset the ore between 1 and 15 m. The Pope John Fault controls the extent of the mineralisation at the northern end of the deposit. The Lucifer fault at the Southern end of the deposit terminates the K2 orebody. The grade continuity within the K2 exists as a high grade, NS trending plunge within the plane of mineralisation. The Moonbeam deposit is the offset of the Pope John K2 along the Lucifer fault ~200 m to the south-west. The K2 composites from the Moonbeam deposit have been transformed to line up with the Pope John deposit and have been used as a soft boundary.
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 strike length of the Pope John K2 structure is approximately 450 m. The K2 mineralisation occurs in a major regional shear system extending over 10s of kilometres. Pope John K2 is ~ 0.5 m wide and can be up to 1.5 m wide with a minimum width of ~ 0.1 m. The K2E orebody is situated in the hangingwall of the K2 on the contact between the Victorious Basalt and Centenary Shale and comprises quartz veining and intense biotite alteration. It currently has a strike length of 40 m and approx. 30 m down dip but is open in all directions. With further development and drilling, the extent and continuity of the mineralisation may increase. Mineralisation is known to occur from the base of cover to around 450 m below surface.
Estimation and modelling techniques	The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.	The Pope John K2 mineralisation used 1.0 m composites with direct grade estimation of gold. The K2E mineralisation used 1.0m composites with direct grade estimation of gold. The footwall (FW) and hangingwall (HW) halo zones used 1.0 m composites with direct grade estimation of gold. With the exception of K2E, the gold grade estimation has been completed using Ordinary Kriging (OK), utilising a three pass search strategy using Datamine Studio RM v 1.4 software. Details of the estimation parameters for each mineralisation zone are summarised below. K2 - divided into two subdomains based on data density; high density around development levels and lower density distant to development. Within the subdomains, the face data and drill hole data were analysed and top cut using the influence limitation approach separately, 120 g/t Au and 100 g/t Au for faces and drill holes respectively. Once top cut, the data was combined and variography completed on the combined composite file, indicating grade continuity in the S plunge direction. The high density data had a search range of ~60 m in direction 1 and 40 m in direction 2, the low density data domain had a search range of 150 m in direction 1 and 130 m in direction 2. Three passes

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Criteria	JORC Code explanation	Commentary
		were used for estimation with distances based on variography. The first pass had a minimum of between 6 - 8 samples and a maximum of 10-14 samples for the high and low-density subdomains. The second pass doubled the ranges, kept the same minimum number of samples and increased the max number of samples to 12-16. The third pass increased the search range to 5 times the original ranges, kept the same minimum number of samples and increased the max number of samples to 14-18 samples. Estimation was completed using a soft boundary between the high and low-density subdomains. Moonbeam K2 data was transformed ~200 m to the north-east and combined with the Pope John composites for estimation, which also used a soft boundary. No restrictions by drill hole or drill hole type have been applied. K2E was estimated using ID2, with a three pass search strategy, using an isotropic search ellipse, 50 m by 50 m by 50 m. The minimum number of samples used for the first pass was 5 and the maximum number 7. The second pass was two times the original ellipse ranges with a minimum of 5 and maximum of 7 samples. The third pass was 5 times the original range, with a minimum of 5 samples and a maximum of 7 samples. A drill hole restriction of a maximum of 3 samples per drill hole was applied to all 3 search passes. HW Halo/FW Halo were both estimated using OK and a three pass estimation strategy. The same sub domaining strategy as the K2 was applied to both halos, they were divided into two subdomains based on data density; high density around development levels and lower density distant to development. Within the subdomains, the face data and drill hole data were analysed and top cut using the influence limitation approach separately, 20 g/t Au for both face and drill holes in the HW halo and 12 g/t Au for both faces and drill holes in the FW halo. The top cut subdomain composite files were combined for variography for each halo. For the HW halo for both subdomains, the first search pass used an ellipse 70 m by 60 m by 40 m with a minimum of 10 samples and maximum of 16 samples. The second pass increased the search ellipse ranges by 2 times the original and kept a minimum of 10 samples and increased the maximum to 16. The third pass increased the search range by 5 times the original and kept a minimum of 10 samples increasing the maximum to 18. For the FW halo for both subdomains, the first search pass used an ellipse 70 m by 40 m by 20 m with a minimum of 10 samples and maximum of 16 samples. The second pass increased the search ranges by 2 times the original with a minimum of 10 samples and increased the maximum to 16 samples. The third pass increased the search range by 5 times the original, keeping a minimum of 10 samples and increasing the maximum to 18 samples. No restrictions by drill hole or drill hole type have been applied. For both FW and HW halos, estimation was completed using a soft boundary between the high and low-density subdomains.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	K2 mineralisation zones had check estimates using Inverse Distance power of 2 (ID2) and Nearest Neighbour (NN) completed as a comparison. K2E mineralised zone had a check estimate using NN completed as a comparison. FW/HW halo zones had an ID2 check estimate completed. Full length versus fixed length composites were also compared. Estimates using a soft and semi-soft boundary (with the Moonbeam composites) have also been compared and reviewed. All estimates have been compared to the previous MRE.
	The assumptions made regarding recovery of by-products.	No assumptions have been made regarding recovery of any by-products.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements have been considered and therefore estimated for this deposit.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The data spacing varies considerably within the deposit ranging from underground development samples taken approximately every 3 m along strike and at 25 m vertically spaced intervals to drill hole intercepts which varied from close spaced 20 m (along strike) to 25 m (down dip) spacing through to more widely spaced intercepts at 40 m (along strike) to 50 m (down dip). As such, the block sizes varied depending on sample density. In areas of high density underground face samples with average spacing of 3 - 4 m a 5 x 5 x 5 m block size was chosen. For lower density drilling (where no development was present) with wider spacing a block size of 10 x 10 x 10 m was chosen. All the varying block sizes are added together after being estimated individually. Search ellipse dimensions were derived from the variogram model ranges.
	Any assumptions behind modelling of selective mining units.	No selective mining units are assumed in this estimate.
	Any assumptions about correlation between variables.	No other elements other than gold have been estimated.
	Description of how the geological interpretation was used to control the resource estimates.	Hangingwall and footwall wireframe surfaces were created using sectional interpretation. These were used to define the Pope John K2 and hangingwall and footwall halo mineralised zones based on the shearing, veins and gold grade. K2 (Pope John) steeply dipping structure with quartz veining evident from drilling and development. Footwall/Hangingwall halo (Pope John)- Steeply dipping sheared structure with minor quartz stringers in the hangingwall and footwall of the K2 evident from drilling and development. For mine planning purposes a waste model is created by projecting the hangingwall and footwall surfaces 5 m either side. A default grade of 0.1 g/t is assigned and the same resource classification as the adjacent ore lode is applied to ensure consistency in MSO Resource Classification reporting.

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Criteria	JORC Code explanation	Commentary
	Discussion of basis for using or not using grade cutting or capping.	Top-cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the mean by more than 5% and reducing the coefficient of variation to around 1.2; these vary by domain (ranging from 12 to 120 g/t for individual domains). The top cut values are applied in several steps, using a technique called influence limitation top cutting. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, where gold requires a top cut, the following variables will be created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) The top-cut and non-top cut values are estimated using search ranges based on the variogram, and the *_BC values estimated using very small ranges (e.g. 5m x 5m x 5m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). The application of the top-cuts has not resulted in a significant decrease in the mean grade from the un-cut to top-cut data. No hard top cuts have been applied to the Pope John resource estimate.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Statistical measures of estimation performance, such as the Slope of Regression, are used to assess the quality of the estimation for each domain. Differences in the global grade of the declustered composite data set and the average model grade were within 10%, or justification for a difference outside 10% was explicable. Swath plots comparing composites to block model grades are prepared and reviewed. Plots are also prepared summarising the critical model parameters. Visually, block grades are assessed against drill hole and face data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	The tonnes have been estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 1.73 g/t cut off within 2.5 m minimum mining width (excluding dilution) MSO's using a $AU1750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No mining assumptions have been made during the resource wireframing or estimation process.
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.	No metallurgical assumptions have been made during the resource wireframing or estimation process.
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 green fields 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.	A "Licence to Operate" is held by the operation which is issued under the requirement of the "Environmental Protection Act 1986", administered by the Department of Environment (DoE). The licence stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are also regulated by DoE and are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licences and lease conditions. An Environmental Management System is in place to ensure that Northern Star employees and contractors exceed environmental compliance requirements. The Kalgoorlie operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits. Kalgoorlie Operations have been compliant with the International Cyanide Management Code since 2008. Compliance with air quality permits is particularly important at Kanowna because of the roaster operation and because there are three facilities in the Kalgoorlie region emitting SO2 gas. Kanowna has a management program in place to minimize the impact of SO2 on regional air quality and ensure compliance with regulatory limits.

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Criteria	JORC Code explanation	Commentary
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.	A thorough investigation into average density values for the various lithological units at Pope John was completed and the mean densities by lithology were coded into the database. Where there were no measurements for a specific lithology and default of 2.8 was applied. Density was then estimated by Ordinary Kriging or Inverse Distance Squared, using the associated gold estimation parameters for that domain. Post estimation, default density values for the oxide and transition zones were applied, based on regional averages.
	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.	No/minimal voids are encountered in the ore zones and underground environment
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Assumptions on the average bulk density of individual lithologies, based on 423 bulk density measurements at Pope John. Assumptions were also made based on regional averages, on the default density applied to transitional (2.3) material, due to lack of data in this area.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: • Geologic grade continuity • Density of available drilling • Statistical evaluation of the quality of the kriging estimate • Confidence in historical data, based on the new Data Class system
	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, quality, quantity and distribution of the data).	All relevant factors have been given due weighting during the classification process.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resource model methodology is appropriate, and the estimated grades reflect the Competent Persons view of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The Resource model has been subjected to internal peer reviews.
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 mineral resource estimate is considered robust and representative of the Pope John style of the K2 mineralisation. The application of geostatistical methods has helped to increase the confidence of the model and quantify the relative accuracy of the resource.
	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.	This resource report relates to the Pope John deposit. The model will show local variability even though the global estimate reflects the total average tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No reconciliation factors are applied to the resource post-modelling.

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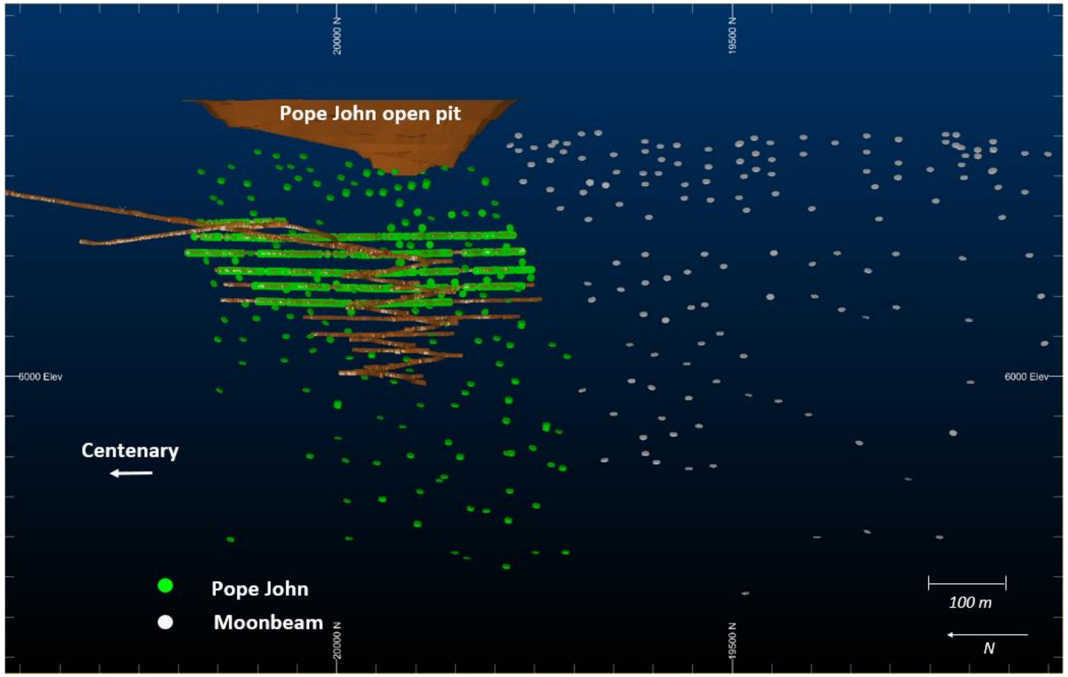

Figure 1. Long section view of the Pope John deposit and data used in the Resource Estimate

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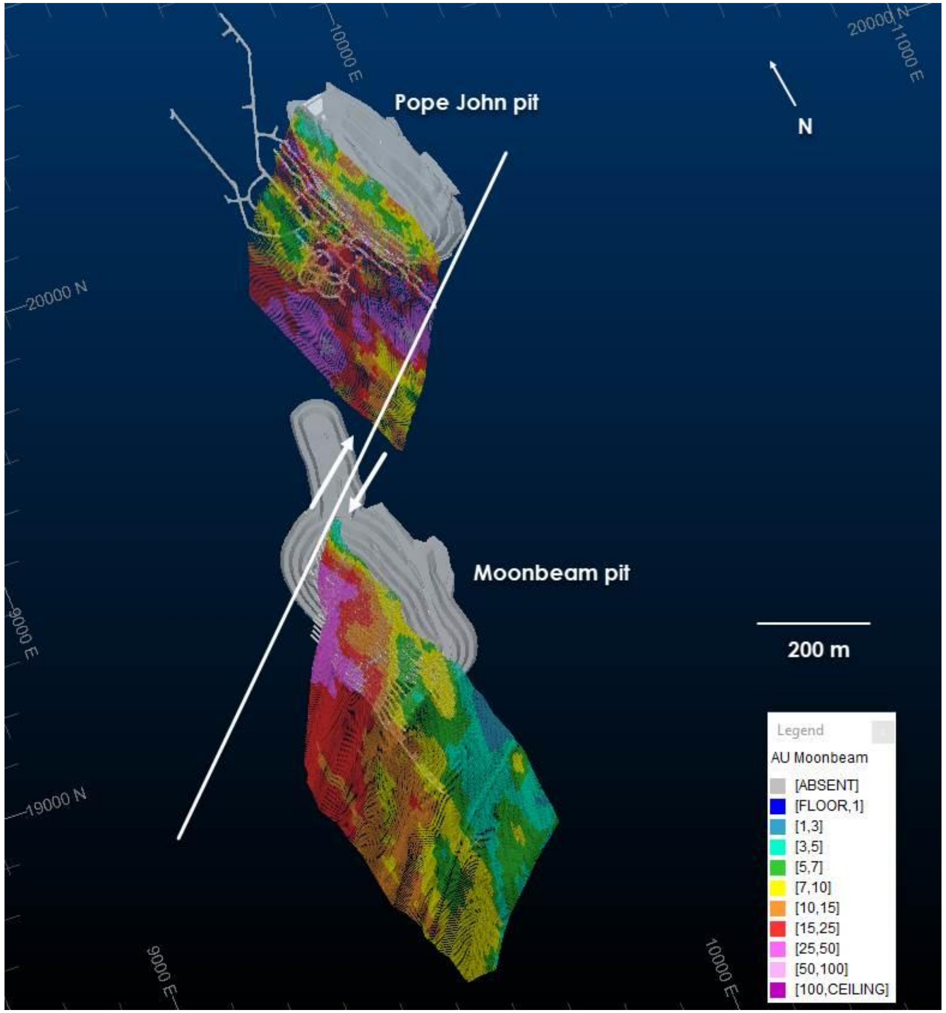

Figure 2. Overview showing the offset between Pope John K2 and Moonbeam K2 along the Lucifer fault

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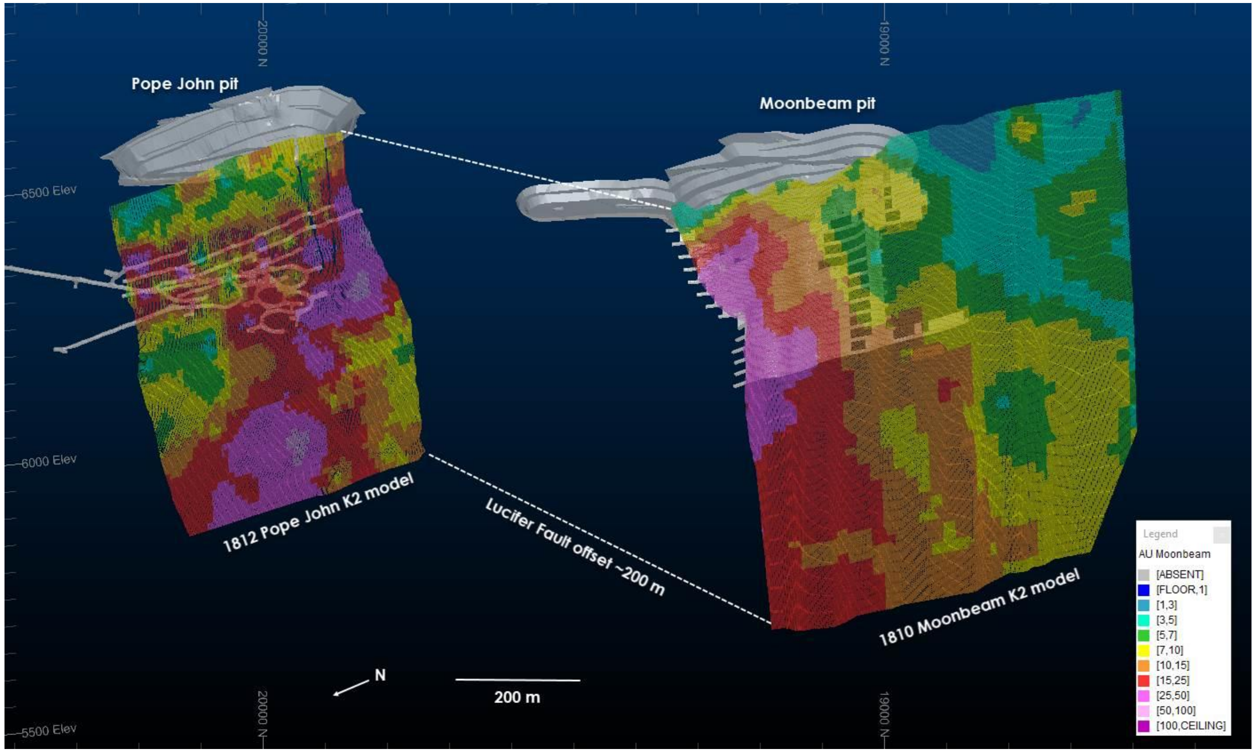

Figure 3. Offset of Pope John K2 and Moonbeam K2 along the Lucifer fault, looking south-east

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star Resources Limited June 2019 Mineral Resource
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been undertaken by the competent person.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	A minimum Pre-Feasibility level study has been completed.

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Criteria	JORC Code explanation	Commentary
	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.	Upgrade of previous Ore Reserve
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. • The assumed AUD gold price is at a conservative assumption of $1,500/oz • Mill recovery factors are based on test work and historical averages from the region. Various cut-off grades are calculated including a break-even cut-off grade (BCOG), Variable cut-off grade (VCOG) and Mill cut-off grade (MCOG). The VCOG is used as the basis for stope design, though any areas which are marginal or require significant development are assessed by a more detailed financial analysis to confirm their profitability.
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).	Indicated Resources were converted to Probable Ore Reserves subject to mine design physicals and an economic evaluation. Stockpiled material was considered as proven
	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 Pope John underground mine (incorporating Millennium, Centenary, Pope John, Moonbeam and Christmas) is accessed via a portal within the open pit. The ore is accessed from the Hanging wall from levels at 20m spacing. A combination of top down open stoping, top down paste filled and bottom up CRF fill mining methods are applied and the levels are broken into selectively sized stoping blocks to maximise production. The selected mining method was evaluated during the initial Pre-Feasibility study and was deemed the most appropriate. A similar mining method is used by Northern Star for areas of the nearby Pegasus mine.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	The mine design considers well established geotechnical constraints and is reviewed by geotechnical engineers prior to being finalised. Historical geological and geotechnical information is gathered from the nearby operations including Barkers, Strzelecki and Centenary, and still in operation, Raleigh, Rubicon, Hornet and Pegasus, and learnings from this are applied to the geotechnical parameters used. Grade control is carried out through resource definition drilling and face sampling of all ore drives.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	This Table 1 applies to underground mining only
	The mining dilution factors used.	0.5m hanging wall and 0.5m footwall dilution has been applied to all stopes. No additional mining dilution factor has been applied.
	The mining recovery factors used.	90% recovery is applied to CRF filled stopes. A calculated 70% recovery is applied to unfilled up hole stopes to account for pillar requirements.
	Any minimum mining widths used.	A minimum stope mining width of 3.0m has been used. This considers a minimum stope width of 2.0m +0.5m dilution in the Hangingwall and +0.5m dilution in the Footwall
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred blocks are excluded from the reported Ore Reserve. No ounces have been included from Inferred material.
	The infrastructure requirements of the selected mining methods.	Remaining Site surface infrastructure requirements for the mining method include: - Pope John Pit dewatering system Underground infrastructure requirements include - Ventilation extensions in Pope John; - Escapeway extensions for Pope John; - Power and pumping infrastructure with mine extension; and - Historical void dewatering infrastructure. All other underground infrastructure was completed in FY18-19.

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Criteria	JORC Code explanation	Commentary
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	NSR own and operate the Kanowna Belle and South Kalgoorlie milling and processing facilities. Both plants are located within 100km of the Kundana Operations. These facilities are designed to process in excess of 3.0 million tonnes per annum. Both plants have the capability to treat free milling ores with additional capacity at the Kanowna Belle facility to treat refractory material. Ore is treated either using the flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery) or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plants campaign both refractory and free milling ores every month.
	Whether the metallurgical process is well-tested technology or novel in nature.	Milling experience gained since 2005, 13 years' continuous operation
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Milling experience gained since 2005, 13 years' continuous operation
	Any assumptions or allowances made for deleterious elements.	No assumptions made
	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.	Milling experience gained since 2005, 13 years' continuous operation
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Pope John is currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are either granted or in the process of being granted.
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.	All current site infrastructure is suitable to the proposed mining plan.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mine development capital cost based on historical performance on site and life-of-mine forward planning. Plant and equipment capital are based on site experience and the LOM plan
	The methodology used to estimate operating costs.	All overhead costs and operational costs are projected forward on an AUD $/t based on historical data.
	Allowances made for the content of deleterious elements.	No allowances made.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Single commodity pricing for gold only, using a long-term gold price of AUD $1,500/oz, 2.5% WA state Government Royalty, as per NSR corporate guidance
	The source of exchange rates used in the study.	All rates considered in Australian Dollars (AUD) as per NSR corporate guidance
	Derivation of transportation charges.	Historic performance
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance
	The allowances made for royalties payable, both Government and private.	All State Govt. and third-party royalties are built into the cost model.
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.	All revenue based on a gold price of AUD $1,500/oz.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.

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Criteria	JORC Code explanation	Commentary
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.	All product is sold direct at spot market prices.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not relevant for gold.
	Price and volume forecasts and the basis for these forecasts.	Not relevant for gold.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not relevant for gold.
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.	All costs assumptions are made based on historical performance from the mine and current economic forecast seen as representative of current market conditions.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities assessed at varying gold prices.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	No issues foreseen.
	Any identified material naturally occurring risks.	No issues foreseen.
	The status of material legal agreements and marketing arrangements.	No issues foreseen.
	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.	No issues foreseen.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	All Ore Reserves include Proved and Probable classifications. These classifications are based on Mineral Resource classifications as modified by subsequent grade control drilling and face sampling results.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results appropriately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	None.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	This ore reserve has been prepared and peer reviewed internally within Northern Star Resources. There have been no external reviews of this Ore Reserve estimate.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve is considered high based on nearby Northern Star operated mines along the same ore bearing structures and the previous 12 months development and stope performance at the Millennium Operation.
	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.	Ore reserves are best reflected as global estimates.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Other than dilution and recovery factors described above, no additional modifying factors applied. There is high confidence in these models as the areas are well known and well drilled.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Reconciliation results from past mining at Centenary, Millennium and Pope John reflect estimates in the Ore Reserve estimates.

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JORC Code, 2012 Edition – Table 1 Report
Strzelecki Underground - 30 June 2019
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.	A combination of sample types was used to collect material for analysis including both surface and underground diamond drilling (DD), reverse circulation (RC) surface drilling and face channel (FC) sampling.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	DD drilling is sampled within geological boundaries with a minimum sample length. Face channel sampling is constrained within geological and mineralised boundaries. RC drilling is primarily sampled on 1m intervals, 4m composite spear samples may be collected in areas where mineralisation is not expected.
	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 30g 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 sampling was split using a rig mounted cone splitter to deliver a sample of approximately 3Kg. Historic underground DD drill core was cut in half using an automated core saw the mass of material collected will depend on the hole size and sampling interval. NSR surface DD core was whole core sampled due to the high nugget nature of mineralisation. Approximately 3Kg of material was collected for each face sample interval. All samples were delivered to a commercial laboratory where they were dried, crushed to 95% passing 3mm if required, at this point large samples may be split using a rotary splitter, pulverisation to 95% passing 75µm, a 30g charge was selected for fire assay. NSR samples were routinely screen fire assayed using a 75iu mesh.
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.).	Both RC and Diamond Drilling techniques were used at the Strzelecki line deposits. Diamond drill holes completed pre-2011 were predominantly NQ2 (50.5mm). All Resource definition holes completed post 2011 were drilled using HQ (63.5mm) diameter core. Daughter holes were NQ. Core was orientated using the Reflex ACT Core orientation system. RC Drilling was completed using a 5.75" drill bit, downsized to 5.25" at depth. In many cases RC pre-collars were drilled followed by diamond tails. Pre-collar depth was to 180m or less if approaching known mineralisation
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	RC drilling contractors adjust their drilling approach to specific conditions to maximize sample recovery. Moisture content and sample recovery is recorded for each RC sample. No recovery issues were identified during RC drilling programs. Recovery was poor at the very beginning of each hole, as is normal for this type of drilling in overburden.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	For diamond drilling the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.
	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.	Recovery was excellent for diamond core and no relationship between grade and recovery was observed. For RC drilling, pre-collars were ended before known zones of mineralisation and recovery was very good through any anomalous zones, no issues were noted.
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 is logged for regolith, lithology, veining, alteration, mineralisation and structure. Structural measurements of specific features are also taken through oriented zones.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All logging is quantitative where possible and qualitative elsewhere. A photograph is taken of every core tray.
	The total length and percentage of the relevant intersections logged.	RC sample chips are logged in 1m intervals. For the entire length of each hole. Regolith, Lithology, alteration, veining and mineralisation are all recorded.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core is cut using an automated core saw. In most cases, half the core is taken for sampling with the remaining half being stored for later reference. Whole core was also submitted throughout this process.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	All RC samples are split using a rig-mounted cone splitter to collect a sample 3-4kg in size from each 1m interval. These samples were utilised for any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside known mineralised zones spear samples were taken over a 4m interval for composite sampling.

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Criteria	JORC Code explanation	Commentary
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	The sampling types used are considered appropriate for the deposits.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are available to guide the selection of sample material in the field. Standard procedures are used for all process within the laboratory.
	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.	Field duplicates were taken for RC samples at a rate of 1 in 20.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Umpire sampling programs are carried out on an ad-hoc basis.
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.	A 30g or 50g Fire assay charge is used with a lead flux, dissolved in the furnace. The prill is totally digested by HCl and HNO_3 acids before Atomic absorption spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine any element concentrations.
	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 Materials (CRMs) are inserted into the sample sequence randomly at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off.
	The use of twinned holes.	No Twinned holes were drilled for this data set.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging was captured using excel templates. Both a hardcopy and electronic copy of these are stored, as well as being loaded into the database using automatic acquire loaders. Assay files are received in csv format and loaded directly into the database by Northern Star Geologists. A geologist then checks that the results have inserted correctly. Hardcopy and electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data.
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.	Planned surface hole positions are located using a Differential GPS by Northern Star staff or a 3rd party contractor. Underground diamond hole positions are marked before drilling by mine survey staff and the actual hole collar position located by mine survey staff once drilling is completed. Surface holes are designed in MGA94_51 grid. During surface drilling, single-shot surveys are every 30m to ensure the hole remains close to design. This is performed using the Reflex Ez-Trac system. Upon hole completion, a Gyroscopic survey is conducted by a third-party contractor, taking readings every 5m for improved accuracy. Direction measurements are collected relative to true north. For UG holes multi-shot surveys are taken every 9m when retreating out of the hole.
	Specification of the grid system used.	Data is collected using both local mine grid and MGA 94_51 as appropriate.
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups of holes over the last 15 years.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Face sampling data is generally 3.5 metres, which equals a development advance cut. Drill hole spacing across the area varies. For underground ranging from 20m x 20m to 40m x 40m to allow the Resource to be upgraded to indicated. For recent NSR surface drilling, spacing is generally wider 120m to 60m, with some infill holes closing to 40m-50m. The majority of these areas are inferred, with areas greater than 100m unclassified.
	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 spacing and distribution is considered sufficient to support the Resource and Reserve estimates where spacing is 100m or less.
	Whether sample compositing has been applied.	Sample data is composited before grade estimation is undertaken.

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Criteria	JORC Code explanation	Commentary
Orientation 7of 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 majority of the structures in the Kundana camp dip steeply (80°) to WSW. To target these orientations the drill hole dips of 60-70° towards ~060° achieve high angle intersections on all structures.
	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.	No sampling bias is considered to have been introduced by the drilling orientation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound and tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits or reviews have recently been conducted on sampling techniques.

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 Strzelecki Mine is situated on the tenements M16/97 and M16/157, wholly owned by Northern Star Resources. There are no private royalty agreements applicable to this tenement.
	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.	No known impediments exist and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The first reference to the mineralisation style encountered at the Kundana project was the mines department report on the area produced by Dr. I. Martin (1987). He reviewed work completed in 1983 – 1984 by a company called Southern Resources, who identified two geochemical anomalies, creatively named Kundana #1 and Kundana #2. The Kundana #2 prospect was subdivided into a further two prospects, dubbed K2 and K2A. Kundana Gold Pty owned and operated the Kundana Gold Mine and treatment plant, focussing on the Centenary, North and Strzelecki pits, which were completed by June 1993. Underground mining soon commenced from extensions to the Strzelecki and South Pits.
Geology	Deposit type, geological setting and style of mineralisation.	The Kundana camp is situated within the Norseman-Wiluna Greenstone Belt, in an area dominated by the Zuleika shear zone, which separates the Coolgardie domain from the Ora Banda domain. Strzelecki deposit is located on the Strzelecki shear zone which also hosts the Raleigh Deposit. The Strzelecki deposit is comprised of 2 laminated gold bearing veins, the "main vein" and the "footwall vein". The main vein, which dips between 55-70^{0} to the west, has an average width of 0.5-0.7m and length of 500m, it is responsible for the bulk of the ounces extracted from the Strzelecki Mine. The vein typically grades between 60-90 gpt. The Strzelecki deposit is bound to the north by the Pope John Fault and to the south by the Lucifer Fault. The Lucifer Fault offsets the Raleigh deposit south from the Christmas deposit. The rock units consist of Powder Sill Gabbro on the hanging wall, generally a thin sliver of silicified Felsic volcanics immediately adjacent to the Strzelecki Vein and Felsic-intermediate volcanics in the footwall. The Strzelecki structure consists of a laminated vein with associated shearing. Intermediate andesitic tuff is located on the FW side of the structure. Strzelecki resides uncomfortably north along strike of the K2 hosted Moonbeam deposit (Figure 3). Gold grade is higher towards the south.

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Criteria	JORC Code explanation	Commentary
		 Mineralised laminated vein 1 from CHCD16004 (630.23-630.54m).
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length.	Too many holes to practically list the complete dataset, the long section and plan reflect the hole positions used for previous estimation stated.
	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.	No exploration results are reported in this release.
	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.	No exploration results are reported in this release.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No exploration results are reported in this release.
Relationship between mineralisation	These relationships are particularly important in the reporting of Exploration Results:	No exploration results are reported in this release.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	No exploration results are reported in this release.

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Criteria	JORC Code explanation	Commentary
widths and intercept lengths	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').	
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.	Appropriate plans and section have been included in the body of this report.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	Substantial historical metallurgical data exists from previous mining operations. In addition, the deposit closely resembles Raleigh Mine which is still actively mined.
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).	Resource definition and extension drilling program is planned once underground drilling platforms are established from neighboring mines (Moonbeam, Pope John or Strzelecki).
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Northern Star personnel have validated the database during the interpretation of the mineralisation, with any holes containing dubious data excluded from the MRE. Northern Star provided a list of holes to be excluded from the MRE and the reasons behind those exclusions.
	Data validation procedures used.	Data validation processes are in place and run upon import into the database to be used for the MRE in Vulcan V10.0.4 by Mining Plus.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The CP has not visited the site
	If no site visits have been undertaken indicate why this is the case.	Northern Star personnel liaised with the CP during the MRE process and responsible for the mineralisation interpretation and input data have been to site and reviewed the core for this deposit.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The geological interpretation is considered robust due to the nature of the mineralisation and that portions of the deposit have been developed along and mined. The level plans and other maps have been used to guide the sub-domaining process.
	Nature of the data used and of any assumptions made.	Underground development mapping and sampling along with diamond drill core lithology, structure, alteration and mineralisation logs have been used to generate the mineralisation model. The primary assumption is that the mineralisation is hosted within structurally controlled quartz veins, which is considered robust.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Due to the close spaced nature of the data from the historic mining and the consistency of the structure conveyed by this dataset, no alternative interpretations have been considered.
	The use of geology in guiding and controlling Mineral Resource estimation.	The mineralisation interpretation is based on a combination of logged quartz percentage or structure and assays.
	The factors affecting continuity both of grade and geology.	The structure is considered to be continuous over the length of the deposit with either quartz or the controlling structure used to guide this interpretation. The grade continuity is not as consistent and as such, the mineralisation has been sub-domained based on consistent grade zones, with these sub-domains used as hard boundaries during the estimation.
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 Strzelecki deposit is hosted within the one structure which strikes approximately N-S over a length of 1.3 km and dips steeply to the W with the down-dip extents in excess of 1,200 m. Although hosted along what is interpreted to be the one structure, the boundary between the Strzelecki and Strzelecki South deposits has been defined by a

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Criteria	JORC Code explanation	Commentary
		change in strike from 340° to 005° respectively. The Strzelecki deposit has a strike length of 500 – 600 m with a down-dip extent of 1,200 m. The Strzelecki South deposit extends over 800 m of strike at the top of the deposit (near surface) with a dip extent of 1,200 m.
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 of gold has been completed using Ordinary Kriging (OK) for the Strzelecki deposit into 5 gold domains using Maptek Vulcan V10.0.4 software. Two domains defined by a small number of drill hole intercepts have been estimated using an Inverse distance squared interpolation technique. Variography has been undertaken on grouped domains for gold. Variogram orientations are largely controlled by the strike and dip of the mineralisation, with the plunge of the higher grade mineralisation evident in long section being effectively replicated during the continuity analysis.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	MP completed the previous MRE update in December 2016 for the Strzelecki-Strzelecki South mineralisation for comparison purposes.
	The assumptions made regarding recovery of by-products.	The Mineral Resource Estimate has been validated using visual validation tools combined with volume comparisons with the input wireframes, mean grade comparisons between the block model and de-clustered composite grade means and swath plots comparing the de-clustered composite grades and block model grades by Northing, Easting and RL.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No assumptions have been made regarding recovery of any by-products.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The data spacing varies considerably within the deposit ranging from underground development samples taken approximately every 3 m along strike and at 25 m vertically spaced intervals to drill hole intercepts which varied from close spaced 20 m (along strike) to 25 m (down dip) spacings through to 75 m (along strike) to 100 m (down dip) spacings. Due to this disparity in data spacing, variable block sizes have been used during the estimation, with 5 m (X) by 5 m (Y) by 12.5 m (Z) used for the area covered by the underground development and a larger parent block size of 10 m (X) by 10 m (Y) by 25 m (Z) used for the areas defined by drill-hole intercepts. A sub-block size of 0.5 m (X) by 0.5 m (Y) by 0.5 m (Z) has been used to define the mineralisation, with the gold estimated at the parent block scale. Pass 1 estimations have been undertaken using a minimum of 6 and a maximum of 20 samples into a search ellipse set at between a half and a quarter of the variogram range for all domains, with a maximum of two samples from each drill hole allowed. Pass 2 estimations have been undertaken using a minimum of 4 and a maximum of 20 samples into a search ellipse set generally set at the variogram range for all domains with a maximum of two samples from each drill hole allowed. Pass 3 estimations have been undertaken using a minimum of 2 and a maximum of 20 samples into a search ellipse set at the variogram range. Two domains with widely spaced data points at depth and along strike have been estimated using a fourth interpolation pass, with this pass using a minimum of 1 and a maximum of 20 samples into a search ellipse one and a half to twice the size of the variogram range. The search ellipses and variography rotation applied during the estimation of each block has been determined by the orientation of the hangingwall and footwall contacts through the use of the dynamic anisotropy function in Maptek Vulcan V10.0.4.
	Any assumptions behind modelling of selective mining units.	No selective mining units are assumed in this estimate.
	Any assumptions about correlation between variables.	No other elements other than gold have been estimated.
	Description of how the geological interpretation was used to control the Resource estimates.	The mineralisation wireframes supplied by Northern Star have been sub-domained in consultation with Northern Star based on orientation and grade, with these sub-domains used to flag the drill hole intercepts in the database. These flagged intercepts have then been used to create composites in Maptek Vulcan V10.0.4 using a residual of 0.1 m. The composite length created varied from 0.5 m for both drill hole and face sample intercepts in the area covered by the underground development to 1.0 m lengths for the drilling defined areas. The composites have been length weighted during the estimation to account for the different composite lengths used.
	Discussion of basis for using or not using grade cutting or capping.	The influence of extreme sample distribution outliers has been reduced by top-cutting where required. The top-cut levels have been determined using a combination of histograms, log probability and mean variance plots. Top cuts have been reviewed and applied on a domain by domain basis. For several the domains, the inclusion of a significant amount of sub-grade material (at detection limit) has skewed the coefficient of variation resulting in a more conservative top-cut grade being used causing a significant decrease in the mean grade of the cut data set – this represents a de-risked estimate of the grade. Ideally, the removal of these sub-grade zones should be investigated to better represent the grade distribution within these domains.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Model validation has been carried out, including visual comparison between de-clustered composites and estimated blocks; check for negative or absent grades; statistical comparison against the input drill hole data and graphical plots.

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Criteria	JORC Code explanation	Commentary
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	The tonnes have been estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	For Mineral Resources, the cut-off grade (COG) is generated using an A$1,750 gold price. Costs incorporated in the COG are built from first principals, based either on actual cost history or budgeted estimates. For Resources in active mine areas, a variable COG has been used for the Resource estimate. The Variable costing is defined as all directly incurred costs involved in the development and extraction of the ore panel (e.g., drill & blast, haulage, processing, refining and royalties on sales.). The variable COG does not include capital development or fixed costs (i.e., costs not directly associated with extraction, processing and selling gold) that would be absorbed by the existing Reserve base.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	The interpretation of mineralisation is independent of mining considerations. After modelling, the software 'Mineable Shape Optimiser' is used to generate optimal mining shape based on a 2m minimum mining width, and variable costing Cut-off grade at the A$1,750 gold price. Any isolated MSO shapes unlikely to be economic are removed from the estimated Resource. The Resource reported is the Measured, Indicated & Inferred material within the MSO shape generated.
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.	No metallurgical or recovery assumptions have been made during the MRE.
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 green fields 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.	No environmental assumptions have been made during the MRE.
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 values have been applied based on the degree of weathering which has been coded into the model. The values used have been obtained from a previous MRE for the Barkers Deposit which is along strike from Strzelecki. No information has been provided on the number of measurements or method used to obtain these values.
	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.	No information has been provided on the number of measurements or method used to obtain these values.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The Resource classification has been applied to the MR estimate based on the drilling data spacing, grade and geological continuity, and data integrity.
	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, quality, quantity and distribution of the data).	The classification takes into account the relative contributions of geological and data quality and confidence, as well as grade confidence and continuity.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The classification reflects the view of the Competent Person.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	This Mineral Resource estimate for Strzelecki deposit has not been audited by an external party.
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 relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC Code.

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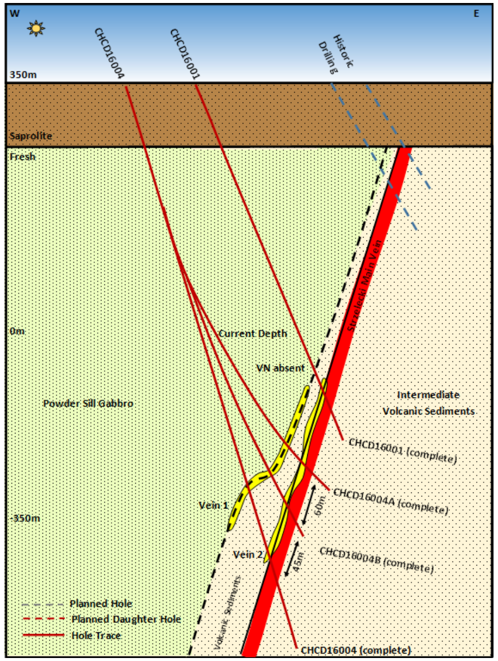
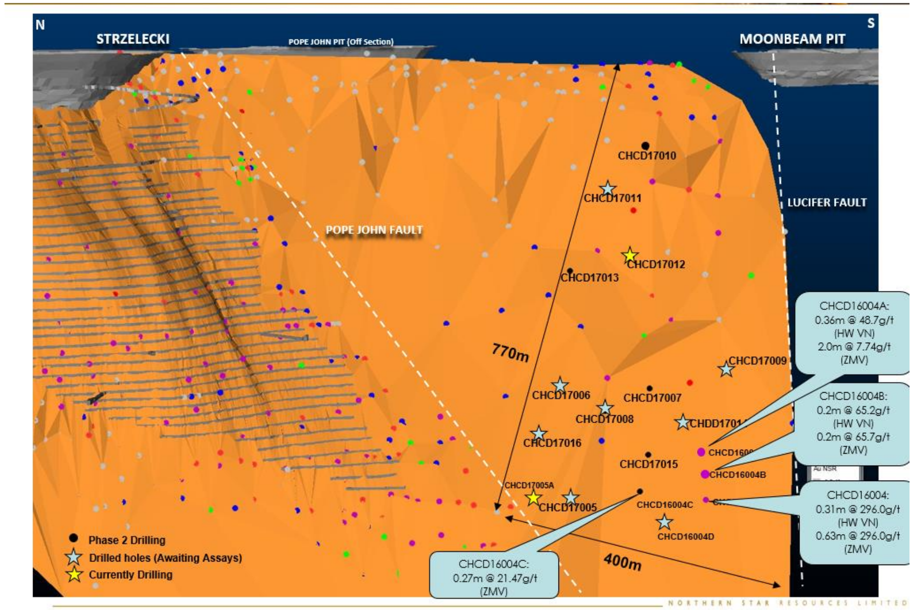
Criteria	JORC Code explanation	Commentary
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.	
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	The statement relates to global estimates of tonnes and grade.

STRZELECKI - REPRESENTATIVE LONG PROJECTION AND CROSS SECTION DIAGRAMS

Cross Section: Strzelecki Deposit



Long Projection: Strzelecki Deposit



APPENDIX B: TABLE 1

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star Resources Limited June 2019 Mineral Resource.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The competent person has conducted multiple sites visits and has been involved in the operation from feasibility study to mine development.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	A minimum Pre-Feasibility level study has been completed.
	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.	Upgrade of previous Ore Reserve.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. The assumed AUD gold price is at a conservative assumption of $1,500/oz.; Mill recovery factors are based on test work and historical averages from the region. Various cut-off grades are calculated including a fully costed cut-off grade (COG), variable cut-off grade (VCOG) and mill cut-off grade (MCOG). The VCOG is used as the basis for stope design, though any areas which are marginal or require significant development are assessed by a more detailed financial analysis to confirm their profitability.
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).	Indicated Resources were converted to Probable Ore Reserves subject to mine design physicals and an economic evaluation. Stockpiled material was considered as Proved Reserve.
	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.	Ore is accessed from a decline located in the hangingwall through levels at 20m vertical spacing. A bottom up CRF fill mining method is applied and the levels are broken into selectively sized stoping blocks to maximise production. The selected mining method was evaluated during the initial Pre-Feasibility study and was deemed the most appropriate. The mining method is similarly used at Northern Star for areas of the nearby Pegasus mine.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	The mine design considers well established geotechnical constraints and is reviewed by geotechnical engineers prior to being finalised. Independent geotechnical reviews were conducted for the Barkers and Strzelecki mines to provide guidance on pillar locations and extraction sequences. Historical geological and geotechnical information is gathered from the nearby operations that operated previously, including Barkers, Strzelecki and Centenary, and still in operation, Raleigh, Rubicon, Hornet and Pegasus, and learnings from this are applied to the geotechnical parameters used. Grade control is carried out through Resource definition drilling and face sampling of all ore drives.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	This Table 1 applies to underground mining only.
	The mining dilution factors used.	5% dilution is applied to CRF filled stopes to account for CRF dilution on the stopes. 10% dilution is applied to unfilled up hole stopes.
	The mining recovery factors used.	95% recovery is applied to CRF filled stopes. A calculated 74% recovery is applied to unfilled up hole stopes to account for pillar requirements.
	Any minimum mining widths used.	A minimum stope mining width of 2m has been used. This considers a minimum stope width of 2m +0.4m dilution in the Hangingwall and +0.4m dilution in the Footwall.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred blocks are excluded from the reported Ore Reserve.

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Criteria	JORC Code explanation	Commentary
		No ounces have been included from Inferred material.
	The infrastructure requirements of the selected mining methods.	Remaining Site surface infrastructure requirements for the mining method include: • CRF Batch Plants for Millennium, Pope John, Barkers, and Strzelecki; • Pope John Pit dewatering system; • Moonbeam power infrastructure; • Moonbeam pit portal access; All other surface infrastructure was completed in FY16-17. Underground infrastructure requirements include: • Ventilation rises for Pope John and Moonbeam, and ventilation extensions on Millennium; • Primary ventilation fans for Pope John and Strzelecki; • Escape way systems and extensions for Millennium and Pope John; • Power and pumping infrastructure with mine extension; • Historical void dewatering infrastructure; and, • Underground Magazines. All other underground infrastructure was completed in FY16-17.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	All Kundana ore is treated at the Kanowna Belle milling facilities. The plant is made up of crushing, grinding, gravity gold recovery, flotation, roasting, CIL, elution and gold recovery circuits. These facilities are designed to handle approximately 1.8 million tonnes of feed per annum. The plant has the capability to treat both refractory and free milling ores, through either using the flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery), or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plant campaigns both refractory and free milling ores every month.
	Whether the metallurgical process is well-tested technology or novel in nature.	Plus 10 years milling experience with Kundana ores.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Plus 10 years milling experience with Kundana ores.
	Any assumptions or allowances made for deleterious elements.	No assumptions made.
	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.	Plus 10 years milling experience with Kundana ores.
	For minerals that are defined by a specification, has the ore Reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Millennium, Centenary and Pope John are currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are either granted or in the process of being granted. Operational expansions to Strzelecki would be subject to new / amended applications. Based on the locations of these operations and considering historical activities, the Competent Person does not view this as presenting significant risk to the extraction of these ore bodies.
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.	All current site infrastructure is suitable to the proposed mining plan.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mine development capital cost based on historical performance on site and life-of-mine forward planning. Plant and equipment capital also based on site experience and the LOM plan.

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Criteria	JORC Code explanation	Commentary
	The methodology used to estimate operating costs.	All overhead costs and operational costs are projected forward on an AUD $/t based on historical data.
	Allowances made for the content of deleterious elements.	No allowances made.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Single commodity pricing for gold only, using a long-term gold price of AUD $1,500/oz., 2.5% WA state Government Royalty, as per NSR corporate guidance.
	The source of exchange rates used in the study.	All rates considered in Australian Dollars (AUD) as per NSR corporate guidance.
	Derivation of transportation charges.	Historic performance.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance.
	The allowances made for royalties payable, both Government and private.	All State Govt. and third-party royalties are built into the cost model.
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.	All revenue based on a gold price of AUD $1,500/oz.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	All product is sold direct at spot market prices.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not relevant for gold.
	Price and volume forecasts and the basis for these forecasts.	Not relevant for gold.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not relevant for gold.
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.	All costs assumptions are made based on historical performance from the mine and current economic forecast seen as representative of current market conditions.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities assessed at varying gold prices.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	No issues foreseen.
	Any identified material naturally occurring risks.	No issues foreseen.
	The status of material legal agreements and marketing arrangements.	No issues foreseen.
	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.	No issues foreseen.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	All Ore Reserves include Proved (if any) and Probable classifications. These classifications are based on Mineral Resource classifications as modified by subsequent grade control drilling and face sampling results.

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Criteria	JORC Code explanation	Commentary
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results appropriately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	None.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	This ore Reserve has been prepared and peer reviewed internally within Northern Star Resources. There have been no external reviews of this Ore Reserve estimate.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the Reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve is considered high based on nearby Northern Star operated mines along the same ore bearing structures.
	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.	Ore Reserves are best reflected as global estimates.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Other than dilution and recovery factors described above, no additional modifying factors applied. There is high confidence in these models as the areas is well known and well drilled.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Reconciliation results from past mining at Centenary, Millennium, Barkers and Strzelecki reflect estimates in the Ore Reserve estimates.

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JORC Code, 2012 Edition – Table 1 Report

EKJV Hornet Open Pit – 30 June 2019

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.	Sampling was completed using a combination of Reverse Circulation (RC) and Diamond Drilling (DD). RC drilling was used to drill pre-collars for many of the Resource definition holes with diamond tails. Diamond drilling constitutes the remainder of the drilling.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Diamond core was transferred to core trays for logging and sampling. Half core samples were nominated by the geologist from both NQ2 and HQ diamond core, with a minimum sample width of either 20cm (HQ) or 30cm (NQ2). RC samples were split using a rig-mounted cone splitter on 1m intervals to obtain a sample for assay. 4m Composite spear samples were collected for most of each hole, with 1m samples submitted for areas of known mineralisation or anomalism.
	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 30g 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.	Samples were taken to Genalysis Kalgoorlie for preparation by drying, crushing to <3mm, and pulverising the entire sample to <75µm. 300g Pulps splits were then dispatched to Genalysis Perth for 50g Fire assay charge and AAS analysis.
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, face sampling, grade control and Diamond Drilling techniques were used at the K2 deposits. Diamond drill holes completed pre-2011 were predominantly NQ2 (50.5mm). All Resource definition holes completed post 2011 were drilled using HQ (63.5mm) diameter core. Core was orientated using the Reflex ACT Core orientation system. RC Drilling was completed using a 5.75" drill bit, downsized to 5.25" at depth. 2 RC pre-collars were drilled followed by diamond tails. Pre-collar depth was to 160m or less if approaching known mineralisation.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	RC drilling contractors adjust their drilling approach to specific conditions to maximise sample recovery. Moisture content and sample recovery is recorded for each RC sample. No recovery issues were identified in the RC drilling.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	For diamond drilling the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.
	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.	Recovery was excellent for diamond core and no relationship between grade and recovery was observed. For RC drilling, pre-collars were ended before known zones of mineralisation and recovery was very good through any anomalous zones, so no issues occurred.
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 is logged for Regolith, lithology, veining, alteration, mineralisation and structure. Structural measurements of specific features are also taken through oriented zones.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All logging is quantitative where possible and qualitative elsewhere. A photograph is taken of every core tray.
	The total length and percentage of the relevant intersections logged.	RC sample chips are logged in 1m intervals for the entire length of each hole. Regolith, lithology, alteration, veining and mineralisation are all recorded.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	All Diamond core is cut and half the core is taken for sampling. The remaining half is stored for later use.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	All RC samples are split using a rig-mounted cone splitter to collect a 1m sample 3-4kg in size. These samples were submitted to the lab from any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside of mineralised zones spear samples were taken over a 4m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Sampling quality is deemed appropriate.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Field duplicates were taken for RC samples at a rate of 1 in 20.

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Criteria	JORC Code explanation	Commentary
	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.	Sample preparation was conducted at Genalysis Kalgoorlie, commencing with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6mm particle size. If the sample is greater than 3kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3kg (typically 1.5kg) at a nominal <3mm particle size. The entire crushed sample (if less than 3kg) or sub-sample is then pulverised to 90% passing 75µm, using a Labtechnics LM5 bowl pulveriser. 300g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Grind checks are performed at both the crushing stage(3mm) and pulverising stage (75µm), requiring 90% of material to pass through the relevant size.
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.	A 50g Fire assay charge is used with a lead flux, dissolved in the furnace. The prill is totally digested by HCl and HNO3 acids before Atomic absorption spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine any element concentrations.
	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 materials (CRMs) are inserted into the sample sequence randomly at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. blanks are inserted into the sample sequence at a rate of 1 per 20 samples. This is random, except where high grade mineralisation is expected where blanks are inserted after the high-grade sample to test for contamination. Failures above 0.2gpt are followed up, and re-assayed. New pulps are prepared if failures remain. Field Duplicates are taken for all RC samples (1 in 20 sample). No Field duplicates are submitted for diamond core.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by a Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off.
	The use of twinned holes.	No known twinned holes were drilled for this data set.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging is captured using a wireless remote Acquire database if their network is available. If network is unavailable, data is entered via a remote licence set up into an offline Acquire database then transferred later into the live database. Both a hardcopy and electronic copy of these are stored, as well as being loaded into the database using automatic acquire loaders. Assay files are received in csv format and loaded directly into the database by the Database administrator (DBA). A geologist then checks that the results have inserted correctly. Hardcopy and electronic copies of these are stored. No adjustments are made to this assay data.
	Discuss any adjustment to assay data.	
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.	Planned hole locations are pegged using a Differential GPS by the field assistants. The collar positions for underground diamond holes are located by the mine surveyors, During drilling, single-shot surveys are every 30m to ensure the hole remains close to design. This is performed using the Reflex Ez-Trac system. Upon hole completion, a gyroscopic survey is conducted by ABIMS taking readings every 5m for improved accuracy. Measurements are taken with reference to true north.
	Specification of the grid system used.	All data is collected using the local mine grid.
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups of holes over the last 15 years.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing across the area varies. For Resource definition drilling, spacing was typically 20m x 20m to allow the Resource to be upgraded to an Indicated Resource.
	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 spacing is considered appropriate for Resource and Ore Reserve classification.
	Whether sample compositing has been applied.	No compositing has been applied to these exploration results, although composite intersections are 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.	The majority of the structures in the Kundana camp dip steeply (80°) to WSW. The Mary Fault structure has a shallow dip but orients to the NW, approximately 60°. To target these orientations the drill hole dips of 60-70° towards ~060° achieve high angle intersections on all structures.
	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.	No sampling bias is considered to have been introduced by the drilling orientation.

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Criteria	JORC Code explanation	Commentary
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound and tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits or reviews have recently been conducted on sampling techniques.

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.	All holes mentioned in this report are located within the Mining Lease M16/309 held by The East Kundana Joint Venture (EKJV). The EKJV is majority owned and managed by Northern Star Resources Limited (51%). The minority holding in the EKJV is held by Tribune Resources Ltd (36.75%) and Rand Mining Ltd (12.25%). Mining Lease M16/309 is subject to two royalty agreements. The agreements that are on M16/309 are the Kundana- Hornet Central Royalty and the Kundana Pope John Agreement No. 2602-13.
	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.	No known impediments exist and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Since the late 1990's the Hornet area has been drilled heavily, initially by Gilt Edge Mining (GEM) then by Goldfields Exploration Pty Limited who drilled extensively from Hornet all the way to Drake prospects. By 2001-2002, Aurion Gold Pty Limited had undertaken two infill programs totalling 43 DD and 63 RC holes. In 2003, Placer Dome Asia Pacific (PDAP) acquired 100% ownership and undertook infill drilling programmes for the K2, K2A, K2B and the Mary fault mineralisation. By mid-2003, PDAP drilled a grade control program to cover the K2 mineralisation to a depth of 35m below surface. Since 2003 the drilling campaigns around the Hornet project area has ceased until late 2000's when Barrick Gold drilled a few holes around the Mary Fault area.
Geology	Deposit type, geological setting and style of mineralisation.	The Kundana camp is situated within the Norseman-Wiluna Greenstone Belt, in an area dominated by the Zuleika shear zone, which separates the Coolgardie domain from the Ora Banda domain. K2-style mineralisation (Hornet) consists of narrow vein deposits hosted by shear zones located along steeply dipping overturned lithological contacts. The K2 structure is present along the contact between a black shale unit (Centenary shale) and intermediate volcanoclastics (Spargoville formation). Minor mineralisation, termed K2B, also occurs further west, on the contact between the Victorious Basalt and Bent Tree Basalt (both part of the regional upper Basalt Sequence). A shallow dipping fault, offsets the K2 structure at the south end of Hornet. This contact exists as a brecciated material hosting within the intermediate volcanoclastic tuff.
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: 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.	Too many holes to practically list the complete dataset however a summary report has been collated to reflect the hole positions used for estimation.
	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.	The exclusion of this data will not adversely impact on the understanding of this release.
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.	No exploration drill hole data is being released.

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Criteria	JORC Code explanation	Commentary
	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.	No exploration drill hole data is being released.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No exploration drill hole data is being released.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	No exploration drill hole data is being released.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	No exploration drill hole data is being released.
	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').	No exploration drill hole data is being released.
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.	Appropriate plans and section have been included in the body of this report.
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.	No exploration drill hole data is being released.
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.	Metallurgical test work was conducted on 7 hornet holes in 2011 with gold recoveries following cyanidation above 95%. Lime consumption was high and cyanide consumption was low.
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).	Further work will continue in the near future to further attempt to extend the shallow Hornet mineralisation further north towards Rubicon. The drilling extents between Hornet and Rubicon is very sparse.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Future work may be conducted to test the continuity of mineralisation between Hornet and Rubicon.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are either recorded on paper and manually entered into to an Acquire database or transferred from a logging laptop into Acquire via an offline database. There are checks in place to avoid duplicate holes and sample numbers.
	Data validation procedures used.	Where possible, raw data is loaded directly to the database from laboratory and survey derived files.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The CP has visited this site once in 2014
	If no site visits have been undertaken indicate why this is the case.	This Resource estimate has been conducted by geologists working in the exploration department and in direct, daily contact with the ore body data used in this Resource estimate.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the deposit was carried out using a systematic approach to ensure continuity of the geology and estimated mineral Resource. The confidence in the geological interpretation is high with the information gained from ore development and underground drilling.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drill holes, 3D photogrammetry, structures.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations have been completed.

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
	The use of geology in guiding and controlling Mineral Resource estimation.	The interpretation of the main K2 structure is based on the presence of quartz veining and continuity between sections on the K2 structure. Drill core logging and face development mapping is used to create 3D constrained wireframes.
	The factors affecting continuity both of grade and geology.	Continuity is affected by the orientation of the K2 structure, and several dextral offset fault structures
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.	Strike length = > 600m; Width = ~1-2m average; Depth = from surface to ~500m maximum below surface.
Estimation and modelling techniques	The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.	The K2 domain mineralisation was subdivided into three zones to separate the main high-grade core and the low-grade Hanging wall and footwall alteration halos. The K2 core was defined by the presence of quartz, the alteration zones were constrained based on grade. 3 dimensional wireframes were created in Datamine Studio to define the volumes for the mineralised domains. Simple Kriging was used to estimate the Hornet Resource. Drill holes were composited into 1m intervals down hole except for the supergene domains which were composited to 2m. The composite lengths could vary between 0.5m and 1.5m to ensure that no sampling was lost during the compositing process. The average grade and total length of the composite data was compared against the average grade and total length of the un-composited data to check the compositing process. The distribution of composite lengths was checked to ensure that most the composites were close to the targeted length. The local mean value used for Simple Kriging was calculated from the declustered mean of the top-cut composited sample data. Search distances used for estimation based on variogram ranges and vary by domain. Drill spacing is generally around 20m x 20m for the Indicated Resource and around 40m x 40m for the Inferred Resource. Top cuts were applied to the sample data based on a statistical analysis of the data and vary by domain. The Kriging neighbourhood was refined using statistical measures of Kriging quality. The estimated grades were assessed against sample grades and against declustered mean values
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Post estimation, Resource estimations do not have tonnage or grade factors applied.
	The assumptions made regarding recovery of by-products.	No assumptions are made and only gold is defined for estimation.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Parent cell size is 10m x 10m x 10m. Sub-cell to 2.5m x 2.5m to suit the narrow north-south orientation of the majority of the domains. Search ellipsoids vary for each domain but are typically around 50 – 100m down plunge, 50m across plunge and 5m perpendicular to plunge.
	Any assumptions behind modelling of selective mining units.	No assumptions made.
	Any assumptions about correlation between variables.	No assumptions made.
	Description of how the geological interpretation was used to control the Resource estimates.	Mineralisation wireframes are created within the geological shapes based on drill logging, face samples, and grade. Low grades can form part of an ore wireframe.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the cut mean by more than 5%. Values selected range from 5gpt to 150gpt and vary by domain.
	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 is through swath plots comparing composites to block model grades, along 20m eastings and RL. Visual checks were also made comparing model grades against the supporting sample data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis.

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	Cut-off grades for reporting the Resource were developed using a gold price of A$1,700 per ounce and budgeted mining costs for 2015/16.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	Historical mining and reconciliation data does not affect wire frame interpretation.
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.	Metallurgical recovery factors have been developed based on extensive experience processing similar material from the Kundana area.
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 green fields 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.	A “Licence to Operate” is held by the operation which is issued under the requirement of the “Environmental Protection Act 1986”, administered by the Department of Environment (DoE). The licence stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are also regulated by DoE and are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licences and lease conditions. An Environmental Management System is in place to ensure that Northern Star employees and contractors exceed environmental compliance requirements. The Kalgoorlie operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits. Kalgoorlie Operations have been compliant with the International Cyanide Management Code since 2008.
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 was determined from surface diamond drill holes with intervals taken from mineralised and non-mineralised zones within the project area. The bulk densities are derived from wet and dry weighting of core no greater than 30cm total length with core samples selected by changes in lithology/alteration or every 30-40m where no change is evident.
	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.	No/minimal voids are encountered in the ore zones.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Bulk densities are applied to domains for the ore zone and interpreted weathering domains
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: Geologic grade continuity Density of available drilling Statistical evaluation of the quality of the kriging estimate
	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, quality, quantity and distribution of the data).	All considered
	Whether the result appropriately reflects the Competent Person’s view of the deposit.	This mineral Resource estimate is considered representative.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	This Resource has not been audited externally. Previous estimates of this area utilising the same, or very similar variables, have been reviewed by internal parties with protocols deemed appropriate.
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	This mineral Resource estimate is considered as robust and representative of the Kundana style of mineralisation. The application of geostatistical methods has helped to increase the confidence of the model and quantify the relative accuracy of the Resource.

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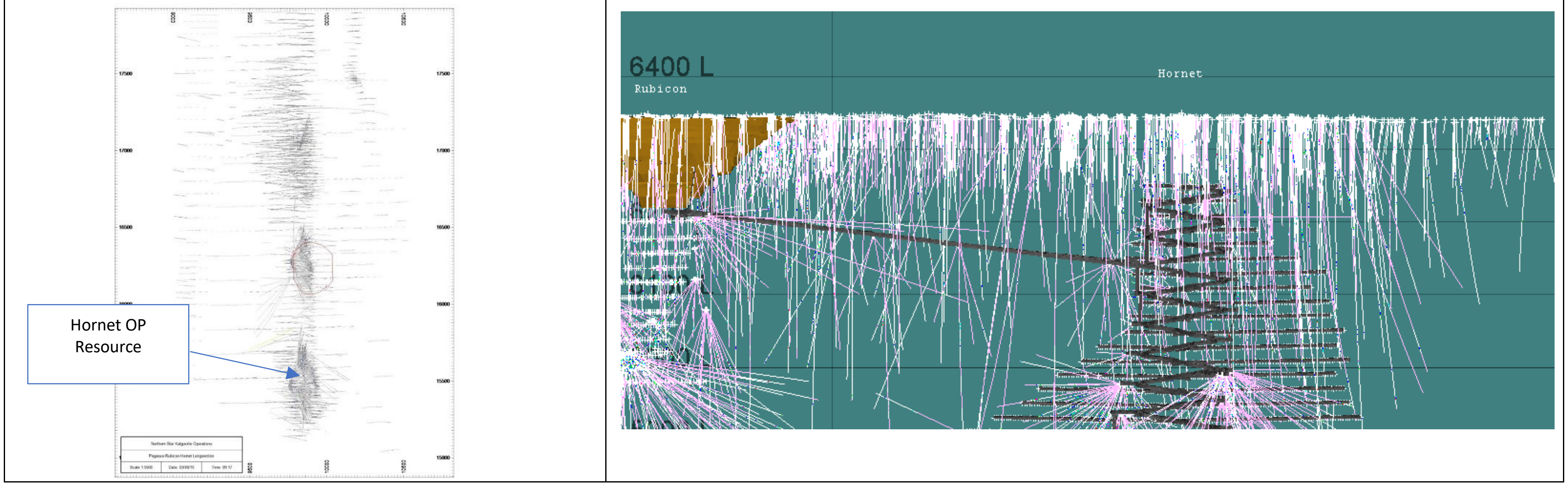
Criteria	JORC Code explanation	Commentary
	qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.	
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.	This Resource report relates to the entirety of the K2 ore zone and surrounding dilution skins. Each of these will show local variability even though the global estimate reflects the total average tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No comparison with production data has been made.

HORNET - REPRESENTATIVE PLAN AND CROSS SECTION



Plan view: Hornet O/P Resource drill collars and Traces

Long Section: Hornet surface Resource area with drill traces

APPENDIX B: TABLE 1

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Reported Ore Reserve is based on updated or depleted Resource models for all areas of Rubicon/Hornet.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	Mineral Resources are reported inclusive of Ore Reserves.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	A site visit has been conducted by the Competent Person.
	If no site visits have been undertaken indicate why this is the case.	The Competent Person is satisfied that the descriptions of the planned infrastructure and locality provided by NST along with the surveyed 3D topography are sufficient information to carry out the mine design and classify the Ore Reserves.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	Pre-Feasibility.
	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.	As above.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	The pit cut-off grade has been calculated based on the key input components (processing, recovery and administration) Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. • The AUD gold price as per corporate guidance. • Mill recovery factors are based on historical data and metallurgical test work. Unit costs are from the "pre-feasibility level" mining cost 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).	Ore Reserves have been calculated by generating detailed mining shapes for the proposed open pit. All open pit mining shapes include planned and unplanned dilution, being waste material that is located within the minable shape. Open pit unplanned dilution has been modelled within the mining shapes as a skin of material likely to be taken additional to material considered to be the smallest mining unit (SMU). This method is considered to be appropriate given the expected ground conditions, orebody width and proposed mining style.
	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 selected mining methods for the Hornet deposit are of a bench mining open pit method. The proposed open pit is to be mined using conventional open pit mining methods (drill, blast, load and haul) by a mining contractor utilising 120 t class excavators and 90 t trucks. This method is used widely in mines across Western Australia and is deemed appropriate given the mature of the ore body.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	Pit wall slopes are based on recommendations provided by Barrick geotechnical reviews and based upon expected rock type, weathering profile and depth below surface.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	The mineral Resource supplied by NST has been used for the open pit optimisation. To generate a series of 'nested' pit shells, a series of inputs are required to sufficiently estimate the value of the material being mined and the cost of extraction. The optimisation requires an economic value for each block in the model, as well as mining and milling costs. The cost of each block is derived from mining and processing costs, with the mining cost related to the block depth and the milling cost only being used if the block can be economically mined. Mining costs were based on quoted rates from a surface mining contractor for similar scaled operations.
	The mining dilution factors used.	Physicals are reported within the generated mining shapes for the open pit Ore Reserve. SMU shapes have been generated for the reporting of Ore Reserve physicals. Dilution accounted for within the SMU is 18%; that is waste material carried within the mining shape. Mining recovery is considered to be 100% of the SMU.
	The mining recovery factors used.	No recovery factors were applied.
	Any minimum mining widths used.	The SMU dimensions for the Ore Reserve Estimate are 2.0 m Wide x 5.0 m High x 5.0 m Long.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Inferred material has not been included within this Ore Reserve estimate (treated as waste) but has been considered in LOM planning. The amount of inferred material has no impact on the sensitivity of the project.

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Criteria	JORC Code explanation	Commentary
	The infrastructure requirements of the selected mining methods.	Infrastructure required for the proposed Hornet Open Pit have been accounted for and included in all work leading to the generation of the Ore Reserve estimate. As there is currently infrastructure in place for the Rubicon/Hornet underground operations and the life of the project is limited planned infrastructure includes: • Offices, workshops and associated facilities; • Dewatering pipeline; • Access Road; • Waste Dump; and • ROM Pad. Processing will be conducted offsite at NST Konawa Bell operation; hence no processing infrastructure is required.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	Ore from the Hornet Open Pit operations is treated at the NST owned Kanowna Belle processing facility located adjacent to the Kanowna Belle mine. The plant is designed to handle approximately 1.8 million tonnes of feed per annum and has the capability to treat both refractory and free milling ores through the flotation circuit and associated concentrate roaster circuit, including carbon-in-leach (CIL) gold recovery, or bypassing the flotation circuit and going directly to a CIL circuit that is designed to treat flotation tails. Ore from the Rubicon/Hornet underground operations is currently processed at the Kanowna Bell facility.
	Whether the metallurgical process is well-tested technology or novel in nature.	Well tested for surface and underground ore.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Metallurgical test work was carried out by ALS Ammtec on representative samples for the Hornet deposit. Based on current information provided by NST from Kanowna Bell metallurgical recovery factors are as follows: • Oxide – 94%; • Transitional – 94%; • Fresh – 94%.
	Any assumptions or allowances made for deleterious elements.	There has been no allowance 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.	Metallurgical test work was carried out by ALS Ammtec on representative samples for the Hornet deposit.
	For minerals that are defined by a specification, has the ore Reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable, gold only.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Environmental impacts and hazards are being considered as part of the DMIRS application process. Waste rock characterisation and hydrogeological investigations indicates the rock mass is considered non-acid forming. Tailings from the open pit operation are proposed to be stored within the existing Tailings Storage Facility (TSF) at Kanowna Bell. A previously granted clearing permit has expired. This will be re-applied for and expected to be granted closer to expected start of the pit.
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.	There is currently infrastructure in place for the Rubicon/Hornet underground operations. Additional infrastructure is planned for the planned Hornet operations. TSF facilities are located Kanowna Belle processing facility located adjacent to the Kanowna Belle mine. It has been assumed that all development of surface infrastructure will be completed to enable development of the Hornet Open Pit Resource. It has been assumed that there will be sufficient water available to develop the Project.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Capital and operating costs have been sourced from supplier and contractor quotes as well as a consultants cost database through the "pre-feasibility study" process.
	The methodology used to estimate operating costs.	A capital and operating cost model has been developed and has been used to complete a life of mine cash flow estimate.
	Allowances made for the content of deleterious elements.	Nil allowance, none expected.

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Criteria	JORC Code explanation	Commentary
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Single commodity pricing for gold only, using a long-term gold price of A$1,500 per ounce as per NST corporate guidance.
	The source of exchange rates used in the study.	NST report in Australian dollars. Therefore, no exchange rate is used or required.
	Derivation of transportation charges.	All transportation charges are based supplier and contractor quotes. This cost component has been used to determine the cut-off grades as well as applied to the operating cash flow estimate.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Processing costs are based on data supplied by NST. This cost component has been used to determine the cut-off grades as well as applied to the operating cash flow estimate.
	The allowances made for royalties payable, both Government and private.	WA State Government royalty of 2.5%. This cost component has been used to determine the cut-off grades as well as applied to the operating cash flow estimate.
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.	Revenue has been based on the commodity price and exchange data provided by NST. Single commodity pricing for gold only, using a long-term gold price of A$1,500 per ounce. 2.5% WA State Government royalty.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	Gold doré from the mine is to be sold at the Perth Mint.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not applicable.
	Price and volume forecasts and the basis for these forecasts.	Not applicable.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not applicable.
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.	The Ore Reserve estimate is based on a financial model for that has been prepared at a “pre-feasibility study” level of accuracy economic modelling. All inputs from mining operations, processing, transportation and sustaining capital as well as contingencies have been scheduled and evaluated to generate a full life of mine cost model. Economic inputs have been sourced from suppliers or generated from database information relating to the relevant area of discipline. A discount rate of 6.2% has been applied. The NPV of the project is positive at the assumed commodity prices.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities were conducted on metal price fluctuations of A$1,500 ± $200 per ounce. Due to the current short life, the project is not seen as highly sensitive to cost inputs.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders including traditional landowner claimants.
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	None.
	Any identified material naturally occurring risks.	None.
	The status of material legal agreements and marketing arrangements.	None.
	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.	All permitting was in place but the clearing permit has expired. This will be re-applied for and expected to be granted closer to expected start of the pit.

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Criteria	JORC Code explanation	Commentary
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	The classification of the Hornet Ore Reserves has been carried out in accordance with the JORC code 2012.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results appropriately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	No Measured Mineral Resource contributes to Probable Ore Reserves.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Ore Reserves reporting processes has been subjected to an internal review by Entech's senior technical personnel in July 2016.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the Reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	The design, schedule and financial model on which the Ore Reserve is based has been completed to a "pre-feasibility study" standard, with a corresponding level of confidence.
	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.	All modifying factors have been applied to design mining shapes on a global scale.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	The Ore Reserve is quoted to a "pre-feasibility' level. There is high confidence in the modifying factors and quoted Ore Reserve as physicals have been reported within minable shapes optimised to the SMU within the final pit design.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	

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JORC Code, 2012 Edition – Table 1 Report

Falcon Deposit: Resources and Reserves – 30 June 2019

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.	A combination of sample types was used to collect material for analysis; underground and surface diamond drilling (DD), surface reverse circulation drilling (RC) and surface RC drilling with diamond tail (RC_DD).

	Falcon		
	# of Holes	Total m's	# of Samples
DD	88	33,135	30,865
FS	-	-	-
RC	1	318	318
RC_DD	1	672	417
Total	90	34,125	31,600

Criteria	JORC Code explanation	Commentary
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	DD drilling is sampled within geological boundaries with a minimum (0.3 m) and maximum (1.0 m) sample length.
	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 30g 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.	DD drill core was nominated for either half core or full core sampling. Samples designated for half core were cut using an automated core saw. The mass of material collected was dependent on the drill hole diameter and sampling interval selected. Core was broken with a rock hammer if sample segments were too large to fit into sample bags. A sample size of at least 3 kg of material was targeted for each face sample interval. All samples were delivered to a commercial laboratory where they were dried and crushed to 90% of material ≤3 mm. At this point, samples greater than 3 kg were split using a rotary splitter, then pulverised to 90% ≤75 µm. A 40 g charge was selected for fire assay of diamond drill hole samples.
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.).	Both Reverse Circulation and Diamond Drilling techniques were used to drill the Falcon deposit. Surface diamond drill holes were completed using HQ2 (63.5 mm) coring, whilst underground diamond drill holes were completed using NQ2 (50.5 mm) coring. Historically, core was orientated using the Reflex ACT Core orientation system. Currently, core is orientated using the Boart Longyear Trucore Core Orientation system. RC Drilling was completed using a 5.75" drill bit, downsized to 5.25" at depth. In several cases, RC pre-collars were drilled, followed by diamond tails. Pre-collar depth was determined in the drill design phase.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	For DD drilling, any core loss is recorded on the core block by the driller. This is then captured by the logging geologist and entered as an interval into the hole log.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	Contractors adjust the rate and method off drilling if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.
	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.	Recovery was excellent for diamond core and no relationship between grade and recovery was observed. Average recovery across the Kundana camp is at 99%. No specific areas within the Falcon model area had issues with recovery.
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 is logged for lithology, veining, alteration, mineralisation and structural data. Structural measurements of specific features are also taken through oriented zones. Logging is entered in AcQuire using a series of drop-down menus which contain the appropriate codes for description of the rock.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet.
	The total length and percentage of the relevant intersections logged.	For all drill holes, the entire length of the hole is logged.
Sub-sampling techniques and	If core, whether cut or sawn and whether quarter, half or all core taken.	The regolith in all drill holes was sampled as full core and the fresh rock was sampled as half core. Core cutting was completed using an automated core saw. Due to the current project stage, half core has been retained for cut holes.

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Criteria	JORC Code explanation	Commentary
sample preparation	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	All RC samples are split using a rig-mounted cone splitter to collect a sample 3 - 4 kg in size from each 1m interval. These samples were utilised for any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside known mineralised zones spear samples were taken over a 4 m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Preparation of NSR samples was conducted at Bureau Veritas' Kalgoorlie facilities; commencing with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3 kg (typically 1.5 kg) at a nominal <3 mm particle size. The entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% ≤75 µm, using a Labtechnics LM5 bowl pulveriser. 400 g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets. The sample preparation is considered appropriate for the deposit.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Standard procedures are used for all processes within the laboratory. Grind checks are performed at both the crushing stage (3 mm) and pulverising stage (75 µm), requiring 90% of material to pass through the relevant size.
	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.	Umpire sampling is performed monthly, where 3% of the samples are sent to the umpire laboratory for processing.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material being sampled.
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.	A 40 g fire assay charge for diamond drill holes is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO_3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis. In circumstances where coarse gold has been encountered in drill core, up to five 40 g charges are fire assayed, or until the pulp is fully exhausted. The mean average is then calculated from the multiple gold fire assays.
	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.	No geophysical tools were used to determine any element concentrations.
	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 materials (CRMs) are inserted into the sample sequence randomly at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t if received are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades at the pulverising stage. No field duplicates were submitted for diamond core. Pulp duplicates are requested after any ore zone. These are indicated on the sample sheet and the submission sheet. When visible gold is observed in core, a quartz flush is requested after the sample. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs. The QA studies indicate that accuracy and precision are within industry accepted limits.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by a Northern Star geologist during the drill hole validation process, and later by a Competent Person to be signed off.
	The use of twinned holes.	No twinned holes were drilled into the Falcon deposit. Re-drilling of some drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database with an 'A' suffix. Re-drilled holes are sampled, whilst the original drill hole is logged, but not sampled.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging and sampling are directly recorded into AcQuire. Assay files are received in csv format and loaded directly into the database using an AcQuire importer object. Assays are then processed through a form in AcQuire for QAQC checks. Hardcopy and noneditable electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments have been made to the assay data.

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Criteria	JORC Code explanation	Commentary
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.	Planned holes are marked up by the mine survey department using a total station survey instrument in mine grid (Kundana 10). The actual hole position is then located by the mine survey department once drilling is completed. In some cases, drill hole collar points are measured off survey stations if a mark-up cannot be completed. Holes are lined up on the collar point using the DHS Azimuth Aligner. Planned azimuths and dips of the holes are downloaded to the aligner which is then placed on the rod string to align the hole for drilling. During drilling, single shot surveys are conducted every 30 m to track the deviation of the hole and to ensure it stays close to design. This is performed using the Devi Shot camera which measures the gravitational dip and magnetic azimuth. Results are uploaded from the Devishot software into a csv format which is then imported into the Acquire database. At the completion of the hole, a Multishot (using the DeviFlex non-magnetic strain gauge instrument) survey is completed, taking measurements every 3 m to ensure accuracy of the hole. This is converted to csv format and imported into the Acquire database.
	Specification of the grid system used.	Collar coordinates are recorded in mine grid (Kundana 10) and transformed into MGA94_51.
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups of holes over the last 15 years.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing varies across the deposit, with majority of drilling between 120 x 120 m and 40 x 40 m spacing.
	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 spacing and distribution is considered sufficient to support the current ‘Inferred’ resource estimate.
	Whether sample compositing has been applied.	No sample compositing has been applied.
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 Falcon deposit is interpreted as a series of NNE-SSW trending structures that dip moderately (65°) to the west (local grid). Diamond drilling was designed to target the orebodies as close to perpendicular as practical. Due to the collar locations available, much of the drilling was completed from footwall to hangingwall. Where this is the case, a maximum drill hole dip of 40° is suggested as steeper holes could result in drilling down-dip of the lode.
	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.	No sampling bias is considered to have been introduced by the drilling orientation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission, samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits have been undertaken of the data and sampling practices.

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.	All holes mentioned in this report are located within the M16/309 and M15/993 Mining leases and are held by The East Kundana Joint Venture (EKJV). The EKJV is majority owned and managed by Northern Star Resources Limited (51%). The minority holding in the EKJV is held by Tribune Resources Ltd (36.75%) and Rand Mining Ltd (12.25%). The tenement on which the Falcon deposit is hosted (M16/309) is subject to three royalty agreements. The agreements that are on M16/309 are the Kundana- Hornet Central Royalty, the Lake Grace Royalty and the Kundana Pope John Agreement No. 2602-13.
	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.	No known impediments exist, and the tenements are in good standing.

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Criteria	JORC Code explanation	Commentary
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The first reference to the mineralisation style encountered at the Kundana project was the mines department report on the area produced by Dr. I. Martin (1987). He reviewed work completed in 1983 – 1984 by a company called Southern Resources, who identified two geochemical anomalies, creatively named Kundana #1 and Kundana #2. The Kundana #2 prospect was subdivided into a further two prospects, dubbed K2 and K2A. Between 1987 and 1997, limited work was completed. Between 1997 and 2006 Tern Resources, (subsequently Rand Mining and Tribune Resources), and Gilt-Edged Mining focused on shallow open pit potential with the Rubicon open pit considered economic and production commenced in 2002. In 2011, Pegasus was highlighted by an operational review team and follow-up drilling was planned through 2012.
Geology	Deposit type, geological setting and style of mineralisation.	The Kundana camp is situated within the Norseman-Wiluna Greenstone Belt, in an area dominated by the Zuleika Shear Zone, which separates the Coolgardie Domain from the Ora Banda Domain. The Falcon deposit is interpreted as a series of mineralised splays off low angle structures that persist through lithological contacts from the K2B (Victorious Basalt - Bent Tree Basalt contact) across the K2A (Bent Tree Basalt- upper felsic and volcaniclastic/sedimentary rocks of the Black Flag Group). The Falcon lodes sit in the hangingwall of the regional 'K2' structure, west of the Pode deposit. The Pode lodes have been used as a proxy when interpreting the Falcon structures as similar trends are present. Falcon lodes are comprised of laminated to brecciated quartz veining internal to a sheared biotite-sericite-ankerite altered siltstone/sandstone unit and an intermediate volcaniclastic unit. Mineralisation is present within veins, on vein selvedges, and within the altered host rock, with coarse gold often observed. There is a strong visual correlation between arsenopyrite and gold mineralisation. Vein orientation appears erratic and this is supported by structural measurements taken from lodes.
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length.	A summary of the data present in the Falcon deposit can be found above. The collar locations are presented in plots contained in the NSR 2019 Resource Report. Drill holes vary in survey dip from +30 to -72 degrees, with hole depths ranging from 42 m to 951 m, with an average depth of 379 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All validated drill hole data was used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	Not applicable
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2 m of barren material (considered < 2 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 2.0 g/t are considered significant, however, where low grades are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	
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.	Appropriate plans and section have been included at the end of this table and in the NSR 2019 resource report.

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Criteria	JORC Code explanation	Commentary
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	Petrology samples were selected for key lithologies and sent for thin section preparation and petrographic investigation.
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).	Resource Targeting (RT) drilling will continue to test the strike length of the deposit to an 80 x 80 m drill spacing. Resource Definition (RSD) drilling to a 40 x 40 m drill spacing will also be conducted to test the continuity of mineralised trends. The necessity for greater drill density will be determined by a follow up drill spacing study to be completed during FY19-20.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release and are detailed in the NSR 2019 resource report.

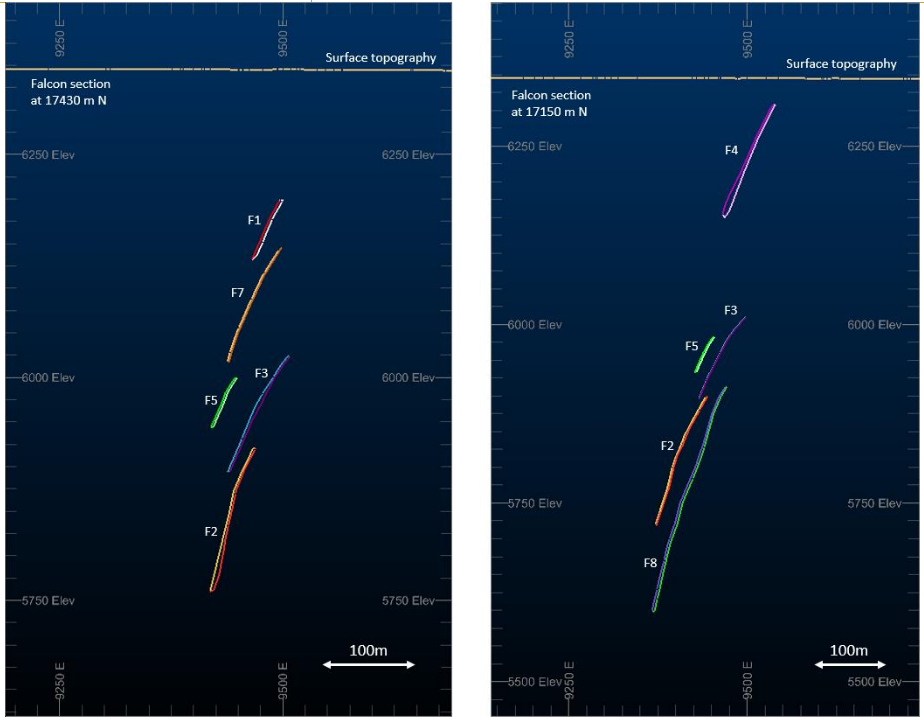

Figure 1. Cross section views of Falcon ore lodes

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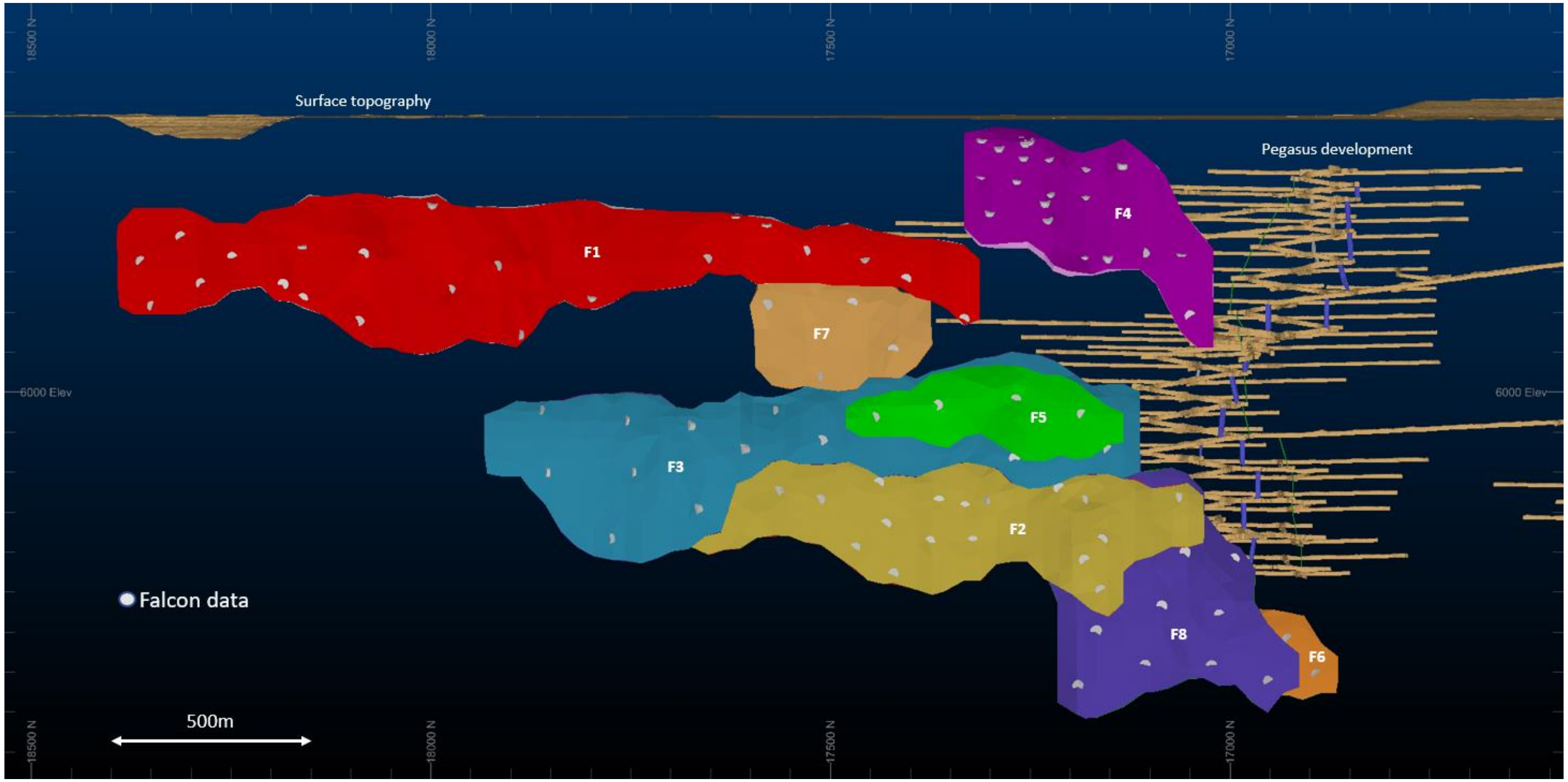

Figure 2. Long section view looking east of the Falcon deposit and data used for estimation

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Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are either recorded on paper and manually entered into a database system or is captured digitally via a logging laptop and directly loaded into the database system. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly into the database from laboratory and survey-tool derived files.
	Data validation procedures used.	The database has further checks performed to back -up those performed in section 2. The complete exported data base including drill and face samples is brought into Datamine RM and checked visually for any apparent errors i.e. holes or faces sitting between levels or not on surface DTM's. Multiple checks are then made on numerical data including: • Empty table checks to ensure all relevant fields are populated • Unique collar location check, • Distances between consecutive surveys is no more than 50m for drill-holes • Differences in azimuth and dip between consecutive surveys of no more than 0.3 degrees • The end of hole extrapolation from the last surveyed shot is no more than 30 m • Underground face sample lines are not greater than +\- 5 degrees from horizontal Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported. This data will not be used in the estimation process. In addition to being validated, drill holes are assigned a Data Class, which provides a secondary level of confidence in the quality of the data. A review of all the historic data for Falcon was undertaken in 2019 and Data Class (DC) values from 0 - 3 assigned, criteria summarised below: DC 3 = Recent data; all data high quality, validated and all original data available. DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR Recent data; minor issues with data such as QAQC fail but not proximal to the ore zone. DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or too dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The geological interpretations underpinning these resource models have been prepared by geologists working in adjacent mines and in direct, daily contact with similar ore bodies. The estimation of grades was undertaken by personnel familiar with the orebody and the general style of mineralisation encountered. The Senior Resource Geologist, a competent person for reviewing and signing off on estimations of the Falcon lode maintained a presence throughout the process.
	If no site visits have been undertaken indicate why this is the case.	
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the Falcon deposit has been carried out using a systematic approach to ensure continuity of the geology and estimated mineral resource. The confidence in the geological interpretation is reasonable given the current density of data present. The interpretation of the Falcon mineralised envelopes was conducted using the sectional interpretation method in Datamine RM software. Sectional interpretation was completed at approximately 20 m spacing in cross-section. Wireframes were checked for unrealistic volumes and updated where appropriate.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including drill holes (lithology, assay and structural data), regional structural models and adjacent analogous deposits.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Due to the wide data spacing, alternative interpretations have been considered. This includes a single steep mineralised trends (as opposed to the current 'stacked' moderately dipping lodes) aligned with regional foliations. The chosen interpretation fits with known local structural trends (i.e. Pode-style mineralisation), although only future data addition will confirm. This has been considered when applying Resource Classification to the MRE and has been clearly stated in all documentation around this model release.
	The use of geology in guiding and controlling Mineral Resource estimation.	The interpretation of the main Falcon structures is based predominantly on moderate to steep dipping mineralised shears within the host unit. Current understanding is that the interbedded siltstone/sandstone forms a rheological control to mineralisation, and these have been viewed as the truncating structures to the east and west of the stacked Falcon lodes. Continuity of structure and mineralisation style along-strike and down-dip is required for at least three consecutive holes along the expected orientation of the mineralised trend for a mineralised envelope to be created for estimation.

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Criteria	JORC Code explanation	Commentary
	The factors affecting continuity both of grade and geology.	Individual mineralised envelopes are thought to be reasonably continuous at the current drill spacing, as similar mineralisation styles, structures and grade tenor exists between adjacent drill holes. Additional drill data is required to confirm this assumption, and this has been considered when applying Resource Classification to the MRE and has been clearly stated in all documentation around this model release. Offsetting structures are not present in the adjacent Pode deposit although significant undulations exist which may have some impact on continuity of the mineralised trends and metal estimated within. Mineralised envelopes for Falcon are confined to the interbedded sandstone/siltstone (SASL) lithological unit. Contacts to the east with Bent Tree basalt and to west with Black Flags intermediate volcaniclastic form the bounding structures for the Falcon mineralisation.
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.	Mineralisation has been modelled at Falcon over a strike length of 1,500 m. Individual mineralised envelopes range from 200 m to 1000 m along strike and from 50 to 300 metres down dip. Mineralised envelope true widths range from 0.5 m to 8 m. Mineralisation is known to occur from the base of cover to around 750 m below surface.
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.	Multiple estimation methodologies have been tested to ascertain the sensitivity of the estimates to various input parameters, including top-cut, influence limitation model block size and kriging neighbourhood. This test work was completed on the Falc4 lode, which has the highest density of data present. The variability between estimates was ~50%, which suggests the requirement for greater data density to improve geological confidence before an Indicated Resource can be released. In order to combat the variability in dip and dip direction a two-dimensional approach has been used for sample selection. Samples and blocks are transformed into two-dimensional space (a single plane in the Y-Z orientation), the estimate is completed in this space, then samples and blocks are back-transformed to their original position. This back-transformation is checked to ensure it agrees with the original position of the wireframe. This methodology negates the requirement for dynamic anisotropy and allows the variogram to be used to estimate grade in the major (down plunge) and semi-major (down dip) orientations. The downside of the two-dimensional approach is the inability of the estimate to reflect variability across the lode. To combat this, a proportional estimate has been used for final grade calculation. Firstly, a 'categorical estimate' is completed on a grade cut-off of 0.30 g/t (0.75 g/t for the Falc4 lode). This cut-off grade has been determined by looking for a break in the grade distribution. There is low variability in this grade between Falcon lodes, so the 0.30 g/t cut-off has been used across all lodes (except Falc4). Blocks above 0.30 g/t are coded with '1' and blocks below with '0'. An estimate is completed on the binary values to ascertain the probability of the block being above the grade cut-off. For instance, if the block estimate returned 0.65, the assumption would be that 65% of that block volume would be above the 0.30 g/t cut-off grade. Following this, two separate data sets are created. One contains all samples above 0.30 g/t and the other all samples below 0.30 g/t. These two data sets are used individually to estimate a high-grade and low-grade model. For lodes with few sample points, or lodes where it was not possible to create a coherent variogram model, Inverse Distance was used for both the proportional and grade estimates. For all other lodes, Ordinary Kriging was used. The final model is created by summing the products of the block proportion estimate and high- and low-grade estimates. FINAL_AU = (PROPORTION*HG_ESTIMATE) +(PROPORTION*LG_ESTIMATE) Note this final estimate is a weighted combination of these two models, which returns a single gold grade for the original block. All estimation uses a three-pass search strategy and have been completed in Datamine RM v 1.4 software. As all estimates use data transformed into two-dimensional space, the direction 3 search has been manipulated to equal the direction 1 search. Lode-specific estimation parameters are outlined below. **Falc1** – No top-cut applied as no anomalous samples present and coefficient of variance within acceptable range. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the south. For categorical estimate, search ranges of 200 m in directions 1 and 3 and 150 m in direction 2 were used. Three passes were used for estimation with distances based on variography. The first pass had a minimum of 5 samples and a maximum of 8 samples. The second pass doubled the ranges, kept the same minimum number of samples and increased the maximum number of samples to 10. The third pass increased the search range to 5 times the original ranges, kept the same minimum number of samples and increased the max number of samples to 12 samples. A restriction of 7 samples was used based on the BHID, which ensured that at least two holes were used for the estimate. LG and HG data set estimates use the same search ranges as the categorical estimate above. The first pass had a minimum of 4 samples and a maximum of 10 samples. The second pass doubled the ranges, increased the minimum number of samples to 6 and kept the same maximum number of samples. For the LG estimate, the third pass increased the minimum number of samples to 8 and kept the same maximum number of samples. No third pass was required for the HG estimate as all blocks were filled in the second pass. For both the HG and LG estimate, a restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for the estimate. A generic variogram has been used to estimate the HG and LG models. **Falc2** – Data was top cut to 20 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the south. For categorical estimate, search ranges of 150 m in directions 1 and 3 and 120 m in direction 2 were used. Three passes were used for estimation

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Criteria	JORC Code explanation	Commentary
		with distances based on variography. The first pass had a minimum of 5 samples and a maximum of 8 samples. The second pass doubled the ranges, kept the same minimum number of samples and increased the maximum number of samples to 10. The third pass increased the search range to 5 times the original ranges, kept the same minimum number of samples and increased the max number of samples to 12 samples. A restriction of 7 samples was used based on the BHID, which ensured that at least two holes were used for the estimate. LG and HG data set estimates use the same search ranges as the categorical estimate above. The first pass had a minimum of 4 samples and a maximum of 10 samples. The second pass doubled the ranges, increased the minimum number of samples to 6 and kept the same maximum number of samples. For the LG estimate, the third pass increased the minimum number of samples to 8 and kept the same maximum number of samples. No third pass was required for the HG estimate as all blocks were filled in the second pass. For both the HG and LG estimate, a restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for the estimate. A generic variogram has been used to estimate the HG and LG models. **Falc3** – Data was top cut to 15 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging shallowly to the south. For categorical estimate, search ranges of 200 m in directions 1 and 3 and 150 m in direction 2 were used. Three passes were used for estimation with distances based on variography. The first pass had a minimum of 5 samples and a maximum of 8 samples. The second pass doubled the ranges, kept the same minimum number of samples and increased the maximum number of samples to 10. The third pass increased the search range to 5 times the original ranges, kept the same minimum number of samples and increased the max number of samples to 12 samples. A restriction of 7 samples was used based on the BHID, which ensured that at least two holes were used for the estimate. LG and HG data set estimates use the same search ranges as the categorical estimate above. The first pass had a minimum of 4 samples and a maximum of 10 samples. The second pass doubled the ranges, increased the minimum number of samples to 6 and kept the same maximum number of samples. For the LG estimate, the third pass increased the minimum number of samples to 8 and kept the same maximum number of samples. No third pass was required for the HG estimate as all blocks were filled in the second pass. For both the HG and LG estimate, a restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for the estimate. A generic variogram has been used to estimate the HG and LG models. **Falc4** – Data was top cut to 15 g/t using the influence limitation approach. In addition to this, a hard top cut of 40 g/t has been applied to limit impact of genuine outliers on the influence limitation model. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the south. For categorical estimate, search ranges of 200 m in directions 1 and 3 and 150 m in direction 2 were used. Only one pass was used for estimation as all blocks were able to be estimated within the variogram range. A minimum of 4 samples and a maximum of 10 samples were used. A restriction of 7 samples has been applied based on the BHID, which ensured that at least two holes were used for the estimate. LG and HG data set estimates use the same search ranges as the categorical estimate above. The first pass had a minimum of 4 samples and a maximum of 10 samples. The second pass doubled the ranges, increased the minimum number of samples to 6 and kept the same maximum number of samples. For the LG estimate, the third pass increased the minimum number of samples to 8 and kept the same maximum number of samples. No third pass was required for the HG estimate as all blocks were filled in the second pass. For both the HG and LG estimate, a restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for the estimate. A generic variogram has been used to estimate the HG and LG models. **Falc5** – No top-cut applied as no anomalous samples present and coefficient of variance within acceptable range. No variography was completed for the Falc5 lode as not enough sets of data points were available for realistic variogram calculation. An ID^2 model was used to inform all Falc5 block estimates. Grade continuity trend has been inferred from nearby lodes as being moderately south plunging. For categorical estimate, search ranges of 300 m in directions 1 and 3 and 100 m in direction 2 were used with anisotropy chosen to suit lode orientation and style. Two passes were used for estimation with distances based on adjacent lodes. The first pass had a minimum of 5 samples and a maximum of 8 samples. The second pass doubled the ranges and kept the same minimum and maximum number of samples. No sample restriction was applied for the categorial estimate as the Falc5 lode is narrow and, in all cases, multiple holes inform blocks. LG and HG data set estimates use the same search ranges as the categorical estimate above. The first pass had a minimum of 4 samples and a maximum of 10 samples. The second pass doubled the range for the HG estimate and increased by a factor of 5 for the LG estimate. Minimum and maximum number of samples stayed the same. For the HG estimate, the third pass second pass multiplied the range by a factor of 10, while the minimum number of samples increased the to 8. The maximum number of samples was unchanged at 10. No third pass was required for the LG estimate as all blocks were filled in the second pass. For both the HG and LG estimate, no sample restriction was applied as the Falc5 lode is narrow and multiple holes are informing all block estimates. **Falc6** – Data was top cut to 15 g/t using the influence limitation approach. No variography was completed for the Falc6 lode as not enough sets of data points were available for realistic variogram calculation. An ID^2 model was used to inform all Falc6 block estimates. Grade continuity trend has been inferred from nearby lodes as being moderately south plunging. For categorical estimate, search ranges of 150 m in directions 1 and 3 and 100 m in direction 2 were used with anisotropy chosen to suit lode orientation and style. One pass was used for estimation with distances based on adjacent lodes. The first pass had a minimum of 5 samples and a maximum of 8 samples. No second or third pass was required for the categorical estimate as all blocks were filled in the first pass. No sample restriction was applied for the categorial estimate as the Falc5 lode is narrow and, in all cases, multiple holes inform blocks. LG and HG data set estimates use the same search ranges as the categorical estimate above. The first pass had a minimum of 4 samples and a maximum of 10 samples. The second pass doubled the range, while the minimum and maximum number of samples stayed the same. No third pass was required for either the HG or LG estimate as all blocks were filled in the second pass. For both the HG and LG estimate, no sample restriction was applied as the Falc5 lode is narrow and multiple holes are informing all block estimates. **Falc7** – Data was top cut to 5 g/t using the influence limitation approach. No variography was completed for the Falc7 lode as not enough sets of data points were available for realistic variogram calculation. An ID^2 model was used to inform all Falc7 block estimates. Grade continuity trend has been inferred from nearby lodes as being moderately south plunging. For categorical estimate, search ranges of 150 m in directions 1 and 3 and 100 m in direction 2 were used with anisotropy chosen to suit lode orientation and style. One pass was used for estimation with distances based on adjacent lodes. The first pass had a minimum of 5 samples and a maximum of 8 samples. No second or third pass was required for the categorical estimate as all blocks were filled in the first pass. No sample restriction was applied for the categorial estimate as the Falc5 lode is narrow

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Criteria	JORC Code explanation	Commentary
		and, in all cases, multiple holes inform blocks. LG and HG data set estimates use the same search ranges as the categorical estimate above. The first pass had a minimum of 4 samples and a maximum of 10 samples. The second pass doubled the range, while the minimum and maximum number of samples stayed the same. No third pass was required for either the HG or LG estimate as all blocks were filled in the second pass. For both the HG and LG estimate, no sample restriction was applied as the Falc5 lode is narrow and multiple holes are informing all block estimates. **Falc8** – Data was top cut to 50 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the south. For categorical estimate, search ranges of 300 m in directions 1 and 3 and 200 m in direction 2 were used. One pass was used for estimation with distances based on adjacent lodes. The first pass had a minimum of 5 samples and a maximum of 8 samples. No second or third pass was required for the categorical estimate as all blocks were filled in the first pass. A restriction of 7 samples was used based on the BHID, which ensured that at least two holes were used for the estimate. LG and HG data set estimates use the same search ranges as the categorical estimate above. The first pass had a minimum of 4 samples and a maximum of 10 samples. The second pass doubled the range, while the minimum and maximum number of samples stayed the same. No third pass was required for either the HG or LG estimate as all blocks were filled in the second pass. For both the HG and LG estimate, a restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for the estimate. A generic variogram has been used to estimate the HG and LG models.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Check estimates have been completed for all lodes. These include conventional Ordinary Kriging (OK) in three-dimensional space with search from variography (with and without dynamic anisotropy applied), conventional Ordinary Kriging (OK) with data and model transformed into two-dimensional space, OK with a generic variogram and isotropic search, Inverse Distance (ID) and Nearest Neighbour (NN) estimates.
	The assumptions made regarding recovery of by-products.	No assumptions have been made regarding recovery of any by-products.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements have been considered or estimated for this deposit.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Data spacing for the Falcon deposit varies from 40 x 40 m to 120 x 120 m. For all lodes, a block size of 10 x 10 x 10 m has been chosen. Search ellipse dimensions were derived from the variogram model ranges, or isotropic ranges based on data density where insufficient data was present for variography analysis.
	Any assumptions behind modelling of selective mining units.	No selective mining units are assumed in this estimate.
	Any assumptions about correlation between variables.	No other elements other than gold have been estimated.
	Description of how the geological interpretation was used to control the resource estimates.	Hangingwall and footwall wireframe surfaces were created using sectional interpretation for each of the Falcon mineralised envelopes. These wireframes are then combined and closed to make a solid which is in turn used to control the volume and samples used to estimate each lode. For mine planning purposes a waste model is created by projecting the hangingwall and footwall surfaces 15 m either side. A default grade of 0.1 g/t is assigned and the same resource classification as the adjacent ore lode is applied to ensure consistency in MSO Resource Classification reporting.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the mean by more than 5% and reducing the coefficient of variation to around 1.2; these vary by domain (ranging from 5 to 50 g/t for individual domains). The top cut values are applied in several steps, using a technique called influence limitation top cutting. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, where gold requires a top cut, the following variables will be created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) • AU_BC (spatial variable; values present where AU data is top cut) The top-cut and non-top cut values are estimated using search ranges based on the variogram, and the *_BC values estimated using very small ranges (e.g. 5 m x 5 m x 5 m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). The application of the top-cuts has not resulted in a significant decrease in the mean grade from the un-cut to top-cut data. Hard top cuts were applied to the Falc4 lode while the remainder of the lodes used influence limitation top cuts.

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	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Statistical measures of estimation performance, such as the Slope of Regression, are used to assess the quality of the estimation for each domain. Differences in the global grade of the declustered composite data set and the average model grade were within 10%, or justification for a difference outside 10% was explicable. Swath plots comparing composites to block model grades are prepared and reviewed. Plots are also prepared summarising the critical model parameters. Visually, block grades are assessed against drill hole and face data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 2.34 g/t cut off within 2.5 m minimum mining width (excluding dilution) MSO's using a $A1,750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No mining assumptions have been made during the resource wireframing or estimation process.
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.	No metallurgical assumptions have been made during the resource wireframing or estimation process.
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 green fields 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.	A "Licence to Operate" is held by the operation which is issued under the requirement of the "Environmental Protection Act 1986", administered by the Department of Environment (DoE). The licence stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are also regulated by DoE and are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licences and lease conditions. An Environmental Management System is in place to ensure that Northern Star employees and contractors exceed environmental compliance requirements. The Kalgoorlie operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits. Kalgoorlie Operations have been compliant with the International Cyanide Management Code since 2008. Compliance with air quality permits is particularly important at Kanowna because of the roaster operation and because there are three facilities in the Kalgoorlie region emitting SO^2 gas. Kanowna has a management program in place to minimize the impact of SO^2 on regional air quality and ensure compliance with regulatory limits.
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.	A thorough investigation into average density values for the various lithological units at Falcon was completed and the mean densities by lithology were coded into the database. Where there were no measurements for a specific lithology and default of 2.8 was applied. Density was then estimated by Ordinary Kriging or Inverse Distance Squared, using the associated gold estimation parameters for that domain. Post estimation, default density values for the oxide and transition zones were applied, based on regional averages.
	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.	No/minimal voids are encountered in the ore zones for Falcon.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Assumptions on the average bulk density of individual lithologies from the regional data set. 21,549 bulk density samples have been used. Results are in line with regional expectations. Default densities have been applied to oxide (1.9t/m^3) and transitional (2.3t/m^3) material, due to lack of data in this area. These values are in line with regional averages.

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Criteria	JORC Code explanation	Commentary
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: • Geologic grade continuity • Density of available drilling • Statistical evaluation of the quality of the kriging estimate • Confidence in historical data, based on the new Data Class system
	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, quality, quantity and distribution of the data).	All relevant factors have been given due weighting during the classification process.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resource model methodology is appropriate, and the estimated grades reflect the Competent Persons view of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The Resource model has been subjected to internal peer reviews.
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.	These mineral resource estimates are considered as robust and representative of the Pode style of mineralisation. The relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC Code.
	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.	This resource report relates to the Falcon deposit. The model will show local variability even though the global estimate reflects the total average tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No reconciliation factors are applied to the resource post-modelling.

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JORC Code, 2012 Edition – Table 1 Report

Golden Hind: Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="3">Sampling techniques</td><td>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.</td><td>Sampling was completed using a combination of Reverse Circulation (RC), Rotary Air Blast (RAB) and Diamond (DD) drilling. RAB drilling was excluded in resource estimation work.
<table>
<tr><th></th><th colspan="3">Golden Hind</th></tr>
<tr><th></th><th># of Holes</th><th>Total m's</th><th># of Samples</th></tr>
<tr><td>DD</td><td>41</td><td>16,437</td><td>14,654</td></tr>
<tr><td>RAB</td><td>1</td><td>14</td><td>8</td></tr>
<tr><td>RC</td><td>84</td><td>8,291</td><td>7,529</td></tr>
<tr><td>RC_DD</td><td>11</td><td>3,662</td><td>2,784</td></tr>
<tr><td>Total</td><td>137</td><td>28,404</td><td>24,975</td></tr>
</table>
</td></tr>
<tr><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>RC samples were split using a rig-mounted cone splitter on 1m intervals to obtain a sample for assay.
Diamond core was placed in core trays for logging and sampling. Half core samples were nominated by the geologist from diamond core with a minimum sample width of either 20 cm (HQ) or 30 cm (NQ2).</td></tr>
<tr><td>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 30g 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.</td><td>RC sampling was split using a rig mounted cone splitter to deliver a sample of approximately 3 kg
DD drill core was cut in half using an automated core saw, where the mass of material collected will vary on the hole diameter and sampling interval
All samples were delivered to a commercial laboratory where they were dried, crushed to 90% passing 3 mm if required, at this point large samples may be split using a rotary splitter, pulverisation to 90% passing 75 µm, a 40 g charge was selected for fire assay.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both Reverse Circulation and Diamond Drilling techniques were used to drill the Falcon deposit.
Surface diamond drill holes were predominantly completed using HQ2 (63.5 mm) coring.
Historically, core was orientated using the Reflex ACT Core orientation system.
RC Drilling was completed using a 5.75" drill bit, downsized to 5.25" at depth.
In limited cases, RC pre-collars were drilled, followed by diamond tails. Pre-collar depth was determined in the drill design phase.</td></tr>
<tr><td rowspan="3">Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>Any core loss in diamond drilling is recorded on the core block by the driller. This is then captured by the logging geologist and entered as an interval into the hole log.
Moisture content and sample recovery is recorded for each RC sample</td></tr>
<tr><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>For diamond drilling, the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.</td></tr>
<tr><td>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.</td><td>Recovery of the ore lode is challenging at Golden Hind, with the brittle quartz vein RMV lode adjacent to the much softer RMS lode. Triple tubing has been employed by the drilling contractor in order to alleviate concerns around recovery although, due in part to the nature of the material being drilled and to the drill orientation oblique to the target structure, core loss is still a challenge. In order to mitigate the impacts on the estimate, samples which have logged core loss through the ore zone are excluded.</td></tr>
<tr><td>Logging</td><td>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.</td><td>All diamond core is logged for regolith, lithology, veining, alteration, mineralisation and structure. Structural measurements of specific features are also taken through oriented zones.
RC sample chips are logged in 1 m intervals for the entire length of each hole. Regolith, lithology, alteration, veining and mineralisation are all recorded.
All logging codes for regolith, lithology, veining, alteration, mineralisation and structure is entered into the AcQuire database using suitable pre-set dropdown codes to remove the likelihood of human error.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet.
	The total length and percentage of the relevant intersections logged.	In all instances, the entire drill hole is logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core is cut using an automated core saw. In most cases, half the core is taken for sampling with the remaining half being stored for later reference. Full core sampling is taken where data density of half core stored is sufficient for auditing purposes.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	As a majority of the data in the Golden Hind data set is historic, it is unknown what sampling methodology was used for these historic RC and RAB samples. For more recent RC drilling (2015 onwards), RC samples were split using a rig-mounted cone splitter to collect a sample 3 - 4 kg in size from each 1 m interval. These samples were utilised for any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside known mineralised zones spear samples were taken over a 4 m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	As a majority of the data in the Golden Hind data set is historic, it is unknown what sample preparation methodology was used. For more recent data (2015 onwards), preparation of samples was conducted at Bureau Veritas' Kalgoorlie facilities. Sample preparation commences with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3 kg (typically 1.5 kg) at a nominal <3 mm particle size. The entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% passing 75 µm, using a Labtechnics LM5 bowl pulveriser. 300 g pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets. The sample preparation is considered appropriate for the deposit.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	As a majority of the data in the Golden Hind data set is historic, it is unknown what quality control procedures were used. For more recent data (2015 onwards), procedures are utilised to guide the selection of sample material in the field. Standard procedures are used for all processes within the laboratory. Grind checks are performed at both the crushing stage (3 mm) and pulverising stage (75 µm), requiring 90% of material to pass through the relevant size.
	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.	As a majority of the data in the Golden Hind data set is historic, it is unknown if any umpire assay campaigns have been completed. None were completed in this reporting period.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material being sampled.
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.	As a majority of the data in the Golden Hind data set is historic, it is unknown what assaying methodology has been used. For more recent data, a 40 g fire assay charge for is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine any element concentrations.
	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.	As a majority of the data in the Golden Hind data set is historic, it is unknown what QC procedures have been used. Procedure below refers to data included since 2015. Certified reference materials (CRMs) are inserted into the sample sequence randomly at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades at the pulverising stage. No field duplicates were submitted for diamond core. Pulp duplicates are requested after any ore zone. These are indicated on the sample sheet and the submission sheet. When visible gold is observed in core, a quartz flush is requested after the sample.

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Criteria	JORC Code explanation	Commentary
		Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs The QA studies indicate that accuracy and precision are within industry accepted limits.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off.
	The use of twinned holes.	No twinned holes were drilled for this data set. Re-drilling of some drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database as an 'A' suffix. Re-drilled holes are sampled whilst the original drill hole is logged but not sampled.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging and sampling are directly recorded into AcQuire. Assay files are received in csv format and loaded directly into the database using an Acquire importer object. Assays are then processed through a form in AcQuire for QAQC checks. Hardcopy and non-editable electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data.
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.	As a majority of the data in the Golden Hind data set is historic, it is unknown what QC procedures have been used. Procedure below refers to data included since 2015. Planned hole collars are pegged using a Differential GPS by the field assistants. The final collar is picked up after hole completion by Cardno Survey with a Real Time Kinematic Differential Global Positioning System (RTKDGPS) in the MGA 94_51 grid. During drilling single-shot surveys are conducted every 30 m to ensure the hole remains close to design. This is performed using the Reflex Ez-Trac system which measures the gravitational dip and magnetic azimuth results are uploaded directly from the Reflex software export into the Acquire database. At the completion of diamond drilling the DeviFlex RAPID continuous in-rod survey instrument taking readings every 2 seconds, In and Out runs and reported in 3 m intervals was also used along with DeviSight GPS compass for surface alignment application True North Azimuth, DIP, latitude and longitude coordinates for set up.
	Specification of the grid system used.	Collar coordinates are recorded in mine grid (Kundana 10) and transformed into MGA94_51.
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups of holes over the last 15 years.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing varies across the deposit, with majority of drilling between 120 x 120 m and 40 x 40 m spacing.
	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 spacing and distribution is considered sufficient to support the resource estimate.
	Whether sample compositing has been applied.	No sample compositing has been applied.
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.	Most of the structures in the Kundana area dip steeply (80°) to the west (local grid). Golden Hind dips at a shallower angle of 55° to the west. Diamond drilling was designed to target the ore bodies perpendicular to this orientation to allow for a favourable intersection angle. Instances where this was not achievable (mostly due to drill platform location), drilling was not completed or re-designed once a suitable platform became available. Drill holes with low intersection angles are excluded from resource estimation where more suitable data is available.
	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.	No sampling bias is considered to have been introduced by the drilling orientation. Where drill holes have been particularly oblique, they have been flagged as unsuitable for resource estimation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits have been undertaken of the data and sampling practices.

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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.	All holes mentioned in this report are located within the M16/309 Mining lease which is held by The East Kundana Joint Venture (EKJV). The EKJV is majority owned and managed by Northern Star Resources Limited (51%). The minority holding in the EKJV is held by Tribune Resources Ltd (36.75%) and Rand Mining Ltd (12.25%). The tenement on which the Golden Hind deposit is hosted is subject to three royalty agreements. The agreements are the Kundana- Hornet Central Royalty, the Lake Grace Royalty and the Kundana Pope John Agreement No. 2602-13.
	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.	No known impediments exist, and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	No other parties performed exploration work at Golden Hind during the reporting period. All previous exploration by other parties is summarised in open file annual reports which are available from the DMIRS.
Geology	Deposit type, geological setting and style of mineralisation.	The Kundana gold camp is situated within the Norseman-Wiluna Greenstone Belt, in an area dominated by the Zuleika shear zone, which separates the Coolgardie domain from the Ora Banda domain. Golden Hind ore lodes are located along the Strzelecki structure. The majority of mineralisation consists of narrow, laminated quartz veining on the contact between volcanogenic sedimentary rock unit and andesite/gabbro (RMV).
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: 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.	A summary of the data present in the Golden Hind deposit can be found above. The collar locations are presented in plots contained in the NSR 2019 resource report. Drill holes vary in survey dip from -42 to -90, with hole depths ranging from 14 m to 1,068 m, and having an average depth of 180 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All of the drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2 m of low-grade material (considered < 2.0 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 2.0 g/t are considered significant, however, where wide zones of low grade are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	
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.	Appropriate plans and section have been included at the end of this Table and in the body of the NSR 2019 resource report.

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Criteria	JORC Code explanation	Commentary
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	No other material exploration data has been collected for this area.
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).	There are no plans for drilling at Golden Hind in FY19-20, although this does not preclude future drilling to extend the Resource.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are either recorded on paper and manually entered into a database system or is captured digitally via a logging laptop and directly loaded into the database system. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly into the database from laboratory and survey-tool derived files.
	Data validation procedures used.	The database has further checks performed to back -up those performed in section 2. The complete exported data base including drill and face samples is brought into Datamine RM and checked visually for any apparent errors i.e. holes or faces sitting between levels or not on surface DTM's. Multiple checks are then made on numerical data including: Empty table checks to ensure all relevant fields are populated Unique collar location check, Distances between consecutive surveys is no more than 50m for drill-holes Differences in azimuth and dip between consecutive surveys of no more than 0.3 degrees The end of hole extrapolation from the last surveyed shot is no more than 30 m Underground face sample lines are not greater than +\- 5 degrees from horizontal Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported. This data will not be used in the estimation process. In addition to being validated, drill holes are assigned a Data Class, which provides a secondary level of confidence in the quality of the data. A review of all the historic data for Falcon was undertaken in 2019 and Data Class (DC) values from 0 - 3 assigned, criteria summarised below: • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR Recent data; minor issues with data such as QAQC fail but not proximal to the ore zone. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or too dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The geological interpretations underpinning these resource models have been prepared by geologists working in adjacent mines and in direct, daily contact with similar ore bodies. The estimation of grades was undertaken by personnel familiar with the orebody and the general style of mineralisation encountered. The Senior Resource Geologist, a competent person for reviewing and signing off on estimations of the Golden Hind lode maintained a presence throughout the process.

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Criteria	JORC Code explanation	Commentary
	If no site visits have been undertaken indicate why this is the case.	
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the Golden Hind deposit has been carried out using a systematic approach to ensure continuity of the geology and estimated mineral resource. The confidence in the geological interpretation in the South is high and is supported with information acquired from drilling. Towards the Northern end of the mineralisation the structure between Sir Walter and Golden Hind is not as well understood. The interpretation of the Golden Hind mineralisation wireframe was conducted using the sectional interpretation method in Vulcan software. Sectional interpretation was completed in vertical east-west sections at approximately 40 m spacing where the drill density was good, and at approximately 80m spacing in the North where the drill density data was sparser. Wireframes were checked for unrealistic volumes and updated where appropriate.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including drill holes and regional structural models.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Due to the consistency of the structure conveyed by this dataset, and knowledge from the adjacent Raleigh deposit, no alternative interpretations have been considered.
	The use of geology in guiding and controlling Mineral Resource estimation.	Golden Hind is an extension of the Raleigh Main Vein (RMV) hosted in the Strzelecki Structure, and is located to the south of Raleigh South/Sir Walter. The continuity of the RMV from Sir Walter to Golden Hind is not well understood currently, and the northern extent of the Golden Hind wireframe will be updated following completion of the 2018 Sir Walter drilling. The interpretation of the Raleigh Main Vein (RMV) is based on the presence of quartz veining and continuity between sections on the main Raleigh structure. The RMV was constrained to high-grade intercepts hosted within the Raleigh Main Vein, with all holes with available photography reviewed for lithology logging. The RMS was identified as a lower-grade halo surrounding the RMV, usually hosted in brecciated Volcaniclastics or Andesite. The RMS was not always present within the drilling, and so was modelled as coincident with the RMV when halo grades were absent, to eliminate overestimation of the volume.
	The factors affecting continuity both of grade and geology.	Grade continuity is affected when the percentage of quartz decreases within the main Raleigh structure and only a sheared structure remains. This results in lower grade in areas where only shear is present and higher grade where quartz is evident.
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 strike length of the Golden Hind structure is approximately 1500 m and is restricted by lack of validated drilling to the north and diamond drilling at depth. The Golden Hind mineralisation occurs in a major regional shear system, the Strzelecki structure, extending over 10s of kilometres. The Golden Hind RMV varies in width but is typically in the range of 0.1 to 1 m. Mineralisation is known to occur from the base of cover to around 900 m below surface in the region.
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.	All Golden Hind RMV and RMS mineralisation used full length composites with direct grade estimation of gold. The primary method of estimation was by Ordinary Kriging (unless otherwise stated), utilising a three pass search strategy using Datamine Studio RM v 1.4 software. Details of the estimation parameters for each mineralisation zone are summarised below. RMV - divided into two subdomains RMV Central and RMV North, with RMV Central further subdomained based on data density; high data density (drilling less than 40 m by 40 m) and lower density (drill spacing greater than 40 m by 40 m). RMV Central and RMV north were analysed and estimated separately. For RMV central a hard top cut of 100 g/t Au was applied and also the top cut influence limitation approach at 60 g/t Au. No top cut was applied to RMV north. Once top cut, variography was completed on the RMV Central domain composites, indicating grade continuity in the south plunge direction. No variography was completed for the RMV North domain due to the low number of samples (22 total). The RMV central domain data had a search range of 300 m in direction 1 and 260 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of 12 samples and a maximum of 17 samples for the high and low-density subdomains. The second pass doubled the ranges, the minimum number of samples was 8 and the max number of samples 15. The third pass increased the search range to 4 times the original ranges, reducing the minimum number of samples to 4 and the max number of samples at 15. Estimation was completed using a soft boundary between the high and low-density subdomains. No restrictions by drill hole or drill hole type have been applied. The RMV north domain was estimated using Inverse distance squared method, the search range was 120 m by 90 m. Three passes were used, the first pass had a minimum of 5 and a minimum of 10 samples, the second pass doubled the range and decreased the minimum to 2 samples with a maximum of 7, the third pass multiplied the original ellipse by 6 times, using a minimum of 2 and maximum of 7. No restrictions by drill hole or drill hole type have been applied. RMS - the RMS domain was analysed, and no top cut applied. Variography was completed on the full-length composite file and indicated grade continuity in the north plunge direction, although fairly isotropic. The RMS domain data had a search range of 200 m in direction 1 and 190 m in direction 2. Three passes were used for estimation with distances based on variography. The first pass had a minimum of 7 samples and a maximum of 12 samples. The second pass doubled the ranges and reduced the minimum number of samples to 5 keeping the max number of samples at 15. The third pass increased the search range to 4 times the original ranges, reducing the minimum number of samples to 2 and keeping the maximum number of samples at 15. No restrictions by drill hole or drill hole type have been applied.

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Criteria	JORC Code explanation	Commentary
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	All mineralisation zones had check estimates using Inverse Distance power of 2 (ID2) and Nearest Neighbour (NN) completed as a comparison. Full length versus fixed length composites were also compared.
	The assumptions made regarding recovery of by-products.	No assumptions have been made regarding recovery of any by-products.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements have been considered and therefore estimated for this deposit.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The data spacing varies considerably within the deposit ranging from closed spaced drilling 40 m (along strike) and 40 m (down dip) through to more widely spaced intercepts at over 80 m (along strike) and 80 m (down dip). As such, the block sizes varied depending on sample density. In areas of where the close spaced data existed, a 10 m x 10 m x 10 m block size was chosen. For lower density drilling with wider spacing a block size of 20 m x 20 m x 20 m was selected. All the varying block sizes are added together after being estimated individually. Search ellipse dimensions were derived from the variogram model ranges.
	Any assumptions behind modelling of selective mining units.	No selective mining units are assumed in this estimate.
	Any assumptions about correlation between variables.	No other elements other than gold have been estimated.
	Description of how the geological interpretation was used to control the resource estimates.	Closed volume wireframes have been created using sectional interpretation. These were used to define the RMV and RMS mineralised zones based on the shearing, veins and gold grade. RMV (Golden Hind) steeply dipping structure with quartz veining evident from drilling. RMS lower grade halo (Golden Hind)- Steeply dipping sheared structure usually hosted in brecciated volcaniclastics. For mine planning purposes a waste model is created by making a waste solid wireframe approximately 30 m either side of the mineralisation. A default grade of 0.1 g/t is assigned and the same resource classification as the adjacent ore lode is applied to ensure consistency in MSO Resource Classification reporting.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the mean by more than 5% and reducing the coefficient of variation to around 1.2; these vary by domain. The top cut values are applied in several steps, using a technique called influence limitation top cutting. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, where gold requires a top cut, the following variables will be created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) • AU_BC (spatial variable; values present where AU data is top cut) The top-cut and non-top cut values are estimated using search ranges based on the variogram, and the *_BC values estimated using very small ranges (e.g. 5 m x 5 m x 5 m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU).
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Statistical measures of estimation performance, such as the Slope of Regression have been used to assess the quality of the estimation for each domain. Differences in the global grade of the declustered composite data set and the average model grade were within 10%, or justification for a difference outside 10% was explicable. Swath plots comparing composites to block model grades are prepared and reviewed. Plots are also prepared summarising the critical model parameters. Visually, block grades are assessed against drill hole data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	The tonnes have been estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 2.0 g/t cut off within 2.5 m minimum mining width (excluding dilution) MSO's using a $AU1750/oz gold price.

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Criteria	JORC Code explanation	Commentary
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No mining assumptions have been made during the resource wireframing or estimation process.
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.	No metallurgical assumptions have been made during the resource wireframing or estimation process.
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 green fields 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.	A "Licence to Operate" is held by the operation which is issued under the requirement of the "Environmental Protection Act 1986", administered by the Department of Environment (DoE). The licence stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are also regulated by DoE and are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licences and lease conditions. An Environmental Management System is in place to ensure that Northern Star employees and contractors exceed environmental compliance requirements. The Kalgoorlie operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits. Kalgoorlie Operations have been compliant with the International Cyanide Management Code since 2008. Compliance with air quality permits is particularly important at Kanowna because of the roaster operation and because there are three facilities in the Kalgoorlie region emitting SO2 gas. Kanowna has a management program in place to minimize the impact of SO2 on regional air quality and ensure compliance with regulatory limits.
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.	A thorough investigation into average density values for the various lithological units at Golden Hind was completed and the mean densities by lithology were coded into the database. Where there were no measurements for a specific lithology and default of 2.7 t/m³ was applied. Density was then estimated by Ordinary Kriging or Inverse Distance Squared, using the associated gold estimation parameters for that domain. Post estimation, default density values for the oxide and transition zones were applied, based on regional averages.
	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.	No/minimal voids are encountered in the ore zones and underground environment.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Assumptions on the average bulk density of individual lithologies, based on 502 bulk density measurements at Golden Hind. Assumptions were also made based on regional averages, on the default density applied to oxide (1.8 t/m³) and transitional (2.3 t/m³) material, due to lack of data in this area.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: • Geologic grade continuity • Density of available drilling • Statistical evaluation of the quality of the kriging estimate • Confidence in historical data, based on the new Data Class system
	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, quality, quantity and distribution of the data).	All relevant factors have been given due weighting during the classification process.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resource model methodology is appropriate, and the estimated grades reflect the Competent Persons view of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The Resource model has been subjected to internal peer reviews.

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Criteria	JORC Code explanation	Commentary
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 mineral resource estimate is considered robust and representative of the Golden Hind style of the RMV mineralisation. The application of geostatistical methods has helped to increase the confidence of the model and quantify the relative accuracy of the resource.
	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.	This resource report relates to the Golden Hind deposit. The model will show local variability even though the global estimate reflects the total average tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No reconciliation factors are applied to the resource post-modelling.

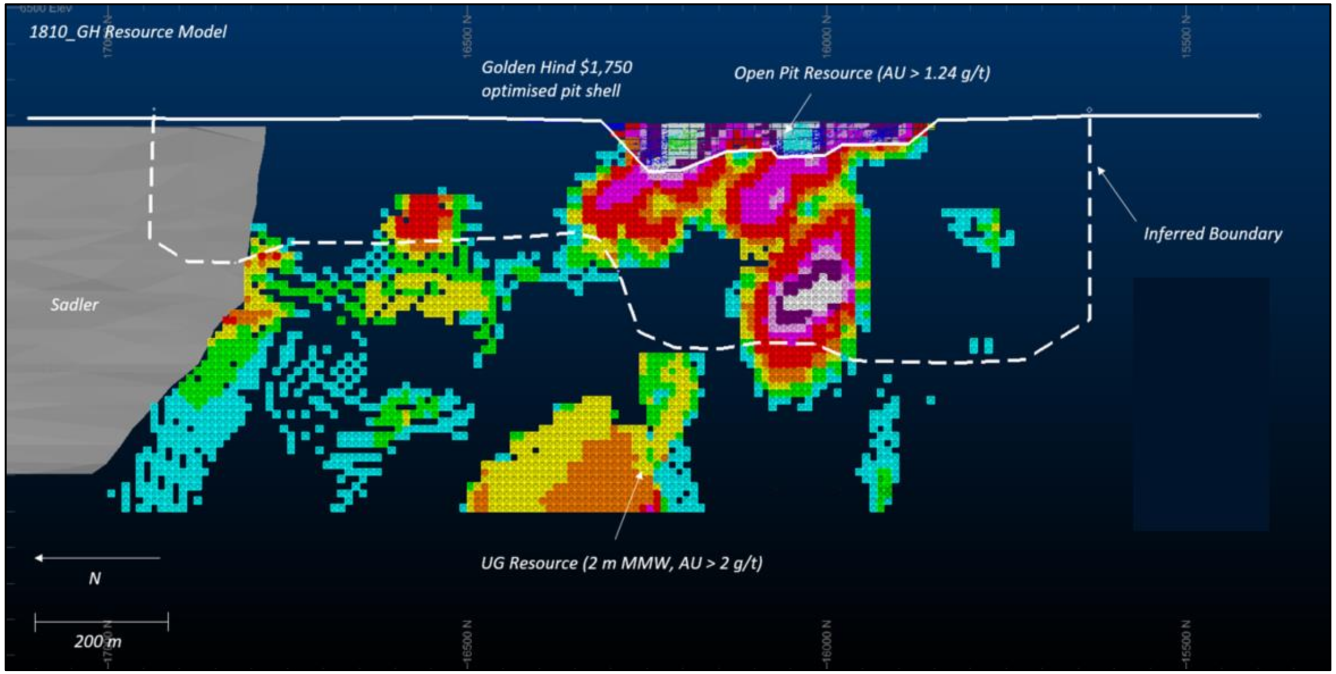

Figure 3. Long section view of the Golden Hind deposit

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JORC Code, 2012 Edition – Table 1 Report

Kundana Area Deposits (Drake, Pegasus, Rubicon and Hornet): Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="3">Sampling techniques</td><td>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.</td><td>A combination of sample types was used to collect material for analysis; underground and surface diamond drilling (DD), surface reverse circulation drilling (RC) and face channel (FC) sampling. Rotary air blast (RAB) holes were excluded from the estimate. Where sufficient DD holes were present, RC holes were also excluded.
<table>
<tr><th></th><th colspan="3">Drake</th><th colspan="3">Pegasus</th><th colspan="3">Rubicon</th><th colspan="3">Hornet</th></tr>
<tr><th>Type</th><th># of Holes</th><th>Total m's</th><th># of Samples</th><th># of Holes</th><th>Total m's</th><th># of Samples</th><th># of Holes</th><th>Total m's</th><th># of Samples</th><th># of Holes</th><th>Total m's</th><th># of Samples</th></tr>
<tr><td>DD</td><td>17</td><td>8,538</td><td>4,264</td><td>369</td><td>119,133</td><td>77,672</td><td>414</td><td>90,856</td><td>65,782</td><td>647</td><td>147,725</td><td>100,542</td></tr>
<tr><td>FS</td><td></td><td></td><td></td><td>2,802</td><td>13,135</td><td>22,977</td><td>1,439</td><td>6,649</td><td>11,766</td><td>3,049</td><td>14,121</td><td>23,604</td></tr>
<tr><td>RC</td><td>41</td><td>5,219</td><td>3,829</td><td>84</td><td>8,429</td><td>5,136</td><td>5</td><td>392</td><td>186</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>RC_DD</td><td>1</td><td>365</td><td>368</td><td>44</td><td>15,914</td><td>10,203</td><td>13</td><td>3,665</td><td>2,749</td><td>1</td><td>243</td><td>141</td></tr>
<tr><td>Total</td><td>59</td><td>14,122</td><td>8,461</td><td>3,299</td><td>156,611</td><td>115,988</td><td>1,871</td><td>101,562</td><td>80,483</td><td>3,697</td><td>162,089</td><td>124,287</td></tr>
</table></td></tr>
<tr><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>DD drilling is sampled within geological boundaries with a minimum (0.3 m) and maximum (1.0 m) sample length. Face channel sampling is constrained within geological and mineralised boundaries with a minimum (0.2 m) and maximum (1.0 m) channel sample length. In some cases, smaller samples (0.1 m – 0.2 m) have been taken to account for smaller structures in the face.</td></tr>
<tr><td>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 30g 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.</td><td>DD drill core was nominated for either half core or full core sampling. Core designated for half core was cut using an automated core saw. The mass of material collected was dependent on the drill hole diameter and sampling interval selected. Core designated for full core was broken with a rock hammer if sample segments were too large to fit into sample bags.
A sample size of at least 3 kg of material was targeted for each face sample interval.
All samples were delivered to a commercial laboratory where they were dried and crushed to 90% of material ≤3 mm. At this point large samples were split using a rotary splitter, then pulverised to 90% ≤75 µm.
For FY19 a 40 g charge was selected for fire assay of diamond drill hole samples, and a 20 g charge for face samples.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both Reverse Circulation and Diamond Drilling techniques were used to drill the Kundana deposits.
Surface diamond drill holes were completed using HQ2 (63.5 mm) coring, whilst underground diamond drill holes were completed using NQ2 (50.5mm) coring.
Historically, core was orientated using the Reflex ACT Core orientation system. Currently, core is orientated using the Boart Longyear Trucore Core Orientation system.
RC Drilling was completed using a 5.75” drill bit, downsized to 5.25” at depth.
In many cases RC pre-collars were drilled, followed by diamond tails. Pre-collar depth was determined in the drill design phase depending on the target being drilled and production constraints.</td></tr>
<tr><td rowspan="3">Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>For DD drilling, any core loss is recorded on the core block by the driller. This is then captured by the logging geologist and entered as an interval into the hole log.</td></tr>
<tr><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>Contractors adjust the rate and method off drilling if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.</td></tr>
<tr><td>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.</td><td>Recovery was excellent for diamond core and no relationship between grade and recovery was observed. Average recovery across the Kundana camp is at 99%.</td></tr>
<tr><td>Logging</td><td>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.</td><td>All diamond core is logged for lithology, veining, alteration, mineralisation and structural data. Structural measurements of specific features are also taken through oriented zones.
Logging is entered in AcQuire using a series of drop-down menus which contain the appropriate codes for description of the rock.
All underground faces are logged for lithology and mineralisation. Logging is captured on a face sample sheet underground which is then transferred to AcQuire. Faces are then input into AcQuire using a series of drop-down menus which contain appropriate codes for description of the rock.</td></tr>
</table>

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet. All underground faces are logged and sampled to provide both qualitative and quantitative data. Faces are washed down and photographed before sampling is completed.
	The total length and percentage of the relevant intersections logged.	For all drill holes, the entire length of the hole is logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core is cut using an automated core saw. Sampling and cutting methodology are dependent on the type of drilling completed. Half core is utilised for Resource targeting (RT) drilling and Resource Definition drilling (RSD). Some RSD holes have been whole core sampled due to production pressures. Grade Control drilling (GC) is whole core sampled.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC samples are split using a rig-mounted cone splitter to collect a sample 3-4 kg in size from each 1m interval. These samples were utilised for any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside known mineralised zones spear samples were taken over a 4 m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Preparation of NSR samples was conducted at Bureau Veritas' Kalgoorlie facilities; commencing with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3 kg (typically 1.5 kg) at a nominal <3 mm particle size. The entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% ≤75 µm, using a Labtechnics LM5 bowl pulveriser. 400 g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets. The sample preparation is considered appropriate for the deposit.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Standard procedures are used for all processes within the laboratory. Grind checks are performed at both the crushing stage (3 mm) and pulverising stage (75 µm), requiring 90% of material to pass through the relevant size.
	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.	Umpire sampling is performed monthly, where 3% of the samples are sent to the umpire laboratory for processing. Umpire samples of faces were analysed using a 40g charge weight.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material being sampled.
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.	A 40 g fire assay charge for diamond drill holes and a 20 g charge for face samples is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine any element concentrations
	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 materials (CRMs) are inserted into the sample sequence at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a nominal rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t if received are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades at the pulverising stage. No field duplicates were submitted for diamond core. Pulp duplicates are requested after any ore zone. These are indicated on the sample sheet and the submission sheet. When visible gold is observed in core, a quartz flush is requested after the sample. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs The QA studies indicate that accuracy and precision are within industry accepted limits.
	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a competent person to be signed off.

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
Verification of sampling and assaying	The use of twinned holes.	No twinned holes were drilled at RHP/Drake. Re-drilling of some drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database with an 'A' suffix. Re-drilled holes are sampled, whilst the original drill hole is logged, but not sampled.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging and sampling are directly recorded into AcQuire. Assay files are received in csv format and loaded directly into the database using an AcQuire importer object. Assays are then processed through a form in AcQuire for QAQC checks. Hardcopy and non-editable electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments have been made to this assay data.
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.	Planned holes are marked up by the mine survey department using a total station survey instrument in mine grid (Kundana 10). The actual hole position is then located by the mine survey department once drilling is completed. In some cases, drill hole collar points are measured off survey stations if a mark-up cannot be completed. Holes are lined up on the collar point using the DHS Azimuth Aligner. Planned azimuths and dips of the holes are downloaded to the aligner which is then placed on the rod string to align the hole for drilling. During drilling, single shot surveys are conducted every 30 m to track the deviation of the hole and to ensure it stays close to design. This is performed using the Devi Shot camera which measures the gravitational dip and magnetic azimuth. Results are uploaded from the Devishot software into a csv format which is then imported into the Acquire database. At the completion of the hole, a Multishot (using the DeviFlex non-magnetic strain gauge instrument) survey is completed, taking measurements every 3 m to ensure accuracy of the hole. This is converted to csv format and imported into the Acquire database.
	Specification of the grid system used.	Collar coordinates are recorded in mine grid (Kundana 10) and transformed into MGA94_51.
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups of holes over the last 15 years.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing varies across the deposit. Resource Targeting (RT) drilling at an 80 x 80 m nominal spacing is infilled during Resource Definition (RSD) down to an average of 30 x 30 m. Grade control drilling follows development and is generally comprised of stab drilling from the development drive at 10 to 15 m spacing.
	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 spacing and distribution is considered sufficient to support the resource and reserve estimates.
	Whether sample compositing has been applied.	No sample compositing has been applied.
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.	Most of the structures in the Kundana area dip steeply (80°) to the west (local grid). Diamond drilling was designed to target the ore bodies perpendicular to this orientation to allow for a favourable intersection angle. Instances where this was not achievable (primarily due to drill platform location), drilling was not completed, or re-designed once a more suitable platform became available. Drill holes with low intersection angles are excluded from resource estimation where more suitable data is available.
	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.	No sampling bias is considered to have been introduced by the drilling orientation. Where drill holes have been particularly oblique, they have been flagged as unsuitable for resource estimation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits have been undertaken of the data and sampling practices.

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.	All holes mentioned in this report are located within the M16/309 and M16/326 Mining leases and are held by The East Kundana Joint Venture (EKJV). The EKJV is majority owned and managed by Northern Star Resources Limited (51%). The minority holding in the EKJV is held by Tribune Resources Ltd (36.75%) and Rand Mining Ltd (12.25%). The tenement on which the Rubicon, Hornet, Pegasus and Drake deposits are hosted (M16/309) is subject to three royalty agreements. The agreements that are on M16/309 are the Kundana- Hornet Central Royalty, the Lake Grace Royalty and the Kundana Pope John Agreement No. 2602-13.

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Criteria	JORC Code explanation	Commentary
	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.	No known impediments exist, and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The first reference to the mineralisation style encountered at the Kundana project was the mines department report on the area produced by Dr. I. Martin (1987). He reviewed work completed in 1983 – 1984 by a company called Southern Resources, who identified two geochemical anomalies, creatively named Kundana #1 and Kundana #2. The Kundana #2 prospect was subdivided into a further two prospects, dubbed K2 and K2A. Between 1987 and 1997, limited work was completed. Between 1997 and 2006 Tern Resources (subsequently Rand Mining and Tribune Resources), and Gilt-edged mining focused on shallow open pit potential, which was not considered viable for Pegasus, however the Rubicon open pit was considered economic and production commenced in 2002. In 2011, Pegasus was highlighted by an operational review team and follow-up drilling was planned through 2012.
Geology	Deposit type, geological setting and style of mineralisation.	The Kundana camp is situated within the Norseman-Wiluna Greenstone Belt, in an area dominated by the Zuleika shear zone, which separates the Coolgardie domain from the Ora Banda domain. K2-style mineralisation (Pegasus, Rubicon, Hornet, Drake) consists of narrow vein deposits hosted by shear zones located along steeply dipping overturned lithological contacts. The K2 structure is present along the contact between a black shale unit (Centenary Shale) and intermediate volcaniclastics (Black Flag Group). Minor mineralisation, termed K2B, also occurs further west, on the contact between the Victorious basalt and Bent Tree Basalt (both part of the regional upper Basalt Sequence). As well as additional mineralisation including the K2E and K2A veins, Polaris/Rubicon Breccia (Silicified and mineralised Shale) and several other HW lodes adjacent to the main K2 structure. A 60° W dipping fault, offsets this contact and exists as a zone of vein-filled brecciated material hosting the Pode-style mineralisation in the Nugget lode at Rubicon.
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: easting and northing of the drill hole collar 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.	A summary of the data present in the RHP/Drake deposits can be found above. The collar locations are presented in plots contained in the NSR 2019 resource report. Drill holes vary in survey dip from +46 to -88 degrees, with hole depths ranging from 10 m to 1413 m, with an average depth of 244 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All validated drill hole data was used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	Excluded information is not considered material.
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2 m of barren material (considered < 2 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 2 g/t are considered significant, however, where low grades are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	Where a true width cannot be estimated, the intersection is noted as "downhole length"

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Criteria	JORC Code explanation	Commentary
Diagrams	Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	Appropriate plans and section have been included at the end of this table and in the NSR 2019 resource report.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	No other material exploration data has been collected for this area. Eleven geotechnical holes were drilled targeting several different areas through lower Rubicon and Pegasus. Holes have been designed for seismic monitoring. Holes were geologically logged to ensure no mineralisation was intersected. Where mineralisation was intersected, appropriate sampling was completed.
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).	Drilling will continue in various parts of the mine with the intention of extending areas of known mineralisation. Areas of focus across RHP/Drake will be those down dip of current high-grade trends on the K2 ahead of development. GC drilling will also be conducted as required on a level by level basis.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release and are detailed in the NSR 2019 Resource Report.
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.	No other material exploration data has been collected for this area. Eleven geotechnical holes were drilled targeting several different areas through lower Rubicon and Pegasus. Holes have been designed for seismic monitoring. Holes were geologically logged to ensure no mineralisation was intersected. Where mineralisation was intersected, appropriate sampling was completed.
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).	Drilling will continue in various parts of the mine with the intention of extending areas of known mineralisation. Areas of focus across RHP/Drake will be those down dip of current high-grade trends on the K2 ahead of development. GC drilling will also be conducted as required on a level by level basis.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release and are detailed in the NSR 2019 Resource Report.

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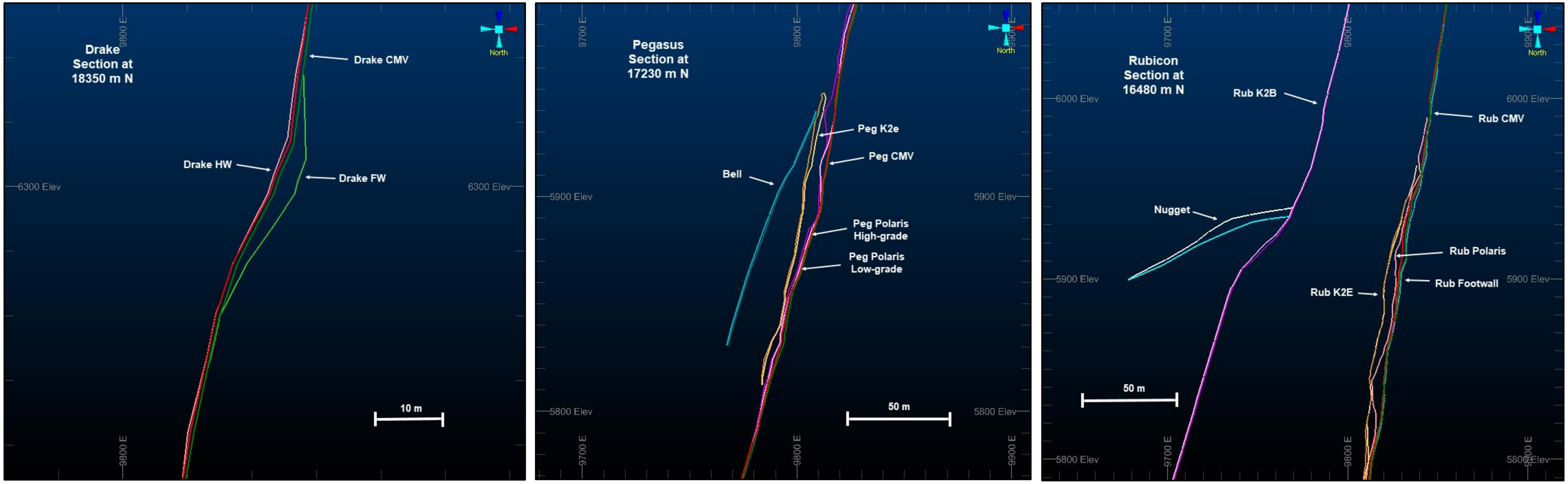

Figure 1. Cross section views of Drake, Pegasus and Rubicon ore lodes

APPENDIX B: TABLE 1

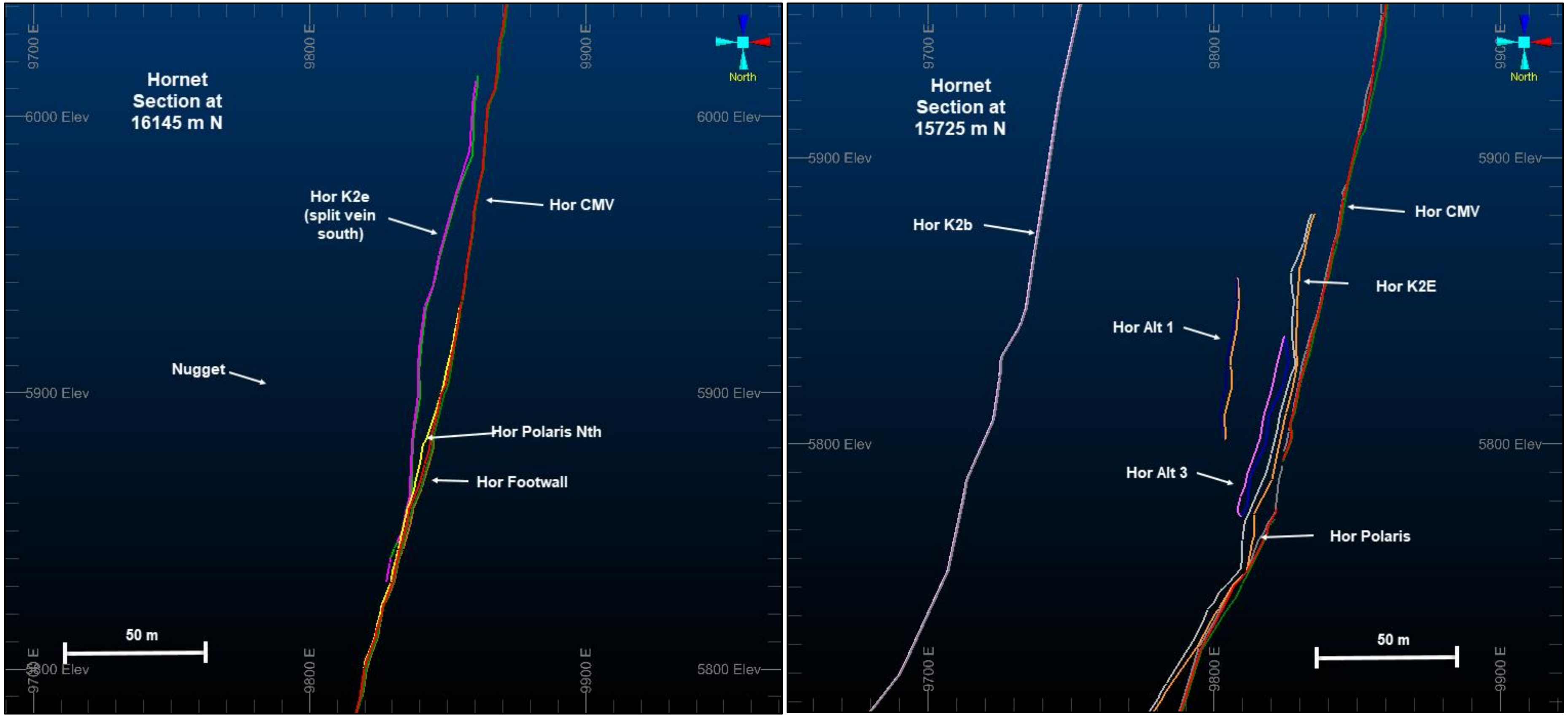

Figure 2. Cross section views of Hornet ore lodes

APPENDIX B: TABLE 1

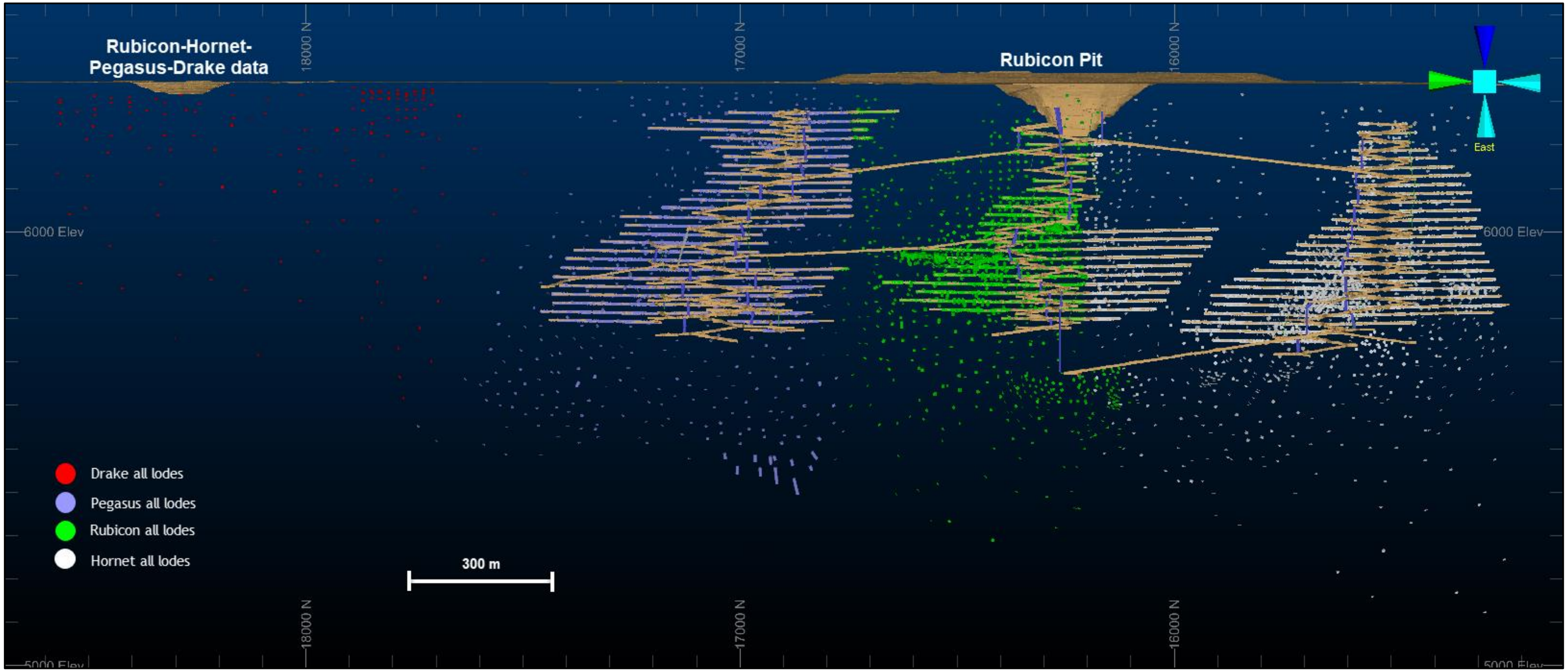

Figure 3. Long section views of Drake, Pegasus, Rubicon and Hornet ore lodes and data used in resource estimations

APPENDIX B: TABLE 1

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are either recorded on paper and manually entered into a database system or is captured digitally via a logging laptop and directly loaded into the database system. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly into the database from laboratory and survey-tool derived files.
	Data validation procedures used.	The database has further checks performed to back -up those performed in Section 2. The complete exported data base including drill and face samples is brought into Datamine and checked visually for any apparent errors - i.e. holes or faces sitting between levels or not on surface DTM's. Multiple checks are then made on numerical data. This includes: • Empty table checks to ensure all relevant fields are populated; • Unique collar location check; • Distances between consecutive surveys is no more than 60m for drill-holes; • Differences in azimuth and dip between consecutive surveys of no more than 0.3 degrees; • The end of hole extrapolation from the last surveyed shot is no more than 30 m; • Underground face sample lines are not greater than +\- 5 degrees from horizontal Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported. This data will not be used in the estimation process. Several drilling programs completed between 2014 and 2016 had erroneous metre depths recorded by the drillers. This resulted in multiple drill holes recording the intersection of the K2 several metres earlier than expected. Until underground development had progressed to these elevations, this was not possible to determine. Unfortunately, there is not a uniform translation that can be applied, therefore these drill holes have been omitted from the ore wireframe interpretations and flagged as invalid. However, where there were no QAQC issue with the assays, the correct intervals have been recorded, the translation in the easting direction required for them to be in the 'correct' location (based on development above and below) applied and these intervals were appended to the data set before compositing. The same sample translation method has been applied to surface drilling in between development levels which are deemed to cause an unrealistic kink in the wireframe interpretation. This is only done after a thorough investigation of the surrounding data to ensure that no secondary veining is present in the footwall or hanging wall and that no separate lodes are missed. In addition to being Resource Flagged as "Yes" or "No", drill holes are assigned a Data Class, which provides a secondary level of confidence in the data quality. Data Class (DC) values range from 0 to 3, with criteria summarised below: • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR Recent data; minor issues with data such as QAQC fail but away from the ore zone. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The geological interpretations underpinning these resource models were prepared by geologists working in the mine who were in direct, daily contact with the ore body. The estimation of grades was undertaken by personnel familiar with the ore body and the general style of mineralisation encountered. The Senior Resource Geologist, a competent person for reviewing and signing off on the RHP and Drake estimate, maintained a site presence throughout the process.
	If no site visits have been undertaken indicate why this is the case.	The Competent Person has maintained a presence onsite.

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Criteria	JORC Code explanation	Commentary
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the RHP and Drake deposits were carried out using a systematic approach to ensure continuity of the geology and estimated mineral resource. The confidence in the geological interpretation is high and is supported with information acquired during ore development as well as from underground and surface diamond drilling. The interpretation of all RHP and Drake mineralised wireframes was conducted using the sectional interpretation method in Datamine RM software. All lodes have been interpreted in plan-view section. Where development levels were present, sectional interpretation was completed at approximately 5 m spacing. Where only drilling data was present, sectional interpretation was completed at approximately 10 - 20 m spacing. Checks were made to ensure that the wireframed volume agreed with the true ore widths of drill hole intersections. As a rule, wireframe extrapolation was limited to one half of the average drill spacing.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drill holes, underground face channel data, 3D photogrammetry and structural models.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations have been proposed.
	The use of geology in guiding and controlling Mineral Resource estimation.	The interpretation of the RHP and Drake mineralisation is based on the presence of mineralised structure (veining and shear), ore-bearing mineralogy (gold and associated sulphides), assayed samples and continuity between sections.
	The factors affecting continuity both of grade and geology.	Individual RHP and Drake mineralised structures are thought to be reasonably continuous at the current drill spacing, as similar mineralisation styles, structures and grade tenor exists between adjacent drill holes. Post-mineralisation dextral offsetting faults (locally called D4 structures) affect the continuity of the K2 structure. These structures are steep-dipping and the general trend is NNW-SSE. The largest is the Mary fault with a ~600 m offset. The White Foil and Poseidon faults form the bounding structures between the Hornet/Rubicon and Rubicon/Pegasus mine areas respectively. Offset on these structures varies between 1 and 10 m. Many smaller scale faults exist within the mining areas although none have a material impact on the Resource model.
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 strike length of the different ore systems varies from ~100 m to 600 m, with the individual Rubicon Hornet, Pegasus and Drake CMV structures having the longest strike lengths. The individual ore bodies occur in a major regional shear system extending over 10s of kilometres. Ore body widths are typically in the range of 0.2 – 3.0 m. The widest orebody is Rubicon Nugget at approximately 7 m. The narrowest is the K2B (present at Rubicon, Hornet and Pegasus) at approximately 0.5 m. The main CMV structure has an average thickness of 0.65 m. Mineralisation is known to occur from the base of cover to ~900 m below surface. The structure is open 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.	RHP and Drake mineralised zones with high data-density used direct grade estimation by Ordinary Kriging (unless otherwise stated) supported by composited sample data. Composite lengths of 1 m were used for all lodes, determined from statistical analysis of all sample lengths in the estimation dataset. In smaller mineralised zones where construction of a coherent variogram was not possible, Inverse Distance has been used. All estimation was completed using Datamine RM software. Details of estimation by ore lode is summarised below: CMV (Rubicon, Hornet and Pegasus) - divided into two grade subdomains based on data density; high density around development levels and lower density for the remainder. Each domain was analysed for top cuts and had variography completed separately. Both subdomains indicate grade continuity in the NNW plunge direction. The high-density domain has search ranges between 90-100 m in direction 1, 60-100 m in direction 2 and 25-50 m in direction 3. The low-density domain has search ranges between 150 – 250 m for direction 1 and 100 – 160 m for direction 2 and 25-50 m in direction 3, Three passes were used for estimation with distances based on variography. The first pass had a minimum of between 6 - 10 samples and a maximum of 10 - 14 samples for both the high and low-density domains. Estimation was completed using a soft boundary between the high and low-density domains and between adjacent CMV domains e.g. Rubicon CMV/Pegasus CMV boundary and Drake CMV/Pegasus CMV boundary. Restrictions by drill hole have been applied to the high-density domain and restrictions by drill hole type have been applied to the low-density domain. Hornet CMV contains a third subdomain based on grade. It is a low-grade domain distinguished by shale thickening and was analysed for top cuts and had variography completed separately. It indicates grade continuity in the SSE direction with search ranges of 80 m in direction 1 and 40 m in direction 2. A minimum of 6 and a maximum of 10 samples were used in the first pass. Three passes were used. Restrictions by drill hole have been applied. Polaris (RHP)- Rubicon Polaris is divided into two subdomains based on data density; high density around development levels and lower density distant to development. Pegasus Polaris is divided into two subdomains along strike based on grade. Hornet Polaris comprises two domains; Polaris North situated proximal to northern Hornet development and Polaris situated proximal to southern Hornet development. Each domain was analysed for top cuts and had variography completed separately. All domains indicate grade continuity plunging to the NNW. Rubicon Polaris has search distances of 40 m for direction 1 and 30 m for direction 2 in the high data density domain and 110 m for direction 1 and 90 m for direction 2 in the low data density domain. Pegasus Polaris has search distances of 50 m for direction 1 and 35 m for direction 2 in the high-grade domain and search distances of 40 m for direction 1 and 30 m for direction 2 in the low-grade domain. Hornet Polaris has search distances of 45 m for direction 1 and 30 m for direction 2 in Polaris North and 35 m for direction 1 and 25 m for direction 2 in Polaris. Three passes were used in all domains. Rubicon Polaris domains used a minimum of 10 samples and a maximum of 16. Pegasus Polaris domains used a minimum of 7 samples and a maximum of 12. Hornet Polaris domains used a minimum of 7 samples and a maximum of 12. Restrictions based on drill hole type were applied to the Rubicon Polaris low density domain. Restrictions by drill hole were applied to the both Hornet Polaris domains. No restrictions were applied to Pegasus Polaris domains.

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Criteria	JORC Code explanation	Commentary
		K2E (RHP)- Rubicon K2E is divided into two subdomains based on data density; high density around development levels and lower density distant to development. Pegasus K2E is divided into two domains (K2E and K2E Lower) based on two separate areas of similar data density. Hornet K2E comprises two domains; A northern Hornet K2E proximal to northern Hornet development and a Hornet K2E proximal to southern Hornet development. Each domain was analysed for top cuts and had variography completed separately. Rubicon, Pegasus and Hornet Polaris indicate grade continuity plunges to the NNW. Rubicon K2E has search distances of 75 m for direction 1 and 50 m for direction 2 in the high data density domain and 150 m for direction 1 and 100 m for direction 2 in the low data density domain. Pegasus K2E has search distances of 75 m for direction 1 and 50 m for direction 2 and K2E Lower has search distances of 150 m for direction 1 and 100 m for direction 2. Both Hornet K2E domains have search distances of ~60 m for direction 1 and 40 m for direction 2. Three passes were used in all domains. In the first pass; Rubicon K2E used a minimum of 10 and a maximum of 16 samples, Pegasus K2E used a minimum of 6 and a maximum of 10 and Hornet K2E used a minimum of 8 and a maximum of 12. Estimation was completed using a soft boundary for only the Rubicon K2E high and low-density subdomains. Restrictions by drill hole type were applied to both domains in the Rubicon K2E. Restrictions by drill hole were applied to Pegasus and Hornet K2E. K2B (Rubicon and Hornet)- Rubicon and Hornet K2B divided into two subdomains based on data density. Each domain was analysed for top cuts and had variography completed separately. All domains indicate grade continuity plunges to the NNW. All Rubicon K2B domains have search distances of 100 m for direction 1 and 100 m for direction 2. Rubicon K2B estimation was tested using variography however an ID2 estimate that used rotation angles obtained from dynamic anisotropy analysis produced a better result. Hornet K2B has search distances of 80 m for direction 1 and 60 m for direction 2 for the high-density subdomain and 250 m for direction 1 and 200 m for direction 2 for the low-density subdomain. Three passes were used in all domains. Rubicon K2B used a minimum of 4-7 samples and a maximum of 7-10 samples in the high and low-density subdomains for the first pass. Hornet K2B used a minimum of 8 samples and a maximum of 12 samples in the high and low-density subdomains for the first pass. Estimation was completed using a soft boundary between the high and low-density subdomains. No restrictions by drill hole or drill hole type have been applied. Nugget (Rubicon)- includes one domain which was top cut and had variography analysis completed which indicates a shallow plunge to the west and ranges of 80 m in direction 1 and 40 m in direction 2. Restriction by drill hole were applied. Footwall (Rubicon and Hornet) – Rubicon footwall is divided into two subdomains based on data density; high density around development levels and lower density for the remainder. Hornet footwall comprises one domain. Each domain was analysed for top cuts and had variography completed separately. All domains indicate grade continuity plunging to the NNW. The Rubicon high-density domain has a search distance of 40 m for direction 1 and 20 m for direction 2 and the low-density domain has search distances of 50 m for both direction 1 and direction 2. Hornet footwall domain has a search distance of 40 m for direction 1 and 30 m for direction 2. Three passes were used in all domains. All domains used a minimum of 10 samples and a maximum of 14-16 samples for the first pass. Estimation was completed using a soft boundary between the Rubicon footwall high and low-density subdomains. Restriction by drill hole type was applied to both Rubicon and Hornet footwall. Bell (Pegasus) – includes one domain which was not top cut and had variography analysis completed which indicates no plunge and has ranges of 50 m in direction 1 and 40 m in direction 2. A minimum of 6 and a maximum of 10 samples were used in the first pass. Three passes were used. Restriction by drill hole was applied. FWVN (Pegasus) – includes one domain which was not top cut. There was insufficient data for variography analysis therefore ID2 was used rather than OK for estimation. Pegasus CMV variography with NNW plunge direction was used for rotation angles in the ID2 estimate. A minimum of 10 and a maximum of 14 samples were used in the first pass. Three passes were used. Restriction by drill hole was applied. INTW (Pegasus) – includes one domain which was top cut. There was insufficient data for variography analysis therefore ID2 was used rather than OK for estimation. Pegasus CMV variography with NNW plunge direction was used for rotation angles in the ID2 estimate. A minimum of 8 and a maximum of 12 samples were used in the first pass. Three passes were used. Restriction by drill hole was applied. CMV (Drake)- divided into two grade subdomains based on data density; high density near surface and lower density at depth. Both domains were analysed for top cuts and had variography completed together and indicate grade continuity in the NNW plunge direction. Each domain has a search distance of 200 m for direction 1 and 150 m for direction 2. Both domains used a minimum of 10 and a maximum of 22 samples in the first pass. Three passes were used. Estimation was completed using a soft boundary between the high and low-density domains and between adjacent CMV domains e.g. Drake CMV/Pegasus CMV boundary. No restrictions by drill hole or drill hole type have been applied. Halo (Drake) – divided into the Hanging wall (HW) and Foot wall (FW) domains either side of the Drake CMV. Both domains were analysed for top cuts separately. Drake CMV variography with NNW plunge direction was used due to lack of data. Both domains used a minimum of 7 and a maximum of 12 samples in the first pass. Three passes were used. No restrictions by drill hole or drill hole type have been applied. HORVQ, ALT1, ALT2, ALT3, LEAF, HONEY (Hornet) – all comprised of one domain and had variography analysis completed which indicates a moderate plunge to the NNW, except for HORVQ which shows a moderate plunge to the SSE. There was insufficient data for variography analysis of ALT2, therefore ID2 was used rather than OK for estimation. All domains used ranges of 40 – 80 m in direction 1 and 20 – 50 m in direction 2. All domains had a minimum of between 6 - 10 samples and a maximum of between 10 - 15 samples in the first pass. Three passes were used. HORVQ and ALT1 were restricted by drill hole while the other lodes had no restrictions.

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Criteria	JORC Code explanation	Commentary
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Check estimates have been completed for all lodes. These include Inverse Distance (ID) and Nearest Neighbour (NN) estimates. Isotropic searches have also been tested to corroborate chosen variogram angles. All mineralised zones at RHP and Drake for the current estimate were compared with previous grade and resource models. This allowed a comparison of tonnes and gold grade for each zone and an overall global comparison.
	The assumptions made regarding recovery of by-products.	No assumptions have been made.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements were estimated in these models.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Block sizes varied depending on sample density. In areas of high data density (underground face samples with average spacing of 3 – 4 m) a 5 x 5 x 5 m block size was chosen. Low density drill spacing is defined as approximately 30 m or greater and a 10 x 10 x 10 m block size was chosen. Estimates were completed with soft boundaries between varying block size estimates, unless a geological feature and contact analysis indicated a hard boundary was required, and added together following individual estimation for final validations Search ellipse dimensions were derived from the variogram model ranges, or isotropic ranges based on data density where insufficient data was present for variography analysis.
	Any assumptions behind modelling of selective mining units.	Selective mining units were not used during the estimation process.
	Any assumptions about correlation between variables.	All variables were estimated independently of each other. Density has used estimation parameters based on the equivalent gold estimation for that domain.
	Description of how the geological interpretation was used to control the resource estimates.	Hanging-wall and foot-wall wireframe surfaces were created using sectional interpretation. These were used to define the RHP and Drake mineralised zones based on the geology (usually a quartz vein) and gold grade. CMV (RHP and Drake)- Steeply dipping structure with quartz veining evident from drilling and development. Polaris (RHP)- Steeply dipping silicified shale structure in the hanging-wall of the CMV with quartz stringers evident from drilling and underground development. K2E (RHP)- Steeply dipping hangingwall structure with quartz veining evident from drilling and underground development. K2B (Rubicon/Hornet)- Steeply dipping hangingwall structure with quartz veining evident from drilling and underground development. Bell/Nugget (Pegasus/Rubicon)– Low angled dilatational fault zones with quartz veining evident from drilling and underground development. Honey, Alteration 1/2/3, HORVQ (Hornet hangingwall mineralised zones)- Sheared and silicified shale with quartz stringers evident from drilling and underground development. Halo (Drake)- Steeply dipping hangingwall and footwall brecciated veining and shearing directly adjacent to the Drake CMV. For mine planning purposes a waste model is created by projecting the hanging wall and footwall surfaces 15 m either side. A default grade of 0.1 g/t is assigned and the same resource classification as the adjacent ore lode is applied.

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Criteria	JORC Code explanation	Commentary
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the mean by more than 5% and reducing the coefficient of variation to around 1.2 and vary by domain (ranging from 4 to 250 g/t for individual domains and deposits). The top cut values are applied in several steps, using a technique called influence limitation top capping. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear; this applies to gold top cutting only. For example, where gold requires a top cut, the following variables will be created and estimated: AU (top cut gold) AU_NC (non- top-cut gold) AU_BC (spatial variable; values present where AU data is top cut) The top-cut and non-top cut values are estimated using search ranges based on the modelled gold variogram, and the *_BC values estimated using very small ranges (e.g. 5 x 5 x 5 m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). The same principle has been applied to produce a ‘lower-cut’ to the composited sample data with the intention of limiting the impact of high-grade samples on genuine low-grade areas, especially where there is an order of magnitude difference in assayed grade. A spatial variable (*_LC) is created using the non-top cut (*_NC) variable which only has values where the low-cut values appear; this applies to gold low cutting only. For example, where gold requires a low cut, the following variables will be created and estimated: AU_NC (non- cut gold) AU_LC (spatial variable; values present where AU data is low-cut) The non-top cut values are estimated using search ranges based on the modelled gold variogram, and the *_LC values estimated using small ranges (e.g. 30 x 20 x 15 m). Where the *_LC values produce estimated blocks within these restricted ranges, the *_LC estimated values replace the original top cut estimated values (AU). Multiple iterations are tested with different A hard top cut is applied instead of/as well in the following situations: If there are extreme outliers within an ore domain If the area has a history of poor reconciliation (i.e. overcalling)
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Statistical measures of Kriging error, such as Kriging Efficiency and Slope of Regression, are used to assess the quality of the estimation for each domain. Differences between the declustered composite data set and the average model grade must be within 10%. Swath plots comparing composites to block model grades are created and visual plots are prepared summarising the critical model parameters. Visually, block grades are assessed against drill hole and face data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 2.37 g/t cut off within 2.5 m minimum mining width MSO’s (with no additional dilution) using a $A1,750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No mining assumptions have been made during the resource wireframing or estimation process.
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.	Metallurgical test work results show that the mineralisation is amendable to processing through the Kanowna Belle treatment plant. Ore processing throughput and recovery parameters were estimated based on historic performance and potential improvements available using current technologies and practices.

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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 green fields 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.	A "Licence to Operate" is held by the operation which is issued under the requirement of the "Environmental Protection Act 1986", administered by the Department of Environment (DoE). The licence stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are also regulated by DoE and are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licences and lease conditions. An Environmental Management System is in place to ensure that Northern Star employees and contractors exceed environmental compliance requirements. The Kalgoorlie operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits. Kalgoorlie Operations have been compliant with the International Cyanide Management Code since 2008. Compliance with air quality permits is particularly important at Kanowna because of the roaster operation and because there are three facilities in the Kalgoorlie region emitting SO2 gas. Kanowna has a management program in place to minimize the impact of SO2 on regional air quality and ensure compliance with regulatory limits.
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.	A thorough investigation into average density values for the various lithological units at RHP and Drake was completed and the mean densities by lithology were coded into the database. Where there were no measurements for a specific lithology and default of 2.8 was applied. Density was then estimated by Ordinary Kriging using the associated gold estimation parameters for that domain. Post estimation, default density values for the oxide and transition zones were applied, based on regional averages.
	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.	No/minimal voids are encountered in the ore zones and underground environment
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Assumptions on the average bulk density of individual lithologies, based on 7,543 bulk density measurements at RHP and Drake. Assumptions were also made based on regional averages, on the default densities applied to oxide (1.8 t/m^3) and transition (2.3 t/m^3) material, due to a lack of data in these zones.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: Geologic grade continuity Density of available drilling Statistical evaluation of the quality of the kriged estimate Confidence in historical data, based on the new Data Class system
	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, quality, quantity and distribution of the data).	All relevant factors have been given due weighting during the classification process.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resource estimation methodology is considered appropriate and the estimated grades reflect the Competent Person's view of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	All resource models have been subjected to internal peer review.
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.	These mineral resource estimates are considered as robust and representative of the RHP and Drake styles of mineralisation. The relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC Code.
	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.	The statement relates to global estimates of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No reconciliation factors are applied to the resource post-modelling.

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Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star 2019MY Resource
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been undertaken by the competent person.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	Feasibility Study
	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.	Upgrade of previous Ore Reserve
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Budget costs and physicals form the basis for Cut Off Grade calculations. Mill recovery is calculated based on historical recoveries achieved Various cut off grades are calculated including a break-even cut-off grade (BCOG), variable cut-off grade (VCOG) and Mill cut-off grade (MCOG). The VCOG is used as the basis for stope design, with areas requiring significant development assessed by detailed financial analysis to confirm their profitability.
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).	Mineral Resource is converted to Ore Reserve after completing a detailed mine design and associated financial assessment.
	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.	Selected mining method deemed appropriate as it has been used at Raleigh since 2005 & Rubicon / Hornet / Pegasus since 2011.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	Design parameters include a 20m level spacing with a stope strike length of 15m for dilution control purposes. This correlates to a Hydraulic Radius of 4.3m
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	Not applicable - this table one applies to underground mining only.
	The mining dilution factors used.	Based on historical mine performance, mining dilution of 5% (Hornet), 0% (Rubicon), 20% (Pegasus) Rock and 10% Paste dilution (10 -30% total) for stoping additional to minimum mining width is applied, as well as 10% dilution for Ore development.
	The mining recovery factors used.	Mining recovery factor of 98.5% is applied to Pegasus and Hornet, 94% is applied to Rubicon based on historical data
	Any minimum mining widths used.	At Rubicon, Hornet, and Pegasus: Minimum stope width of 3.0m where the vein is less than 2m wide. 1m additional to vein width when greater than 2m wide.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred blocks are excluded from the reported reserve.
	The infrastructure requirements of the selected mining methods.	Infrastructure in place, currently an operating mine.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	All EKJV ore is treated at the Kanowna Belle milling facilities. These facilities are designed to handle approximately 1.8 million tonnes of feed per annum. The plant has the capability to treat both refractory and free milling ores, through either using the flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery) or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plant campaigns both refractory and free milling ores every month. Between campaigns, the circuit is “cleaned out” using mineralised waste. The plant is made up of crushing, grinding, gravity gold recovery, flotation, roasting, CIL, elution and gold recovery circuits.

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Criteria	JORC Code explanation	Commentary
	Whether the metallurgical process is well-tested technology or novel in nature.	Milling experience gained over plus 10 years operation.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Milling experience gained over plus 10 years operation.
	Any assumptions or allowances made for deleterious elements.	No assumption made.
	The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody.	Milling experience gained over plus 10 years operation.
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Rubicon, Hornet, Pegasus operations are currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are granted.
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.	All current site infrastructure is suitable to the proposed mining plan.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mine development capital cost based on historical performance on site and life-of-mine forward planning. Plant and equipment capital are based on site experience and the LOM plan.
	The methodology used to estimate operating costs.	All overhead costs and operational costs are projected forward on a first principals modelling basis.
	Allowances made for the content of deleterious elements.	No allowances made.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Corporate guidance.
	The source of exchange rates used in the study.	Corporate guidance.
	Derivation of transportation charges.	Historic performance.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance.
	The allowances made for royalties payable, both Government and private.	All royalties are built into the cost model.
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.	A$1,500/oz gold.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	It is assumed all gold is sold directly to market at the Corporate gold price guidance of A$1,500/oz.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not Applicable.
	Price and volume forecasts and the basis for these forecasts.	Corporate guidance.

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Criteria	JORC Code explanation	Commentary
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not Applicable.
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.	All costs assumptions are made based on historical performance from the mine and current economic forecast seen as representative of current market conditions.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities have been used with gold price ranges of A$1,300 to A$1,700 per ounce.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	No Issues.
	Any identified material naturally occurring risks.	No Issues.
	The status of material legal agreements and marketing arrangements.	No Issues.
	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.	No Issues.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	Ore Reserves classifications are derived from the underlying resource model classifications – i.e. Measure Resource material is converted to either Proved or Probable Reserves, with Indicated Resource material converting to Probable Reserve.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results accurately reflect the competent persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Nil.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Reserve has been internally reviewed in line with Northern Star Resource governance standard for Reserves and Resources. There have been no external reviews of this Ore reserve estimate.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve Estimate is considered high based on current mine and reconciliation performance.
	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.	Estimates are global but will be reasonably accurate on a local scale.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Not applicable.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Historical reconciliation of Rubicon, Hornet and Pegasus mine production has been used in the generation both the underlying Resource estimate and subsequent modifying factors applied to develop a Reserve.

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report

Kundana Area Deposits (Pode): Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td>Sampling techniques</td><td>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.</td><td>A combination of sample types was used to collect material for analysis; underground and surface diamond drilling (DD), surface reverse circulation drilling (RC) and face channel (FC) sampling.
<table>
<tr><th></th><th colspan="3">Pode</th></tr>
<tr><th>Type</th><th># of Holes</th><th>Total m's</th><th># of Samples</th></tr>
<tr><td>DD</td><td>708</td><td>182515</td><td>135558</td></tr>
<tr><td>FS</td><td>592</td><td>3048</td><td>5182</td></tr>
<tr><td>RC</td><td>8</td><td>1170</td><td>683</td></tr>
<tr><td>RC_DD</td><td>39</td><td>16418</td><td>10283</td></tr>
<tr><td>Total</td><td>1347</td><td>203151</td><td>151706</td></tr>
</table></td></tr>
<tr><td></td><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>DD drilling is sampled within geological boundaries with a minimum (0.3 m) and maximum (1.0 m) sample length. Face channel sampling is constrained within geological and mineralised boundaries with a minimum (0.2 m) and maximum (1.0 m) channel sample length. In some cases, smaller samples (0.1 m – 0.2 m) have been taken to account for narrower structures in the face. Where possible, face sampling is conducted from channels perpendicular to the vein structure.</td></tr>
<tr><td></td><td>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 30g 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.</td><td>DD drill core was nominated for either half core or full core sampling. Samples designated for half core were cut using an automated core saw. The mass of material collected was dependent on the drill hole diameter and sampling interval selected. Core was broken with a rock hammer if sample segments were too large to fit into sample bags.
A sample size of at least 3 kg of material was targeted for each face sample interval.
All samples were delivered to a commercial laboratory where they were dried and crushed to 90% of material ≤3 mm. At this point, samples greater than 3 kg were split using a rotary splitter, then pulverised to 90% ≤75 µm.
For FY19, a 40 g charge was selected for fire assay of diamond drill hole samples, and a 20 g charge for face samples.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both Reverse Circulation and Diamond Drilling techniques were used to drill the Kundana deposits.
Surface diamond drill holes were completed using HQ2 (63.5 mm) coring, whilst underground diamond drill holes were completed using NQ2 (50.5 mm) coring.
Historically, core was orientated using the Reflex ACT Core orientation system. Currently, core is orientated using the Boart Longyear Trucore Core Orientation system.
RC Drilling was completed using a 5.75" drill bit, downsized to 5.25" at depth.
In many cases RC pre-collars were drilled, followed by diamond tails. Pre-collar depth was determined in the drill design phase.</td></tr>
<tr><td>Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>For DD drilling, any core loss is recorded on the core block by the driller. This is then captured by the logging geologist and entered as an interval into the hole log.</td></tr>
<tr><td></td><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>Contractors adjust the rate and method off drilling if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.</td></tr>
<tr><td></td><td>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.</td><td>Recovery was excellent for diamond core and no relationship between grade and recovery was observed. Average recovery across the Kundana camp is at 99%. No specific areas within Pode had issues with recovery.</td></tr>
<tr><td>Logging</td><td>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.</td><td>All diamond core is logged for lithology, veining, alteration, mineralisation and structural data. Structural measurements of specific features are also taken through oriented zones.
Logging is entered in AcQuire using a series of drop-down menus which contain the appropriate codes for description of the rock.
All underground faces are logged for lithology and mineralisation. Logging is captured on a face sample sheet underground which is then transferred to AcQuire. Faces are then input into AcQuire using a series of drop-down menus which contain appropriate codes for description of the rock.</td></tr>
</table>

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet. All underground faces are logged and sampled to provide both qualitative and quantitative data. Faces are washed down and photographed before sampling is completed.
	The total length and percentage of the relevant intersections logged.	For all drill holes, the entire length of the hole is logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core is cut using an automated core saw. Sampling and cutting methodology are dependent on the type of drilling completed. Half core is utilised for Resource targeting (RT) drilling and Resource Definition drilling (RSD). Some RSD holes have been whole core sampled due to production pressures. Grade Control drilling (GC) is whole core sampled.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC samples are split using a rig-mounted cone splitter to collect a sample 3-4 kg in size from each 1m interval. These samples were utilised for any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside known mineralised zones spear samples were taken over a 4 m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Preparation of NSR samples was conducted at Bureau Veritas' Kalgoorlie facilities; commencing with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3 kg (typically 1.5 kg) at a nominal <3 mm particle size. The entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% ≤75 µm, using a Labtechnics LM5 bowl pulveriser. 400 g Pulp subsamples are then taken with an aluminum scoop and stored in labelled pulp packets. The sample preparation is considered appropriate for the deposit.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Standard procedures are used for all processes within the laboratory. Grind checks are performed at both the crushing stage (3 mm) and pulverising stage (75 µm), requiring 90% of material to pass through the relevant size.
	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.	Umpire sampling is performed monthly, where 3% of the samples are sent to the umpire laboratory for processing. Umpire samples of faces were analysed using a 40g charge weight.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material being sampled.
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.	A 40 g fire assay charge for diamond drill holes and a 20 g charge for face samples is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine element concentrations
	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 materials (CRMs) are inserted into the sample sequence at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a nominal insertion rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t if received are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades at the pulverising stage. No field duplicates were submitted for diamond core or face samples. Pulp duplicates are requested after any ore zone. These are indicated on the sample sheet and the submission sheet. When visible gold is observed in core, a quartz flush is requested after the sample. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs. The QA studies indicate that accuracy and precision are within industry accepted limits.
	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a competent person to be signed off.

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Criteria	JORC Code explanation	Commentary
Verification of sampling and assaying	The use of twinned holes.	No twinned holes were drilled at Pode. Re-drilling of some drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database with an 'A' suffix. Re-drilled holes are logged and sampled, whilst the original drill hole is logged, but not sampled.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging and sampling are recorded directly into AcQuire. Assay files are received in .csv format and loaded directly into the database using an AcQuire importer object. Assays are then processed through a form in AcQuire for QAQC checks. Hardcopy and noneditable electronic copies are stored.
	Discuss any adjustment to assay data.	No adjustments have been made to this assay data.
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.	Planned holes are marked up by the mine survey department using a total station survey instrument in mine grid (Kundana 10). The actual hole position is then located by the mine survey department once drilling is completed. In some cases, drill hole collar points are measured off survey stations if a mark-up cannot be completed. Holes are lined up on the collar point using the DHS Azimuth Aligner. Planned azimuths and dips of the holes are downloaded to the aligner which is then placed on the rod string to align the hole for drilling. During drilling, single shot surveys are conducted every 30 m to track the deviation of the hole and to ensure it stays close to design. This is performed using the DeviShot camera which measures the gravitational dip and magnetic azimuth. Results are uploaded from the Devishot software into a csv format which is then imported into the Acquire database. At the completion of the hole, a Multishot (using the DeviFlex non-magnetic strain gauge instrument) survey is completed, taking measurements every 3 m to ensure accuracy of the hole. This is converted to csv format and imported into the Acquire database.
	Specification of the grid system used.	Collar coordinates are recorded in mine grid (Kundana 10) and transformed into MGA94_51.
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups of holes over the last 15 years.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing varies across the deposit. Resource Targeting (RT) drilling at an 80 x 80 m nominal spacing is infilled during Resource Definition (RSD) down to an average of 30 x 30 m. Grade control drilling follows development and is generally comprised of stab drilling from the development drive at 10 to 15 m spacing.
	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 spacing and distribution is considered sufficient to support the resource and reserve estimates.
	Whether sample compositing has been applied.	No sample compositing has been applied.
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.	Pode structures in the Kundana area dip on average (50°) to the west (local grid). Diamond drilling was designed to target the orebodies perpendicular to this orientation to allow for a favourable intersection angle. In instances where this was not possible (primarily due to drill platform location), drilling was not completed, or re-designed once a more suitable platform became available. Drill holes with extremely poor intersection angles are excluded from resource 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.	No sampling bias is considered to have been introduced by the drilling orientation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits have been undertaken of the data and sampling practices.

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.	All holes mentioned in this report are located within the M16/309 and M16/326 Mining leases and are held by The East Kundana Joint Venture (EKJV). The EKJV is majority owned and managed by Northern Star Resources Limited (51%). The minority holding in the EKJV is held by Tribune Resources Ltd (36.75%) and Rand Mining Ltd (12.25%). The tenement on which the Pode deposits are hosted (M16/309) is subject to three royalty agreements. The agreements that are on M16/309 are the Kundana-Hornet Central Royalty, the Lake Grace Royalty and the Kundana Pope John Agreement No. 2602-13.

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Criteria	JORC Code explanation	Commentary
	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.	No known impediments exist, and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The first reference to the mineralisation style encountered at the Kundana project was the mines department report on the area produced by Dr. I. Martin (1987). He reviewed work completed in 1983 – 1984 by a company called Southern Resources, who identified two geochemical anomalies, creatively named Kundana #1 and Kundana #2. The Kundana #2 prospect was subdivided into a further two prospects, dubbed K2 and K2A. Between 1987 and 1997, limited work was completed. Between 1997 and 2006 Tern Resources (subsequently Rand Mining and Tribune Resources), and Gilt-edged mining focused on shallow open pit potential, which was not considered viable for Pegasus, however the Rubicon open pit was considered economic and production commenced in 2002. In 2011, Pegasus was highlighted by an operational review team and follow-up drilling was planned through 2012.
Geology	Deposit type, geological setting and style of mineralisation.	The Kundana camp is situated within the Norseman-Wiluna Greenstone Belt, in an area dominated by the Zuleika shear zone, which separates the Coolgardie domain from the Ora Banda domain. K2-style mineralisation (Pegasus, Rubicon, Hornet, Drake) consists of narrow vein deposits hosted by shear zones located along steeply dipping overturned lithological contacts. The K2 structure is present along the contact between a black shale unit (Centenary Shale) and intermediate volcaniclastics (Black Flag Group). Minor mineralisation, termed K2B, also occurs further west, on the contact between the Victorious basalt and Bent Tree Basalt (both part of the regional upper Basalt Sequence). As well as additional mineralisation including the K2E and K2A veins, Polaris/Rubicon Breccia (Silicified and mineralised Shale) and several other HW lodes adjacent to the main K2 structure. A 60° W dipping fault, offsets this contact and exists as a zone of vein-filled brecciated material hosting the Pode-style mineralisation at Pegasus and the Nugget lode at Rubicon.
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: 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.	A summary of the data present in the Pode deposits can be found above. The collar locations are presented in plots contained in the NSR 2019 resource report. Drill holes vary in survey dip from +43 to -73 degrees, with hole depths ranging from 15 m to 1413 m. Average hole depth is 289 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All validated drill hole data was used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	The exclusion of any information is not material
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2 m of barren material (considered < 2 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 2.0 g/t are considered significant, however, where low grades are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	True widths have been calculated for intersections of the known ore zones, otherwise noted as "downhole length"

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Criteria	JORC Code explanation	Commentary
Diagrams	Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	Appropriate plans and section have been included at the end of this table and in the NSR 2019 resource report.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	No other material exploration data has been collected for this area.
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).	RT drilling will continue in FY19-20 to define the extents of the Pode-style mineralisation. Following this, RSD and Grade Control drilling will also be conducted as required.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release and are detailed in the NSR 2019 resource report.

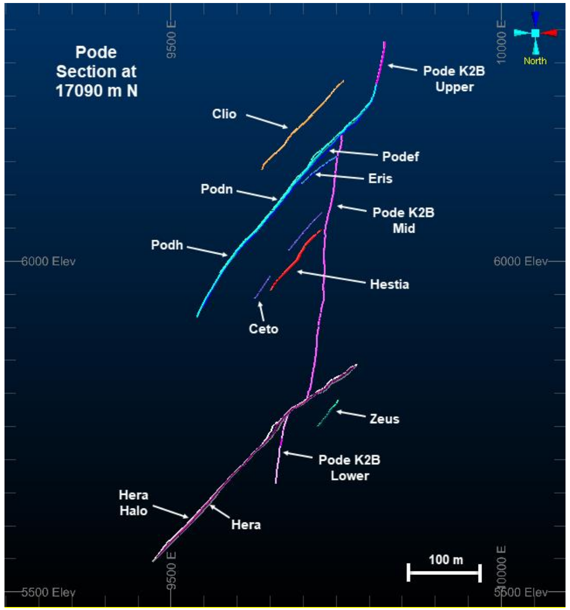

Figure 1. Cross section views of Pode ore lodes

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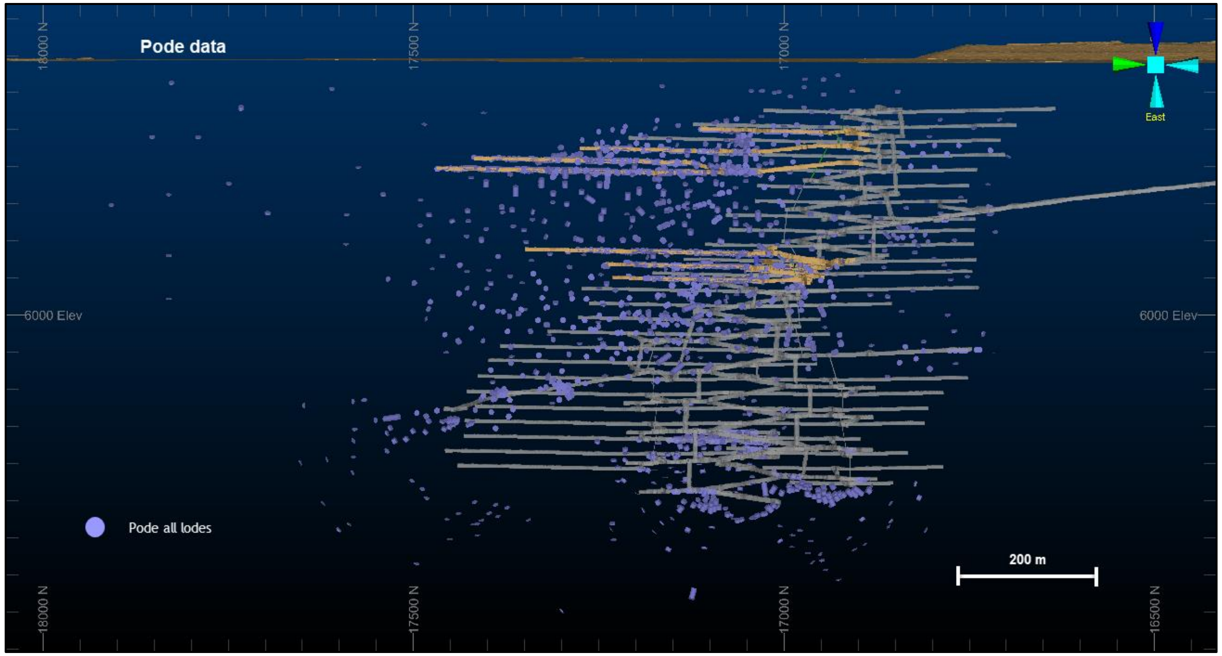

Figure 2. Long section view of Pode ore lodes and data used in resource estimations

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are either recorded on paper and manually entered into a database system or is captured digitally via a logging laptop and directly loaded into the database system. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly into the database from laboratory and survey-tool derived files.
	Data validation procedures used.	The database has further checks performed prior to estimation to confirm data validity. The complete exported database (including drill and face samples) is imported into Datamine and checked visually for any apparent errors i.e. holes or faces sitting between levels or not on surface DTM's. Multiple checks are then made on numerical data. These include: • Empty table checks to ensure all relevant fields are populated; • Unique collar location check; • Distances between consecutive surveys is no more than 60m for drill-holes; • Differences in azimuth and dip between consecutive surveys of no more than 0.3 degrees; • The end of hole extrapolation from the last surveyed shot is no more than 30 m;

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
		• Underground face sample lines are not greater than +\- 5 degrees from horizontal Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported. This data will not be used in the estimation process. Several drilling programs completed between 2014 and 2016 had erroneous metre depths recorded by the drillers. This resulted in multiple drill holes recording the intersection of the K2 several metres earlier than expected. Until underground development had progressed to these elevations, the extent of the error was not possible to determine. Unfortunately, there is not a uniform translation that can be applied, therefore these drill holes have been omitted from the ore wireframe interpretations and flagged as invalid. However, where there were no QAQC issue with the assays, the correct intervals have been recorded, the translation in the easting direction required for them to be in the 'correct' location (based on development above and below) applied and these intervals were appended to the data set before compositing. The same sample translation method has been applied to surface drilling in between development levels which are deemed to cause an unrealistic kink in the wireframe interpretation. This is only done after a thorough investigation of the surrounding data to ensure that no secondary veining is present in the footwall or hanging wall and that no separate lodes are missed. In addition to being Resource Flagged as "Yes" or "No", drill holes are assigned a Data Class, which provides a secondary level of confidence in the data quality. Data Class (DC) values range from 0 to 3, with criteria summarised below: • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR Recent data; minor issues with data such as QAQC fail but away from the ore zone. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The geological interpretations underpinning these resource models were prepared by geologists working in the mine who were in direct, daily contact with the ore body. The estimation of grades was undertaken by personnel familiar with the ore body and the general style of mineralisation encountered. The Senior Resource Geologist, a competent person for reviewing and signing off on the Pode estimate maintained a site presence throughout the process.
	If no site visits have been undertaken indicate why this is the case.	The Competent Person has maintained a presence onsite.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the Pode deposits were carried out using a systematic approach to ensure continuity of the geology and estimated mineral resource. The confidence in the geological interpretation is high and is supported with information acquired during ore development as well as from underground and surface diamond drilling. The interpretation of all Pode mineralised wireframes was conducted using the sectional interpretation method in Datamine RM software. All Pode lodes have been interpreted in plan-view. Where development levels were present, sectional interpretation was completed at approximately 5 m spacing. Where only drilling data was present, sectional interpretation was completed at approximately 10-20 m spacing. Checks were made to ensure that the wireframed volume agreed with the true ore widths of drill hole intersections. As a rule, wireframe extrapolation was limited to one half of the average drill spacing.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including surface mapping, DD and RC drill holes, underground face channel data, 3D photogrammetry and regional and local structural models.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	There is no alternative interpretation put forward
	The use of geology in guiding and controlling Mineral Resource estimation.	The interpretation of the Pode mineralisation is based on the presence of mineralised structure (veining and shear), ore-bearing mineralogy (gold and associated sulphides), assayed samples and continuity between sections.
	The factors affecting continuity both of grade and geology.	Individual Pode mineralised envelopes are thought to be reasonably continuous at the current drill spacing, as similar mineralisation styles, structures and grade tenor exists between adjacent drill holes. Offsetting structures are not known to be present in Pode although significant undulations exist which may have some impact on continuity of the mineralised trends and metal estimated within. Mineralised envelopes for Pode are confined to the Victorious basalt (porphyritic) and Bent Tree basalt (fine-grained) lithological units.

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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 strike length of the different ore systems varies from ~200 m to ~1200 m. The individual ore bodies occur in a major regional shear system extending over 10s of kilometres. Ore body widths are typically in the range of 0.4 - 2 m. The widest orebody is Hera Halo at approximately 2 m. The narrowest is Zeus at approximately 0.4 m. The PodN structure has an average thickness of 1.5 m. Mineralisation is known to occur from the base of cover to ~800 m below surface and is open in all directions.
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.	Pode mineralised zones with high data-density used direct grade estimation by Ordinary Kriging (unless otherwise stated) supported by composited sample data. Composite lengths of 1 m were used for all lodes, determined from statistical analysis of all sample lengths in the estimation dataset. In smaller mineralised zones where construction of a coherent variogram was not possible, Inverse Distance has been used. All estimation was completed using Datamine RM software. Details of estimation by ore lode is summarised below: **PodN** – Divided into two subdomains based on data density. Data was top cut to 150 g/t using the influence limitation approach. In addition to this a hard top cut of 400 g/t was used to limit the impact of genuinely anomalous data points. Variography was completed on the composited data file, indicating grade continuity plunging shallowly to the south. Searches were completed in three passes. For the high data-density estimate, search ranges of 50 m in direction 1 (dir1), 30 m in direction 2 (dir2) and 25 m in direction 3 (dir3) were used. For the low data-density estimate, search ranges of 120 m in dir1, 100 m in dir2 and 60 m in dir3 were used. The first pass had a minimum of 4 - 5 samples and a maximum of 8 - 15 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The minimum number of samples required has been increased for each subsequent search pass. Dynamic anisotropy has been used for the estimate, with the plunge component hard coded to 45° based on the variogram-derived search orientation. A restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **PodH** – Divided into two subdomains based on data density. Data was top cut to 30 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the north. Searches were completed in three passes. For the high data-density estimate, search ranges of 50 m in dir1, 40 m in dir2 and 30 m in dir3 were used. For the low data-density estimate, search ranges of 120 m in dir1, 90 m in dir2 and 60 m in dir3 were used. For both subdomains, the first pass had a minimum of 5 samples and a maximum of 12 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. Dynamic anisotropy has been used for the estimate, with the plunge component hard coded to 45° based on the variogram-derived search orientation. A restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **PodF** – Divided into two subdomains based on data density. Data was top cut to 20 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging shallowly to the south. Searches were completed in three passes. For the high data-density estimate, search ranges of 40 m in dir1/dir2 and 25 m in dir3 were used. For the low data-density estimate, search ranges of 85 m in dir1, 65 m in dir2 and 45 m in dir3 were used. For both subdomains, the first pass had a minimum of 5 samples and a maximum of 12 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. Dynamic anisotropy has been used for the estimate, with the plunge component hard coded to 45° based on the variogram-derived search orientation. A restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **K2B** – Divided into two subdomains based on grade. Top cutting was completed separately on the high-grade and low-grade subdomains (50 g/t and 20 g/t respectively) using the influence limitation approach. Variography was completed on the composited data files separately with both indicating grade continuity plunging moderately to the north. Searches were completed in three passes. For the high-grade estimate, search ranges of 50 m in dir1, 35 m in dir2 and 25 m in dir3 were used. For the low-grade estimate, search ranges of 85 m in dir1, 60 m in dir2 and 40 m in dir3 were used. The first pass had a minimum of 4 - 5 samples and a maximum of 10 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. A restriction of 2 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **Hera** – Divided into two subdomains based on data density. Data was top cut to 400 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging steeply to the south. Searches were completed in three passes. For the high data-density estimate, search ranges of 40 m in dir1/dir2 and 20 m in dir3 were used. For the low data-density estimate, search ranges of 180 m in dir1, 130 m in dir2 and 60 m in dir3 were used. For both subdomains, the first pass had a minimum of 5 samples and a maximum of 10 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples required has been increased for each subsequent search pass, while the minimum amount has stayed the same. Dynamic anisotropy has been used for the estimate, with the plunge component hard coded to 40° based on the variogram-derived search orientation. A restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **Halo** – Divided into two subdomains based on data density. Data was top cut to 50 g/t using the influence limitation approach. All other search parameters identical to Hera lode, excepting the use of dynamic anisotropy (not used for the Halo lode). **Hestia** – Estimated as a single domain. Data was top cut to 30 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the north. Searches were completed in three passes. Search ranges of 75 m in dir1, 35 m in dir2 and 15 m in dir3 were used. The first

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		pass had a minimum of 5 samples and a maximum of 10 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. Dynamic anisotropy has been used for the estimate, with the plunge component hard coded to 40° based on the variogram-derived search orientation. A restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **Ceto** – Estimated as a single domain. Data was top cut to 10 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the south. Searches were completed in three passes. Search ranges of 60 m in dir1, 40 m in dir2 and 30 m in dir3 were used. The first pass had a minimum of 6 samples and a maximum of 10 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. A restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **Eris** – Estimated as a single domain. Data was top cut to 8 g/t using the influence limitation approach. No variography completed due to lack of data pairs in domain. Continuity fans analysed to ascertain search orientation and anisotropy. Searches were completed in three passes. Search ranges of 75 m in dir1, 35 m in dir2 and 15 m in dir3 were used. The first pass had a minimum of 6 samples and a maximum of 8 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. A restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **Clio** – Estimated as a single domain. Data was top cut to 12 g/t using the influence limitation approach. No variography completed due to lack of data pairs in domain. Continuity fans analysed to ascertain search orientation and anisotropy. Searches were completed in three passes. Search ranges of 80 m in dir1, 50 m in dir2 and 30 m in dir3 were used. The first pass had a minimum of 6 samples and a maximum of 8 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. A restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **Kratos** – Estimated as a single domain. Data was top cut to 10 g/t using the influence limitation approach. No variography completed due to lack of data pairs in domain. Continuity fans analysed to ascertain search orientation and anisotropy. Searches were completed in three passes. Search ranges of 80 m in dir1, 50 m in dir2 and 30 m in dir3 were used. The first pass had a minimum of 6 samples and a maximum of 8 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. A restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **Ares** – Estimated as a single domain. No top-cut applied as no anomalous samples present and coefficient of variance within acceptable range. No variography completed due to lack of data pairs in domain. Continuity fans analysed to ascertain search orientation and anisotropy. Searches were completed in three passes. Search ranges of 80 m in dir1, 50 m in dir2 and 30 m in dir3 were used. The first pass had a minimum of 6 samples and a maximum of 8 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. A restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **Zeus** – Estimated as a single domain. Data was top cut to 80 g/t using the influence limitation approach. No variography completed due to lack of data pairs in domain. Continuity fans analysed to ascertain search orientation and anisotropy. Searches were completed in three passes. Search ranges of 75 m in dir1, 35 m in dir2 and 15 m in dir3 were used. The first pass had a minimum of 5 samples and a maximum of 7 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. Dynamic anisotropy has been used for the estimate, with the plunge component hard coded to 45° based on the variogram-derived search orientation. A restriction of 2 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate. **Apollo** – Estimated as a single domain. Data was top cut to 15 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the north. Searches were completed in three passes. Search ranges of 80 m in dir1, 30 m in dir2 and 25 m in dir3 were used. The first pass had a minimum of 5 samples and a maximum of 7 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. A restriction of 3 samples was used based on the BHID, which ensured that at least two holes were used for each block estimate.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Check estimates have been completed for all lodes. These include Inverse Distance (ID) and Nearest Neighbour (NN) estimates. Isotropic searches have also been tested to corroborate chosen variogram angles.
	The assumptions made regarding recovery of by-products.	No assumptions have been made.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements were estimated in these models.

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	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Block sizes varied depending on sample density. In areas of high data-density (underground face samples with average spacing of 3 – 4 m) a 5 x 5 x 5 m block size was chosen. Low density drill spacing is defined as approximately 30 m or greater and a 10 x 10 x 10 m block size was chosen. Estimates were completed with soft boundaries between varying block size estimates (unless a geological feature and contact analysis indicated a hard boundary was required) and added together following individual estimation for final validations Search ellipse dimensions were derived from the variogram model ranges, or isotropic ranges based on data density where insufficient data was present for variography analysis.
	Any assumptions behind modelling of selective mining units.	Selective mining units were not used during the estimation process.
	Any assumptions about correlation between variables.	All variables were estimated independently of each other. Density has used estimation parameters based on the equivalent gold estimation for that domain.
	Description of how the geological interpretation was used to control the resource estimates.	Hanging-wall and foot-wall wireframe surfaces were created using sectional interpretation. These were used to define the Pode mineralised zones based on the geology (usually a quartz vein) and gold grade. Pode mineralised zones are predominantly low angled dilatational fault zones with quartz veining evident from drilling (all lodes) and development (PodN, PodF, PodH, Hera and Hera Halo only). For mine planning purposes a waste model is created by projecting the hanging wall and footwall surfaces 15 m either side. A default grade of 0.1 g/t is assigned and the same resource classification as the adjacent ore lode is applied.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the mean by more than 5% and reducing the coefficient of variation to around 1.2. Top cuts vary by domain and range from 8 to 400 g/t. The top cut values are applied in several steps, using a technique called influence limitation top cutting. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, where gold requires a top cut, the following variables will be created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) • AU_BC (spatial variable; values present where AU data is top cut) The top-cut and non-top cut values are estimated using search ranges based on the modelled gold variogram, and the *_BC values estimated using very small ranges (e.g. 5 x 5 x 5m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU).
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Statistical measures of Kriging error, such as Kriging Efficiency and Slope of Regression, are used to assess the quality of the estimation for each domain. Differences in the global grade of the declustered composite data set and the average model grade were within 10%, or justification for a difference outside 10% was explicable. Swath plots comparing composites to block model grades are created and visual plots are prepared summarising the critical model parameters. Visually, block grades are assessed against drill hole and face data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 2.37 g/t cut off within 2.5 m minimum mining width MSO's (with no additional dilution), using a $Aus1750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No mining assumptions have been made during the resource wireframing or estimation process.

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Criteria	JORC Code explanation	Commentary
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.	Metallurgical test work results show that the mineralisation is amendable to processing through the Kanowna Belle treatment plant. Ore processing throughput and recovery parameters were estimated based on historic performance and potential improvements available using current technologies and practices.
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 green fields 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.	A "Licence to Operate" is held by the operation which is issued under the requirement of the "Environmental Protection Act 1986", administered by the Department of Environment (DoE). The licence stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are also regulated by DoE and are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licences and lease conditions. An Environmental Management System is in place to ensure that Northern Star employees and contractors exceed environmental compliance requirements. The Kalgoorlie operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits. Kalgoorlie Operations have been compliant with the International Cyanide Management Code since 2008. Compliance with air quality permits is particularly important at Kanowna because of the roaster operation and because there are three facilities in the Kalgoorlie region emitting SO2 gas. Kanowna has a management program in place to minimize the impact of SO2 on regional air quality and ensure compliance with regulatory limits.
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.	A thorough investigation into average density values for the various lithological units at Pode was completed and the mean densities by lithology were coded into the database. Where there were no measurements for a specific lithology and default of 2.8 was applied. Density was then estimated by Ordinary Kriging using the associated gold estimation parameters for that domain. Post estimation, default density values for the oxide and transition zones were applied, based on regional averages.
	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.	No/minimal voids are encountered in the ore zones and underground environment
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Assumptions on the average bulk density of individual lithologies, based on 7,543 bulk density measurements at Pode and RHP. Assumptions were also made based on regional averages, on the default densities applied to oxide (1.80) and transitional (2.30) material, due to a lack of data in these zones.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: • Geologic grade continuity • Density of available drilling • Statistical evaluation of the quality of the kriging estimate • Confidence in historical data, based on the new Data Class system
	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, quality, quantity and distribution of the data).	All relevant factors have been given due weighting during the classification process.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resource estimation methodology is considered appropriate and the estimated grades reflect the Competent Persons view of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	All resource models have been subjected to internal peer review.
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.	These mineral resource estimates are considered as robust and representative of the Pode style of mineralisation. The relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC Code.

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Criteria	JORC Code explanation	Commentary
	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.	The statement relates to global estimates of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No reconciliation factors are applied to the resource post-modelling.

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star 2019MY Resource
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been undertaken by the competent person.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	Feasibility Study
	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.	Upgrade of previous Ore Reserve
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Budget costs and physicals form the basis for Cut Off Grade calculations. Mill recovery is calculated based on historical recoveries achieved Various cut off grades are calculated including a break-even cut-off grade (BCOG), variable cut-off grade (VCOG) and Mill cut-off grade (MCOG). The VCOG is used as the basis for stope design, with areas requiring significant development assessed by detailed financial analysis to confirm their profitability.
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).	Mineral Resource is converted to Ore Reserve after completing a detailed mine design and associated financial assessment.
	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.	Selected mining method deemed appropriate as it has been used at Raleigh since 2005.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	Design parameters include a 20m level spacing with a stope strike length of 15m for dilution control purposes. This correlates to a Hydraulic Radius of 4.3m
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	Not applicable - this table one applies to underground mining only.
	The mining dilution factors used.	Based on historical mine performance, mining dilution of 5% Rock and 10% Paste dilution (15% total) for stoping additional to minimum mining width is applied, as well as 10% dilution for Ore development.
	The mining recovery factors used.	Mining recovery factor of 98.5% is applied to Pode.
	Any minimum mining widths used.	Minimum stope width of 3.0m where the vein is less than 2m wide. 1m additional to vein width when greater than 2m wide.
	The way Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred blocks are excluded from the reported reserve.

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Criteria	JORC Code explanation	Commentary
	The infrastructure requirements of the selected mining methods.	Infrastructure in place, currently an operating mine.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	All EKJV ore is treated at the Kanowna Belle milling facilities. These facilities are designed to handle approximately 1.8 million tonnes of feed per annum. The plant has the capability to treat both refractory and free milling ores, through either using the flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery), or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plant campaigns both refractory and free milling ores every month. Between campaigns, the circuit is “cleaned out” using mineralised waste. The plant is made up of crushing, grinding, gravity gold recovery, flotation, roasting, CIL, elution and gold recovery circuits.
	Whether the metallurgical process is well-tested technology or novel in nature.	Milling experience gained over plus 10 years operation.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Milling experience gained over plus 10 years operation.
	Any assumptions or allowances made for deleterious elements.	No assumption made.
	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.	Milling experience gained over plus 10 years operation.
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Rubicon, Hornet, Pegasus operations are currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are granted.
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.	All current site infrastructure is suitable to the proposed mining plan.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mine development capital cost based on historical performance on site and life-of-mine forward planning. Plant and equipment capital are based on site experience and the LOM plan.
	The methodology used to estimate operating costs.	All overhead costs and operational costs are projected forward on a first principals modelling basis.
	Allowances made for the content of deleterious elements.	No allowances made.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Corporate guidance.
	The source of exchange rates used in the study.	Corporate guidance.
	Derivation of transportation charges.	Historic performance.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance.
	The allowances made for royalties payable, both Government and private.	All royalties are built into the cost model.
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.	A$1,500/oz gold.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
	The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.	It is assumed all gold is sold directly to market at the Corporate gold price guidance of A$1,500/oz.

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Criteria	JORC Code explanation	Commentary
Market assessment	A customer and competitor analysis along with the identification of likely market windows for the product.	Not Applicable.
	Price and volume forecasts and the basis for these forecasts.	Corporate guidance.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not Applicable.
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.	All costs assumptions are made based on historical performance from the mine and current economic forecast seen as representative of current market conditions.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities have been used with gold price ranges of A$1,300 to A$1,700 per ounce.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	No Issues.
	Any identified material naturally occurring risks.	No Issues.
	The status of material legal agreements and marketing arrangements.	No Issues.
	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.	No Issues.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	Ore Reserves classifications are derived from the underlying resource model classifications – i.e. Measure Resource material is converted to either Proved or Probable Reserves, with Indicated Resource material converting to Probable Reserve.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results accurately reflect the competent persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Nil.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Reserve has been internally reviewed in line with Northern Star Resource governance standard for Reserves and Resources. There have been no external reviews of this Ore reserve estimate.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve Estimate is considered high based on current mine and reconciliation performance.
	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.	Estimates are global but will be reasonably accurate on a local scale.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Not applicable.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Historical reconciliation of Rubicon, Hornet and Pegasus mine production has been used in the generation both the underlying Resource estimate and subsequent modifying factors applied to develop a Reserve.

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report
Raleigh-Sadler: Resources and Reserves – 30 June 2019
Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="3">Sampling techniques</td><td>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.</td><td>A combination of sample types was used to collect material for analysis, including surface and underground diamond drilling (DD), surface reverse circulation drilling (RC) and face channel (FC) sampling. RAB holes were excluded from the estimate. Where sufficient diamond drill holes were present, RC holes were also excluded.
<table>
<tr><th></th><th colspan="3">Raleigh</th></tr>
<tr><th></th><th># of Holes</th><th>Total m's</th><th># of Samples</th></tr>
<tr><td>DD</td><td>616</td><td>110,121</td><td>50,768</td></tr>
<tr><td>FS</td><td>7,199</td><td>27,774</td><td>43,766</td></tr>
<tr><td>RC</td><td>5</td><td>672</td><td>451</td></tr>
<tr><td>RC_DD</td><td>32</td><td>9,566</td><td>2,892</td></tr>
<tr><td>Total</td><td>7,852</td><td>148,133</td><td>97,877</td></tr>
</table></td></tr>
<tr><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>DD drilling is sampled within geological boundaries with a minimum (0.3 m) and maximum (1.0 m) sample length. Face channel sampling is constrained within geological and mineralised boundaries with a minimum (0.2 m) and maximum (1.0 m) channel sample length. In some cases, smaller samples (0.1 m – 0.2 m) have been taken to account for narrower structures in the face. These samples are frequent at Raleigh due to the nature of the extremely narrow ore structure present at Raleigh.</td></tr>
<tr><td>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 30g 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.</td><td>DD drill core was nominated for either half core or full core sampling. Samples designated for half core were cut using an automated core saw. The mass of material collected was dependent on the drill hole diameter and sampling interval selected. Core was broken with a rock hammer if sample segments were too large to fit into sample bags.
A sample size of at least 3 kg of material was targeted for each face sample interval.
All samples were delivered to a commercial laboratory where they were dried and crushed to 90% of material ≤3 mm. At this point, samples greater than 3 kg were split using a rotary splitter, then pulverised to 90% ≤75 µm.
For FY19 a 40 g charge was selected for fire assay of diamond drill hole samples, and a 20 g charge for face samples.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both Reverse Circulation and Diamond Drilling techniques were used to drill the Raleigh deposit.
Surface diamond drill holes were completed using HQ2 (63.5 mm) coring whilst underground diamond drill holes where completed using both NQ2 (50.5 mm) and NQ3 (43 mm) coring.
Historically, core was orientated using the Reflex ACT Core orientation system. Currently, core is orientated using the Boart Longyear Trucore Core Orientation system.
RC Drilling was completed using a 5.75” drill bit, downsized to 5.25” at depth.
In many cases, RC pre-collars were drilled, followed by diamond tails. Pre-collar depth was determined in the drill design phase.</td></tr>
<tr><td rowspan="3">Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>Any core loss in diamond drilling is recorded on the core block by the driller. This is then captured by the logging geologist and entered as an interval into the hole log.</td></tr>
<tr><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>For diamond drilling, the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.</td></tr>
<tr><td>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.</td><td>Recovery of the ore lode is challenging at Raleigh, with the brittle quartz vein RMV lode adjacent to the much softer RMS lode. Triple tubing has been employed by the drilling contractor in order to alleviate concerns around recovery although, due in part to the nature of the material being drilled and to the drill orientation oblique to the target structure, core loss is still a challenge. In order to mitigate the impacts on the estimate, samples which have logged core loss through the ore zone are excluded. No relationship between sample recovery and grade has been discerned.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
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 is logged for lithology, veining, alteration, mineralisation and structural data. Structural measurements of specific features are also taken through oriented zones. Logging is entered in AcQuire using a series of drop-down menus which contain the appropriate codes for description of the rock. All underground faces are logged for lithology and mineralisation. Logging is captured on a face sample sheet underground which is then transferred to AcQuire. Faces are then entered into AcQuire using a series of drop-down menus which contain appropriate codes for description of the rock.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet. All underground faces are logged and sampled to provide both qualitative and quantitative data. All faces are washed down and photographed before sampling is completed.
	The total length and percentage of the relevant intersections logged.	For all drill holes, the entire length of the hole was logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core is cut using an automated core saw. Sampling and cutting methodology are dependent on the type of drilling completed. Half core is utilised for Resource targeting (RT) drilling and Resource Definition drilling (RSD). Some RSD holes have been whole core sampled due to production pressures. Grade Control drilling (GC) is whole core sampled.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC samples are split using a rig-mounted cone splitter to collect a sample 3-4 kg in size from each 1m interval. These samples were utilised for any zones approaching known mineralisation and from any areas identified as having anomalous gold. Outside known mineralised zones spear samples were taken over a 4 m interval for composite sampling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Preparation of NSR samples was conducted at Bureau Veritas' Kalgoorlie facilities; commencing with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3 kg (typically 1.5 kg) at a nominal <3 mm particle size. The entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% ≤75 µm, using a Labtechnics LM5 bowl pulveriser. 400 g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets. The sample preparation is considered appropriate for the deposit.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are utilised to guide the selection of sample material in the field. Standard procedures are used for all processes within the laboratory. Grind checks are performed at both the crushing stage (3 mm) and pulverising stage (75 µm), requiring 90% of material to pass through the relevant size.
	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.	Umpire sampling is performed monthly, where 3% of the samples are sent to the umpire lab for processing. Umpire samples of faces were analysed using a 40g charge weight.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material being sampled.
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.	A 40 g fire assay charge for diamond drill holes and a 20-gm charge for face samples is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO_3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine any element concentrations.
	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 materials (CRMs) are inserted into the sample sequence at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a nominal rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t if received are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades at the pulverising stage. No field duplicates were submitted for diamond core. Pulp duplicates are requested after any ore zone. These are indicated on the sample sheet and the submission sheet. When visible gold is observed in core, a quartz flush is requested after the sample.

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Criteria	JORC Code explanation	Commentary
		Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs. The QA studies indicate that accuracy and precision are within industry accepted limits.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off.
	The use of twinned holes.	No twinned holes were drilled for Raleigh. Re-drilling of some drill holes has occurred due to issues downhole (e.g. bogged rods). These have been captured in the database with an 'A' suffix. Re-drilled holes are sampled whilst the original drill hole is logged but not sampled.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging and sampling are directly recorded into AcQuire. Assay files are received in csv format and loaded directly into the database using an Acquire importer object. Assays are then processed through a form in AcQuire for QAQC checks. Hardcopy and non-editable electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data.
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.	Planned holes are marked up by the mine survey department using a total station survey instrument in mine grid (Kundana 10). The actual hole position is then located by the mine survey department once drilling is completed. In some cases, drill hole collar points are measured off survey stations if a mark-up cannot be completed. Holes are lined up on the collar point using the DHS Azimuth Aligner. Planned azimuths and dips of the holes are downloaded to the aligner which is then placed on the rod string to align the hole for drilling. During drilling, single shot surveys are conducted every 30 m to track the deviation of the hole and to ensure it stays close to design. This is performed using the DeviShot camera which measures the gravitational dip and magnetic azimuth. Results are uploaded from the Devishot software into a csv format which is then imported into the Acquire database. At the completion of the hole, a Multishot (using the DeviFlex non-magnetic strain gauge instrument) survey is completed, taking measurements every 3 m to ensure accuracy of the hole. This is converted to csv format and imported into the Acquire database.
	Specification of the grid system used.	Collar coordinates are recorded in mine grid (Kundana 10) and transformed into MGA94_51.
	Quality and adequacy of topographic control.	Quality topographic control has been achieved through Lidar data and survey pickups of holes over the last 15 years.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing varies across the deposit. For resource targeting drill spacing was typically 60 m x 60 m. This allowed for infill drilling at 30 m x 30 m spacing known as resource definition. Grade control drilling was drilled on a level by level basis with drill spacing between 10 m to 15 m.
	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 spacing and distribution is considered sufficient to support the resource and reserve estimates
	Whether sample compositing has been applied.	No sample compositing has been applied.
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 major Raleigh structures dip steeply (80°) to the west (local grid). Diamond drilling was designed to target the ore bodies as close to perpendicular as possible, allowing for a favourable intersection angle. In instances where this was not achievable (mostly due to drill platform location), drilling was not completed or re-designed once a suitable platform became available. Drill holes with low intersection angles are excluded from resource estimation where more suitable data is available.
	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 explained above, holes drilled on suboptimal orientations are thought to suffer more from recovery issues than those drilled near perpendicular to the lode. Robust data validation has been completed to ensure no sample bias is introduced by including these holes. Where drill holes have been particularly oblique, they have been flagged as unsuitable for resource estimation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits have been undertaken of the data and sampling practices at this stage.

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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.	All holes mentioned in this report are located within either the M15/993 or M16/157 Mining leases. M15/993 which is held by The East Kundana Joint Venture (EKJV). The EKJV is majority owned and managed by Northern Star Resources Limited. The minority holding in the EKJV is held by Tribune Resources Ltd and Rand Mining Ltd. M16/157 is fully owned by Northern Star Resources Limited. The tenements on which the Raleigh and Sadler deposit is hosted is subject to three royalty agreements. The agreements are the Kundana- Hornet Central Royalty, the Lake Grace Royalty and the Kundana Pope John Agreement No. 2602-13.
	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.	No known impediments exist, and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	No other parties performed exploration work at Raleigh during the reporting period. All previous exploration by other parties is summarised in open file annual reports which are available from the DMIRS.
Geology	Deposit type, geological setting and style of mineralisation.	The Kundana gold camp is situated within the Norseman-Wiluna Greenstone Belt, in an area dominated by the Zuleika shear zone, which separates the Coolgardie domain from the Ora Banda domain. Raleigh ore lodes are located along the Strzelecki structure, with mining commencing in 2000. The majority of mineralisation consists of narrow, laminated quartz veining on the contact between volcanogenic sedimentary rock unit and andesite/gabbro (RMV). Sadler is the southern extent of Raleigh, with no clear geological boundary distinguishing them. Underground mining began in Sadler in FY19.
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length.	A summary of the data present in the Raleigh and Sadler deposits can be found above. The collar locations are presented in plots contained in the NSR 2019 resource report. Drill holes vary in survey dip from +48 to -83, with hole depths ranging from 15 m to 950 m, and having an average depth of 180 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All of the drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	The exclusion of nay data is not considered material
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2 m of low-grade material (considered < 2.0 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 2.0 g/t are considered significant, however, where wide zones of low grade are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	True widths have been calculated for intersections of the known ore zones, if unknown, the length is notes as "downhole length"
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.	Appropriate plans and section have been included at the end of this Table and in the body of the NSR 2019 resource report.

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Criteria	JORC Code explanation	Commentary
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	No other material exploration data has been collected for this area.
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).	There are no plans for drilling at Raleigh-Sadler in FY19-20, although this does not preclude future drilling to extend Raleigh-Sadler.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

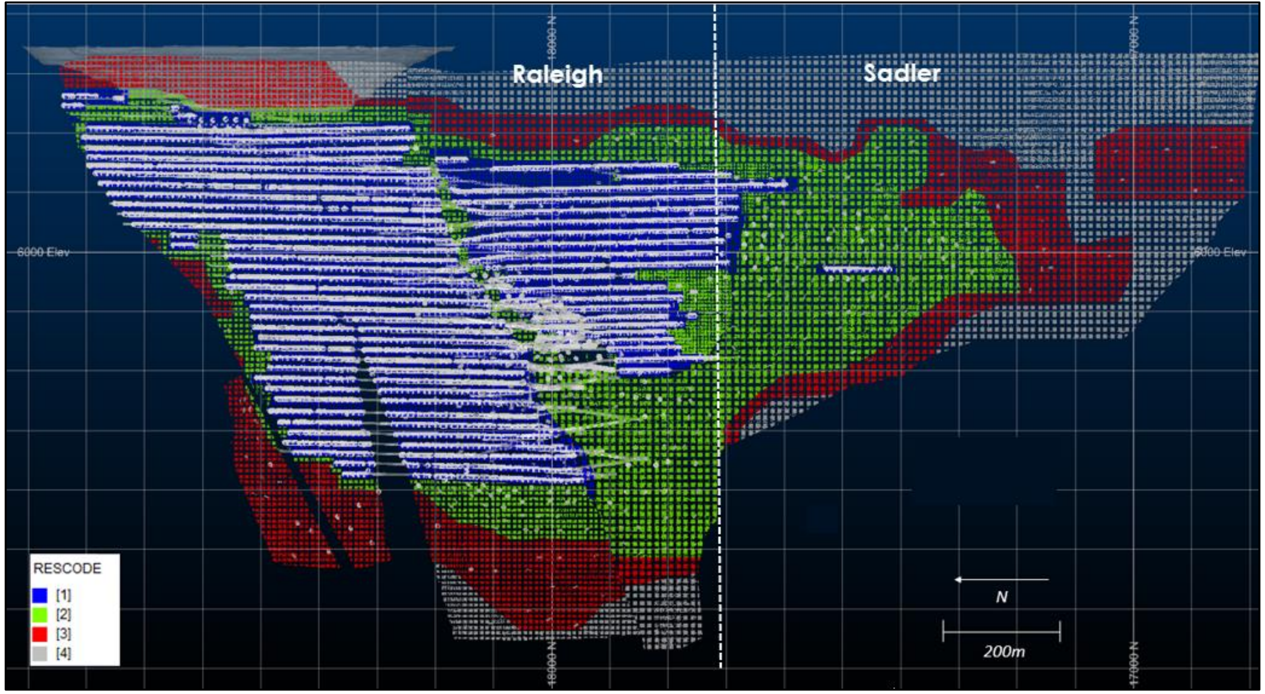

Figure 1. Long section view of the Raleigh and Sadler deposits and data used for estimation

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Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are either recorded on paper and manually entered into a database system or is captured digitally via a logging laptop and directly loaded into the database system. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly into the database from laboratory and survey derived files.
	Data validation procedures used.	The database has further checks performed prior to estimation to confirm data validity. The complete exported database (including drill and face samples) is imported into Datamine and checked visually for any apparent errors i.e. holes or faces sitting between levels or not on surface DTM's. Multiple checks are then made on numerical data. These include: • Empty table checks to ensure all relevant fields are populated; • Unique collar location check; • Distances between consecutive surveys is no more than 60m for drill-holes; • Differences in azimuth and dip between consecutive surveys of no more than 0.3 degrees; • The end of hole extrapolation from the last surveyed shot is no more than 30 m; • Underground face sample lines are not greater than +\- 5 degrees from horizontal Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported. This data will not be used in the estimation process. Several drilling programs completed between 2015 and 2016 had erroneous metre depths recorded by the drillers. This resulted in multiple drill-holes recording the intersection of the main Raleigh structures several metres earlier than expected. Until underground development had progressed to these elevations, this was not possible to determine. Unfortunately, there is not a uniform translation that can be applied; therefore these drill-holes have been omitted from the ore wireframe interpretations and flagged as invalid. However, where there were no QAQC issue with the assays, the correct intervals have been recorded, the translation in the easting direction required for them to be in the 'correct' location (based on development above and below) applied, and these intervals were appended to the data set before compositing. The same sample translation method has been applied to surface drilling in between development levels which are deemed to cause an unrealistic kink in the wireframe interpretation. This is only done after a thorough investigation of the surrounding data to ensure that no secondary veining is present in the footwall or hanging wall and that no separate lodes are missed. In addition to being Resource Flagged as "Yes" or "No", drill holes are assigned a Data Class, which provides a secondary level of confidence in the data quality. Data Class (DC) values range from 0 to 3, with criteria summarised below: • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR Recent data; minor issues with data such as QAQC fail but away from the ore zone. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The geological interpretations underpinning these resource models were prepared by geologists working in the mine and in direct, daily contact with the ore body. The estimation of grades was undertaken by personnel familiar with the ore body and the general style of mineralisation encountered. The Senior Resource Geologist, a competent person for reviewing and signing off the Raleigh estimate maintained a site presence throughout the process.
	If no site visits have been undertaken indicate why this is the case.	The Competent Person has maintained a presence onsite.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the Raleigh and Sadler deposit was carried out using a systematic approach to ensure continuity of the geology and estimated mineral resource. The confidence in the geological interpretation is high and is supported with information acquired during ore development as well as from drilling. The interpretation of all Raleigh and Sadler mineralisation wireframes were conducted using the sectional interpretation method. Where development levels were present sectional interpretation was completed in plan view at approximately 5 m spacing to allow for a better constrained and geologically realistic wireframe. Where only drilling data was present sectional interpretation was completed in cross-section view at approximately 10 – 20 m spacing. Wireframes were checked for unrealistic volumes and updated where appropriate. Checks were made to ensure that the wireframed volume agreed with the true ore widths of drill hole intersections. As a rule, wireframe extrapolation was limited to one half of the average drill spacing.

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Criteria	JORC Code explanation	Commentary
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drill holes, underground face channel data, 3D photogrammetry and structural models.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations have been put forward
	The use of geology in guiding and controlling Mineral Resource estimation.	The interpretation of Raleigh and Sadler mineralisation is based on the presence of mineralised structure (veining and shear), ore-bearing mineralogy (gold and associated sulphides), assayed samples and continuity between sections. Interpretation of the **Raleigh Main Vein** (RMV) is based on the presence of a high-grade laminated quartz vein. Pinch-outs are common and significant time has been invested into ensuring a wireframe model is created that best represents the variable width of the lode. Volume considerations are of particular importance for the RMV as the average ore width is < 0.3 m. The **Raleigh Main Shear** (RMS) is located adjacent to the RMV and migrates between the hangingwall and footwall along the contact between the Quartz arenite (SAQ) and Intermediate andesite (IA). It presents as a zone of increased shear and, on rare occasions, some minor veining can also be present. A **Halo** lode (halo) has been estimated that estimates grade present between the RMV and RMS. **Skinners Lode** (SKV) is in the hangingwall of the RMV and presents as a chalky-white vein (as opposed to the laminated grey-white RMV). Pinch-outs are less common, and width is more consistent than the RMV. Skinners lode truncates against the RMV at its southern extent. The **ZZ and ZZ2** are two hangingwall lodes comprised of stockwork-style vein arrays which dips shallowly to the west. They are truncated at the east by the RMV and at the west by the SKV. The **RMVS** lode includes both the Raleigh vein and shear structures where data density is not sufficient to confidently separate the two mineralisation types. This has been extended from Raleigh to Sadler and constitutes most of the Sadler ore body, where the RMV has not been delineated from ore development.
	The factors affecting continuity both of grade and geology.	Grade continuity is affected when the percentage of quartz decreases within the main Raleigh structure and only a sheared structure remains. This results in lower grade in areas where only shear is present and higher grade where quartz is evident.
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 strike length of the different ore systems varies from ~100 m to 600 m, the Raleigh Main Vein and Shear (RMVS) being the most extensive. The individual ore bodies occur in a major regional shear system extending over 10s of kilometres. Ore body widths are typically in the range of 0.1 - 1.1 m. RMV records the narrowest at 0.1 m and SKV the widest at 1.1 m. RMV has an average width of 0.3 m Mineralisation is known to occur from the base of cover to around 900 m below surface.
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.	All Raleigh mineralisation zones except for the Raleigh Main Shear (RMS) used direct grade estimation by Ordinary Kriging. The RMS was estimated using Categorical Indicator Kriging. Typically, full length composites were used, determined from statistical analysis of all sample lengths in the domain dataset. All estimation was completed using Datamine RM software. Details on the estimation by ore lode is summarised below: **RMV** – Estimated as a single domain. Data was top cut to 1000 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the north. Searches were completed in three passes. Search ranges of 100 m in direction 1 (dir1), 75 m in direction 2 (dir2) and 50 m in direction 3 (dir3) were used. The first pass had a minimum of 8 samples and a maximum of 12 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. No additional sample restrictions were used for the RMV estimate. **RMS** – divided into two grade subdomains. Binary estimate completed on composited data set with indicators (0 or 1) applied based on grade cut-off (> 2.5 g/t) and quartz vein presence (vein logged in LITH1 field). Estimate returns result between 0 and 1. Cut-off of 0.45 chosen to ascertain two grade subdomains (high grade and low grade) for final gold estimate. Data sets top cut to 150 g/t (high grade subdomain) or 50 g/t (low grade subdomain) using the influence limitation approach. Same variogram and search parameters used for both high- and low-grade subdomains. Variogram indicates grade continuity plunging moderately to the north. Searches were completed in three passes. Search ranges of 100 m in dir1, 80 m in dir2 and 40 m in dir3 were used. The first pass had a minimum of 6 samples and a maximum of 8 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The minimum number of samples allowed has been decreased for each subsequent search pass, while the maximum amount has stayed the same. No additional sample restrictions were used for the RMS estimate. **RMVN** – Divided into two subdomains based on data density. Data was top cut to 500 g/t and 100 g/t (for high-density and low-density subdomains respectively) using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging steeply to the north. Searches were completed in three passes. For the high data-density estimate, search ranges of 100 m in dir1, 50 m in dir2 and 100 m in dir3 were used. For the low data-density estimate, search ranges of 190 m in dir1, 140 m in dir2 and 70 m in dir3 were used. The first pass had a minimum of 4 - 6 samples and a maximum of 6 - 10 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The minimum and maximum number of samples required are the same for all search passes. For the low data density estimate, a restriction of 3 samples was used based on the DHTYPE, which ensured that a maximum of 2 channel samples were able to be used for each block estimate. Estimation was completed using a soft boundary between the high and low-density subdomains and between adjacent Raleigh domains (RMV, RMS and RMVS).

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Criteria	JORC Code explanation	Commentary
		RMVS – Divided into two subdomains based on grade. Data was top cut to 200 g/t and 10 g/t (for high-grade and low-grade subdomains respectively) using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the south. Searches were completed in three passes. For the high-grade estimate, search ranges of 150 m in dir1, 80 m in dir2 and 50 m in dir3 were used. For the low-grade estimate, search ranges of 250 m in dir1, 150 m in dir2 and 100 m in dir3 were used. The first pass had a minimum of 5 - 6 samples and a maximum of 7 - 10 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been decreased for each subsequent search pass, while the minimum amount has stayed the same. For the high-grade estimate, a restriction of 3 samples was used based on the DHTYPE, which ensured that a maximum of 3 channel samples were able to be used for each block estimate. For the low-grade estimate, a restriction of 1 channel sample was used. Estimation was completed using a soft boundary between the high and low-density subdomains and between adjacent Raleigh domains (RMV, RMS and RMVN). **RMV/RMS Halo** (halo) - Estimated as a single domain. Data was top cut to 10 g/t using the influence limitation approach. Variography borrowed from the RMV estimate, as not enough sample pairs were available to construct a coherent variogram. Searches were completed in three passes. Search ranges of 100 m in dir1, 75 m in dir2 and 50 m in dir3 were used. The first pass had a minimum of 8 samples and a maximum of 12 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. No additional sample restrictions were used for the halo estimate. **SKV** – Divided into two subdomains based on grade. Data was top cut to 600 g/t and 30 g/t (for high-grade and low-grade subdomains respectively) using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the north. Searches were completed in three passes. For the high-grade estimate, search ranges of 100 m in dir1, 60 m in dir2 and 40 m in dir3 were used. For the low-grade estimate, search ranges of 100 m in dir1, 50 m in dir2 and 30 m in dir3 were used. The first pass had a minimum of 4 - 7 samples and a maximum of 6 - 10 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The minimum and maximum number of samples required are the same for all search passes. No additional sample restrictions were used for the SKV estimate. **ZZ** - Estimated as a single domain. Data was top cut to 60 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging shallowly to the south. Searches were completed in three passes. Search ranges of 30 m in dir1, 15 m in dir2 and 10 m in dir3 were used. The first pass had a minimum of 6 samples and a maximum of 10 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The minimum and maximum number of samples required are the same for all search passes. A restriction of 4 samples was used based on the BHID, which ensured that a maximum of 4 samples were able to be used from an individual drill hole. **ZZ2** - Estimated as a single domain. Data was top cut to 40 g/t using the influence limitation approach. Variography was completed on the composited data file, indicating grade continuity plunging moderately to the north. Searches were completed in three passes. Search ranges of 25 m in dir1, 15 m in dir2 and 10 m in dir3 were used. The first pass had a minimum of 8 samples and a maximum of 12 samples. The second pass doubled the ranges, and the third pass increased the search range by a factor of 10. The maximum number of samples allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. A restriction of 2 samples was used based on the DHTYPE, which ensured that a maximum of 2 channel samples were able to be used for each block estimate
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Check estimates have been completed for all lodes. These include Inverse Distance (ID) and Nearest Neighbour (NN) estimates.
	The assumptions made regarding recovery of by-products.	No assumptions are made, and gold is the only metal defined for estimation.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements were estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Block sizes varied depending on sample density. In areas of high data-density (underground face samples with average spacing of 3 – 4 m) a 5 x 5 x 5 m block size was chosen. Low density drill spacing is defined as approximately 30 m or greater and a 10 x 10 x 10 m block size was chosen. Estimates were completed with soft boundaries between varying block size estimates (unless a geological feature and contact analysis indicated a hard boundary was required) and added together following individual estimation for final validations Search ellipse dimensions were derived from the variogram model ranges, or isotropic ranges based on data density where insufficient data was present for variography analysis.
	Any assumptions behind modelling of selective mining units.	Selective mining units were not used during the estimation process.
	Any assumptions about correlation between variables.	All variables were estimated independently of each other. Density has used estimation parameters based on gold.

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Criteria	JORC Code explanation	Commentary
	Description of how the geological interpretation was used to control the resource estimates.	Hangingwall and footwall wireframe surfaces were created using sectional interpretation. These were used to define the Raleigh mineralised zones based on the geology and gold grade. **Raleigh Main Vein** (RMV) - Steeply dipping structure with smoky quartz veining evident from drilling and development **Raleigh Main Vein South** (RMVS) - Steeply dipping structure with smoky quartz veining and shearing evident from drilling and development **Raleigh Main Vein North** (RMVN) - Steeply dipping structure with smoky quartz veining evident from drilling and development **Raleigh Main Shear** (RMS) - Steeply dipping shear structure sitting in the footwall of the RMV with occasional quartz vein strings, evident from development. **Skinners Vein** (SKV) - Steeply dipping structure with chalky-white quartz veining sitting in the hanging wall of the RMV. **ZZ/ZZ2** - Low angled narrow stacked quartz veining, sitting between the RMV and SKV, evident from drilling and development in the 5880 level. For mine planning purposes a waste model is created by projecting the hanging wall and footwall surfaces 5 m either side. A default grade of 0.1 g/t is assigned and the same resource classification as the adjacent ore lode is applied.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the mean by more than 5% and reducing the coefficient of variation to around 1.2. Top cuts vary by domain and range from 10 to 1000 g/t. The top cut values are applied in several steps, using a technique called influence limitation top cutting. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, where gold requires a top cut, the following variables will be created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) • AU_BC (spatial variable; values present where AU data is top cut) The top-cut and non-top cut values are estimated using search ranges based on the modelled gold variogram, and the *_BC values estimated using very small ranges (e.g. 5 x 5 x 5m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). A hard top cut is applied instead of/as well in the following situations: If there are extreme outliers within an ore domain If the area has a history of poor reconciliation (i.e. overcalling)
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Statistical measures of Kriging error, such as Kriging Efficiency and Slope of Regression, are used to assess the quality of the estimation for each domain. Differences in the global grade of the declustered composite data set and the average model grade were within 10%, or justification for a difference outside 10% was explicable. Swath plots comparing composites to block model grades are created and visual plots are prepared summarising the critical model parameters. Visually, block grades are assessed against drill hole and face data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 2.77 g/t cut off within 2.5 m minimum mining width MSO's (no additional dilution applied), using a $AU1750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No mining assumptions have been made during the resource wireframing or estimation process.

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Criteria	JORC Code explanation	Commentary
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.	Metallurgical test work results show that the mineralisation is amendable to processing through the Kanowna Belle treatment plant. Ore processing throughput and recovery parameters were estimated based on historic performance and potential improvements available using current technologies and practices.
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 green fields 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.	A "Licence to Operate" is held by the operation which is issued under the requirement of the "Environmental Protection Act 1986", administered by the Department of Environment (DoE). The licence stipulates environmental conditions for the control of air quality, solid waste management, water quality, and general conditions for operation. Groundwater licenses are held for water abstraction, including production bore field water use for mineral processing, and mine dewatering, in accordance with the Rights in Water and Irrigation Act 1914. These licenses are also regulated by DoE and are renewable on a regular basis. Kanowna Operations conduct extensive environmental monitoring and management programs to ensure compliance with the requirements of the licences and lease conditions. An Environmental Management System is in place to ensure that Northern Star employees and contractors exceed environmental compliance requirements. The Kalgoorlie operations are fully permitted including groundwater extraction and dewatering, removal of vegetation, mineral processing, and open pits. Kalgoorlie Operations have been compliant with the International Cyanide Management Code since 2008. Compliance with air quality permits is particularly important at Kanowna because of the roaster operation and because there are three facilities in the Kalgoorlie region emitting SO_2 gas. Kanowna has a management program in place to minimize the impact of SO_2 on regional air quality and ensure compliance with regulatory limits.
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.	A thorough investigation into average density values for the various lithological units at Raleigh-Sadler was completed and the mean densities by lithology were coded into the database. Where there were no measurements for a specific lithology and default of 2.7 was applied. Density was then estimated by Ordinary Kriging using the associated gold estimation parameters for that domain. Post estimation, default density values for the oxide and transition zones were applied, based on regional averages.
	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.	No/minimal voids are encountered in the ore zones and underground environment.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Assumptions on the average bulk density of individual lithologies, based on 2920 bulk density measurements at Raleigh. Assumptions were also made based on regional averages, on the default densities applied to oxide (1.8 t/m^3) and transitional (2.3 t/m^3) material, due to lack of measurements in these zones.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on a series of factors including: • Geologic grade continuity • Density of available drilling • Statistical evaluation of the quality of the kriging estimate • Confidence in historical data, based on the new Data Class system
	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, quality, quantity and distribution of the data).	All relevant factors have been given due weighting during the classification process.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resource model methodology is appropriate, and the estimated grades reflect the Competent Persons' view of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	All resource models have been subjected to internal peer reviews.
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.	These mineral resource estimates are considered as robust and representative of the Strzelecki style of mineralisation. The relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC Code.

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Criteria	JORC Code explanation	Commentary
	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.	The statement relates to global estimates of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	No reconciliation factors are applied to the resource post-modelling.

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star 2019MY Resource
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been undertaken by the competent person.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	Feasibility Study
	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.	Upgrade of previous Ore Reserve
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Budget costs and physicals form the basis for Cut Off Grade calculations. Mill recovery is calculated based on historical recoveries achieved Various cut off grades are calculated including a break-even cut-off grade (BCOG), variable cut-off grade (VCOG) and Mill cut-off grade (MCOG). The VCOG is used as the basis for stope design, with areas requiring significant development assessed by detailed financial analysis to confirm their profitability.
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).	Mineral Resource is converted to Ore Reserve after completing a detailed mine design and associated financial assessment.
	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.	Selected mining method deemed appropriate as it has been used at Raleigh since 2005.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	Design parameters include a 22m level spacing with a stope strike length of 15m for dilution control purposes. This correlates to a Hydraulic Radius of 4.5m
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	Not applicable - this table one applies to underground mining only.
	The mining dilution factors used.	Based on historical mine performance, mining dilution of 8% (rock and paste) for stoping additional to minimum mining width is applied, as well as 10% dilution for Ore development.
	The mining recovery factors used.	Mining recovery factor of 94% is applied based on historical data
	Any minimum mining widths used.	A minimum stope width of 3.0m where the vein is less than 2m wide. An additional 1m is applied where the vein width is greater than 2m wide.

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Criteria	JORC Code explanation	Commentary
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred blocks are excluded from the reported reserve.
	The infrastructure requirements of the selected mining methods.	Infrastructure in place, currently an operating mine.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	All EKJV ore is treated at the Kanowna Belle milling facilities. These facilities are designed to handle approximately 1.8 million tonnes of feed per annum. The plant has the capability to treat both refractory and free milling ores, through either using the flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery), or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plant campaigns both refractory and free milling ores every month. Between campaigns, the circuit is “cleaned out” using mineralised waste. The plant is made up of crushing, grinding, gravity gold recovery, flotation, roasting, CIL, elution and gold recovery circuits.
	Whether the metallurgical process is well-tested technology or novel in nature.	Milling experience gained over plus 10 years operation.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Milling experience gained over plus 10 years operation.
	Any assumptions or allowances made for deleterious elements.	No assumption made.
	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.	Milling experience gained over plus 10 years operation.
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Rubicon, Hornet, Pegasus operations are currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are granted.
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.	All current site infrastructure is suitable to the proposed mining plan.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mine development capital cost based on historical performance on site and life-of-mine forward planning. Plant and equipment capital are based on site experience and the LOM plan.
	The methodology used to estimate operating costs.	All overhead costs and operational costs are projected forward on a first principals modelling basis.
	Allowances made for the content of deleterious elements.	No allowances made.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Corporate guidance.
	The source of exchange rates used in the study.	Corporate guidance.
	Derivation of transportation charges.	Historic performance.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance.
	The allowances made for royalties payable, both Government and private.	All royalties are built into the cost model.
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.	AUD$ 1,500/oz gold.

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Criteria	JORC Code explanation	Commentary
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	It is assumed all gold is sold directly to market at the Corporate gold price guidance of AUD$1,500/oz.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not Applicable.
	Price and volume forecasts and the basis for these forecasts.	Corporate guidance.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not Applicable.
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.	All costs assumptions are made based on historical performance from the mine and current economic forecast seen as representative of current market conditions.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities have been used with gold price ranges of AUD$1,300 to AUD$1,700 per ounce.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	No Issues.
	Any identified material naturally occurring risks.	No Issues.
	The status of material legal agreements and marketing arrangements.	No Issues.
	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.	No Issues.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	Ore Reserves classifications are derived from the underlying resource model classifications – i.e. Measure Resource material is converted to either Proved or Probable Reserves, with Indicated Resource material converting to Probable Reserve.
	Whether the result appropriately reflects the Competent Person’s view of the deposit.	The results accurately reflect the competent persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Nil.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Reserve has been internally reviewed in line with Northern Star Resource governance standard for Reserves and Resources. There have been no external reviews of this Ore reserve estimate.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve Estimate is considered high based on current mine and reconciliation performance.
	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.	Estimates are global but will be reasonably accurate on a local scale.

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Criteria	JORC Code explanation	Commentary
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Not applicable.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Historical reconciliation of Rubicon, Hornet and Pegasus mine production has been used in the generation both the underlying Resource estimate and subsequent modifying factors applied to develop a Reserve.

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JORC Code, 2012 Edition – Table 1 Report

South Kalgoorlie Operations (excluding HBJ and Mt Martin): Resources and Reserves – 30 June 2019

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.	Chips from the RC drilling face-sampling hammer are collected for assaying. Samples have been collected from numerous other styles of drilling at SKO, including but not limited to RAB, air core, blast-hole, sludge drilling and face samples.
	Include reference to measures taken to ensure sample retrospectivity and the appropriate calibration of any measurement tools or systems used.	Diamond drill-core is geologically logged and then sampled according to geology (minimum sample length of 0.4 m to maximum sample length of 1.5 m) – where consistent geology is sampled, a 1m length is used for sampling the core. The core is sawn half-core with one half sent off for analysis.
	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 30g 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: Sampling from a standard 5½" RC, three tier riffle splitter (approximately 5kg sample), split to a 12.5% fraction (approximately 3kg) or to a 12% fraction via a rig-mounted cone splitter. All residual material is retained on the ground in rows of 10 or 20 samples. Four-metre composites are obtained via representative scoop / spear sampling of the one-metre residual piles, until required for re-split analysis (samples returning Au >0.2ppm) or eventual disposal. Historical RC drilling is assumed to employ similar practices. An assumed 90% chip recovery (losses to fines) from RC drilling.
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 drilling is used for either testing / targeting deeper mineralised systems or to define the orientation of the host geology. Many of these holes had RC pre-collars generally to a depth of between 60 – 120m, followed by a diamond tail. The majority of these holes have been drilled at NQ2 size with minor HQ sized core. All diamond holes were surveyed during drilling with downhole cameras, and then at end of hole using a Gyro Inclinometer at 5 or 10 m intervals. Drill hole collars were surveyed by onsite mine surveyors. RC drilling is used predominantly for defining and testing for near-surface mineralisation and utilises a face sampling hammer with the sample being collected on the inside of the drill-tube. RC drill holes utilise downhole single or multi shot cameras. Drill hole collars were surveyed by onsite mine surveyors.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	RC drilling contractors adjust their drilling approach to specific conditions to maximize sample recovery. Moisture content and sample recovery is recorded for each RC sample. No recovery issues were identified during RC drilling programs. Recovery was poor at the very beginning of each hole, as is normal for this type of drilling in overburden.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	Representation is assured through qualified geologists identifying intervals for sampling which are related directly to observed geology.
	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 defined relationship exists between sample recovery and grade. Nor has sample bias due to preferential loss or gain of fine or coarse material been noted.
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.	Northern Star surface diamond drill-holes are all orientated and have been logged in detail for geology, veining, alteration, mineralisation and orientated structure. Northern Star underground drill-holes are logged in detail for geology, veining, alteration, mineralisation and structure. Core has been logged in enough detail to allow for the relevant mineral resource estimation techniques to be employed. Surface core is photographed both wet and dry and underground core is photographed wet. All photos are stored on the companies' servers, with the photographs from each hole contained within separate folders. Development faces are mapped geologically. RC, RAB and Air core chips are geologically logged. Sludge drilling is logged for lithology, mineralisation and vein percentage. Logging is quantitative in nature. All holes are logged completely, all faces are mapped completely.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All logging is quantitative where possible and qualitative elsewhere. A photograph is taken of every core tray.
	The total length and percentage of the relevant intersections logged.	Chip samples have been logged by qualified geologists to a level of detail to support the Mineral Resource estimate.

APPENDIX B: TABLE 1

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.	NQ2 and HQ diameter core is sawn half core using a diamond-blade saw, with one half of the core consistently taken for analysis. Smaller sized core (LTK48 and BQ) are whole core sampled. The un-sampled half of diamond core is retained for check sampling if required. SKO staff collect the sample in pre-numbered calico sample bags which are then submitted to the laboratory for analysis. Delivery of the sample is by a SKO staff member.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC samples are collected at 1m intervals with the samples being riffle split through a three-tier splitter. The samples are collected by the RC drill crews in pre-numbered calico sample bags which are then collected by SKO staff for submission. Delivery of the sample to the laboratory is by a SKO staff member.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Upon delivery to the laboratory, the sample numbers are checked against the sample submission sheet. Sample numbers are recorded and tracked by the laboratory using electronic coding. Sample preparation techniques are considered appropriate for the style of mineralisation being tested for – this technique is industry standard across the Eastern Goldfields.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are available to guide the selection of sample material in the field. Standard procedures are used for all process within the laboratory.
	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.	Field duplicates are taken for diamond drill core samples at a rate of 1 in 30.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material being sampled.
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.	Only nationally accredited laboratories are used for the analysis of the samples collected at SKO. The laboratory oven dries, and if necessary (if the sample is >3kg), riffle split the sample, which is then jaw crushed and pulverised (the entire 3kg sample), in a ring mill to a nominal 90% passing 75 microns. All recent RC and Diamond core samples are analysed via Fire Assay, which involves a 30g charge (sub-sampled after the pulverisation) of the analytical pulp being fused at 1050°C for 45 minutes with litharge. The resultant metal prill is digested in Aqua regia and the gold content determined by atomic adsorption spectrometry – detection limit is 0.01 ppm Au.
	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.	No geophysical tools were used to determine any element concentrations
	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.	Quality Assurance and Quality Control (QA/QC) samples are routinely submitted by SKO staff and comprise standards, blanks, assay pills, field duplicates, lab duplicates and repeat analyses. The results for these QA/QC samples are routinely analysed by Senior Geologists with any discrepancies dealt with in conjunction with the laboratory prior to the analytical data being imported into the database. There is limited information available on historic QA/QC procedures. SKO has generally accepted the available data at face value and carry out data validation procedures as each deposit is re-evaluated. The analytical techniques used are considered appropriate for the style of mineralisation being tested for – this technique is industry standard across the Eastern Goldfields. Ongoing production data generally confirms the validity of prior sampling and assaying of the mined deposits to within acceptable limits of accuracy.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All data used in the calculation of resources and reserves are compiled in databases which are overseen and validated by senior geologists.
	The use of twinned holes.	Virtual twinned holes have been drilled in several instances across all sites with no significant issues highlighted. Drill hole data is also routinely confirmed by development assay data in the operating environment.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Primary data is collected utilising LogChief. The information is imported into a SQL database server and verified.
	Discuss any adjustment to assay data.	All data used in the calculation of resources and reserves are compiled in databases (underground and open pit) which are overseen and validated by senior geologists. No adjustments have been made to any assay data.

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
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.	Collar coordinates for surface RC and diamond drill-holes were generally determined by either RTK-GPS or a total station survey instrument. Underground drill-hole locations (Mount Marion) were all surveyed using a Leica reflector less total station. Recent surface diamond holes were surveyed during drilling with down-hole single shot cameras and then at the end of the hole by Gyro-Inclinometer at 5 or 10mm intervals. Holes not gyro-surveyed were surveyed using Eastman single shot cameras at 20m intervals. RC drill-holes utilised down-hole single shot camera surveys spaced every 15 to 30m down- hole. Down-hole surveys for underground diamond drill-holes were taken at 15 – 30m intervals by Reflex single-shot cameras.
	Specification of the grid system used.	The orientation and size of the project determines if the resource estimate is undertaken in local or MGA 94 grid. Each project has a robust conversion between local, magnetic and an MGA grid which is managed by the SKO survey department.
	Quality and adequacy of topographic control.	Topographic control is generated from RTK GPS. This methodology is adequate for the resources in question.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill spacing ranges from 10m x 5m grade control drilling to 100m x 100m at deeper levels of the resources. Resources are classified based on drill density and geologic continuity.
	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.	Interpretations in this area are well understood and is supported by the knowledge from open pit and underground operations. However, given the mineralisation is controlled by shear zones the mineralisation continuity is considered to be less understood. The resource is classified on a combination of drill density and the number of samples used to estimate the resource blocks.
	Whether sample compositing has been applied.	Compositing is carried out based upon the modal sample length of each project.
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.	Drilling intersections are nominally designed to be as perpendicular to the orebody as far as underground infrastructure constraints / topography allows. Development sampling is nominally undertaken normal to the various orebodies. Where drilling angles are sub optimal the number of samples per drill hole used in the estimation has been limited to reduce any potential bias.
	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.	It is not considered that drilling orientation has introduced an appreciable sampling bias.
Sample security	The measures taken to ensure sample security.	For samples assayed at the on-site laboratory facilities, samples are delivered to the facility by Company staff. Upon delivery the responsibility for sample security and storage falls to the independent third-party operators of these facilities. For samples assayed off-site, samples are delivered to a third-party transport service, who in turn relay them to the independent laboratory contractor. Samples are stored securely until they leave site.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	Site generated resources and reserves and the parent geological data is routinely reviewed by the Northern Star Corporate technical team

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.	State Royalty of 2.5% of revenue applies to all tenements, although does not apply to the 16 freehold titles (which host the majority of SKO's Resource inventory). There are a number of minor agreements attached to a select number of tenements and locations with many of these royalty agreements associated with tenements with no current Resources and/or Reserves. A royalty is payable in the form of 1.75% of the total gold ounces produced from the following resources: Shirl Underground, Golden Hope, Bellevue, and any reclaimed tailings. The South Kalgoorlie Operations consists of 35 Mining Leases and 19 Exploration and Prospecting Licences. The Project also includes 9 Miscellaneous Licences, 2 groundwater Licences and 16 Freehold Lots known as the Hampton "Exempted East Locations". The Area of the leases covers approximately 35,638 Hectares with a further 71,861 Hectares of Freehold Land.

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
	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 leases and licences to operate are granted and in the order of 2 and 21 years. There are no known impediments to continued operation.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The HBJ 'line of lode' is a 6 km zone of mineralisation that extends from Golden Hope in the south to Celebration in the north. The existing HBJ pit was mined for over 25 years producing approximately 1.6 Mozs Au and was owned by separate companies across the Location 48 and Location 50 tenement boundary. Gold was first discovered in the New Celebration area in 1919 and a short-lived gold rush ensued. Intermittent exploration for gold and nickel was undertaken by a variety of companies in the 1960s and 1970s. The rising gold price further rekindled interest in the area in the 1980s, and open-pit mining at New Celebration started in 1986 by a joint venture comprising Newmont Holdings Limited (subsequently Newcrest; 60%), Hampton Areas Australia Ltd., (25%) and Mt Martin Gold Mines (15%), which merged with Titan Resources in 1993. The New Celebration project includes the Hampton Boulder deposit. In June 2001 Hill 50 Gold agreed to purchase the New Celebration project from Newcrest Mining. In December 2001 Harmony Gold Mining acquired Hill 50 Gold, the transaction giving Harmony Gold Mining a 100% interest in the New Celebration project. The Jubilee deposit located south of the Hampton Boulder deposit was evaluated and mined by Hampton Areas Australia Ltd from 1984 to 1996 with open pit mining starting in 1987. New Hampton Goldfields (New Hampton) acquired the Jubilee deposit in 1996. In May 2001, Harmony Gold Mining acquired New Hampton, and combined the operations of New Hampton's Jubilee operations and associated small open pits with the New Celebration project into the South Kalgoorlie Operations (SKO). In 2007, Dioro Exploration NL (Dioro) acquired the SKO from Harmony Gold (Australia) Pty Ltd (Harmony) via its wholly owned subsidiaries, South Kal Mines Pty Ltd, New Hampton Goldfields Ltd and Aurora Gold (WA) Pty Ltd. The tenement package at SKO was then purchased by Avoca Resources in April 2010, which was subsequently acquired by Alacer Gold Corp. Pty Ltd in early 2011. Westgold Resources Limited acquired the SKO tenement holdings in October 2013 via the acquisition of Alacer Gold's Australian assets. In April 2018 Northern Star Resources acquired the SKO tenement holdings with the purchase of HBJ Minerals Pty Ltd from Westgold.
Geology	Deposit type, geological setting and style of mineralisation.	Stratigraphy for the Ora Banda and Kalgoorlie Domains is relatively well-known and comprise (from stratigraphically lowest) a lower basalt unit, komatiitic to high-magnesian basaltic rocks, an upper basalt unit and overlying felsic volcanic-sedimentary units. Conglomeratic and sandstone units unconformably overlie the upper felsic units adjacent to major shear zones. Layered mafic sills occur within various stratigraphic units and cross-cutting Proterozoic dykes also occur throughout the region. Metamorphic grade ranges from upper greenschist to upper amphibolite facies. The deformation history of the area is generally divided into four main phases, comprising north-directed thrusting with recumbent folding and stratigraphic repetition in D1. The second deformation (D2) resulted in north-northwest trending folds which are reflected in the dominant north-northwest trending fabric of the greenstone belts. Shortening continued during D3 with strike slip movement along northwest to north northwest trending shear zones and D4 brittle faulting. Mount Marion: The Mount Marion deposit is located on the eastern side of the Coolgardie Domain within a flexure in the Karramindie Shear Zone. It is hosted within a sub-vertical sequence of meta- komatiites intercalated with metasediments that have been metamorphosed to amphibolite facies. Gold mineralisation occurs in a footwall and hangingwall lode, each ranging in thickness from 2 to 15m. The mineralisation plunges steeply to the west and is open at depth. Pernatty: The Pernatty deposit is hosted within a granophyric phase of a gabbro and is controlled by a structurally complex interaction of a number of major shear zones. Shearing has altered the original granophyric quartz dolerite to a biotite-carbonate-plagioclase- pyrite schist. The sequence has also been intruded by mafic and felsic porphyritic dykes, which are also mineralised.
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length.	No drill hole information is being presented in this release.
	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.	Exclusion of information is not material.

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Criteria	JORC Code explanation	Commentary
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.	No drill hole information is being presented in this release.
	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.	No drill hole information is being presented in this release.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No drill hole information is being presented in this release.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	No drill hole information is being presented in this release.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	No drill hole information is being presented in this release.
	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').	No drill hole information is being presented in this release.
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.	No drill hole information is being presented in this release.
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.	No drill hole information is being presented in this release.
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.	There is no other substantive exploration data associated with this release.
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).	Ongoing surface and underground exploration activities will be undertaken to support continuing mining activities at Northern Star Gold Operations.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	No diagrams attached, Mt Marion and Pernatty are due for major review next year.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	The database used for the estimation was extracted from the Northern Star's DataShed database management system stored on a secure SQL server.
	Data validation procedures used.	As new data is acquired it passes through a validation approval system designed to pick up any significant errors before the information is loaded into the master database. The information is uploaded by a series of Sequel routines and is performed as required. The database contains diamond drilling (including geotechnical and specific gravity data) and some associated metadata. By its nature this database is large in size, and therefore exports from the main database are undertaken (with or without the application of spatial and various other filters) to create a database of workable size, preserve a snapshot of the database at the time of orebody modelling and interpretation and preserve the integrity of the master database.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The CP has not visited site.
	If no site visits have been undertaken indicate why this is the case.	The Resource process has been closely overseen by company personnel who have visited the site. The competent person has reviewed the inputs and outcomes of the work, including engagement with persons familiar with the site.

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	Mount Marion: The lithological and structural model for the Mount Marion deposit is well understood as it is supported by the knowledge gained from open-pit and underground operations. The mineralisation is hosted along a dilational flexure within the lode gneiss with clearly defined contact mineralisation with the surrounding ultramafic lithologies. The lithological model is used as the basis for the mineralisation interpretation and has been derived from predominantly RC and Diamond drill-holes. The confidence of the geological controls on mineralisation is consistent with the resource classification applied to the deposit. No alternative interpretations have been devised for this deposit. Pernatty: Mineralisation at Pernatty is controlled by a complex arrangement of very well- defined shear zones with the highest-grade mineralisation associated with structural intersections and flexures along the three main shears. Given the consistency in orientation of the three main controlling shears, the confidence in the geological and mineralisation interpretation is deemed adequate.
	Nature of the data used and of any assumptions made.	Geological interpretation of the deposit was carried out using a systematic approach to ensure that the resultant estimated Mineral Resource figure is both sufficiently constrained, and representative of the expected sub-surface conditions.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations have been completed.
	The use of geology in guiding and controlling Mineral Resource estimation.	In all aspects of resource estimation, the factual and interpreted geology was used to guide the development of the interpretation.
	The factors affecting continuity both of grade and geology.	Continuity is affected by the orientation of the Boulder Lefroy Fault Zone, as well as alteration style within felsic and intermediate porphyries.
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.	Mount Marion mineralisation extends to just under 1km in strike length, 800m in depth with the lodes varying in width from 3 – 15m. The mineralisation is steeply plunging resulting in a very small surface expression of the lodes. The Pernatty deposit has a strike extent of 500m, 400m dip extent and up to 300m in lateral extent. The individual lodes are of varying orientations and are generally between 2 – 15m wide. All mineralisation is open 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.	Techniques employed at SKO for Modelling: Geological Interpretation: After validating the drill hole data to be used in the estimation, interpretation of the orebody is undertaken in sectional and / or plan view to create the outline strings which form the basis of the three-dimensional orebody wireframe. Wireframing is then carried out using a combination of automated stitching algorithms and manual triangulation to create an accurate three-dimensional representation of the sub-surface mineralised body. Compositing: Sample data was extracted from the database by first intersecting and flagging the database within the solid. The intersection was then composited into a composite database. The assay data for the project was composited downhole on a best fit 1m interval, which has eliminated residuals, which would previous be excluded from the estimate. No compositing was done across domain boundaries, honouring all existing domain flagging Statistical analysis: Statistical analysis was completed for Au for each mineralisation domain. Data for some of the domains exhibit an increased degree of skewness. Top cutting the data in these zones has reduced the skew of the data. To determine the top-cut values for each domain, an analysis was carried out on the composite data by use of the statistics, log probability plots. Search Ellipse: The search ellipses applied were based on a combination of drill hole spacing and variographic analysis. Various minimum and maximum samples were used in the first search with a maximum of four samples per drill-hole allowed. Several passes were used each with increasing search ellipse sizes, all the blocks in the mineralised domains were informed in the first pass.an and variance plots and histograms of Au distribution.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	The block models are depleted using surfaces / domains generated by the SKO Survey. Validation of the models was completed by visual inspection, statistical comparisons and comparison with reconciliation data, with the final model achieving a satisfactory validation.
	The assumptions made regarding recovery of by-products.	No assumptions have been made about the correlation between variables.

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Criteria	JORC Code explanation	Commentary
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No by-products or deleterious elements are estimated.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Cell sizes are selected for each deposit with reference to the available supporting data and the degree of geological confidence the company has in the deposit. Grades for 3D models were estimated into cells with size y =10m, x = 2.5m, z =10m. Search ellipse dimensions were derived from the variogram model ranges.
	Any assumptions behind modelling of selective mining units.	Selective mining units were not used during the estimation process.
	Any assumptions about correlation between variables.	No assumptions have been made about the correlation between variables.
	Description of how the geological interpretation was used to control the resource estimates.	A volume model was generated in Surpac v6.6 using topographic surfaces and mineralised zone wireframes as constraints.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were applied to the composited sample data with the intention of reducing the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data with a general aim of not impacting the mean by more than 5% and vary by domain.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	The estimation is validated using the following: a visual interrogation, a comparison of the mean composite grade to the mean block grade for each domain, a comparison of the wireframe volume to the block volume for each domain, Grade trend plots (moving window statistics), comparison to the previous resource estimate. The process undertaken indicates that the resource model is accurate as the spatial grade distribution of the data is generally well represented by the model.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The cut off grades used for the reporting of the Mineral Resources have been selected based on the style of mineralisation, depth from surface of the mineralisation and the most probable extraction technique.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	Mining of the “Surface” portion of the resource has been assumed to be via conventional surface mining techniques (hydraulic backhoe excavator and diesel haul tuck). Mining of the “Underground” portion of the resource has been assumed to be via conventional underground mining techniques. Minimum mining width of 2m in both the surface and underground environment assumed.
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 majority of the SKO resource base comprises deposits that have some level of mining history and hence established metallurgical properties.
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 green fields 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.	The significant operational history at SKO has allowed for a consistent set of environmental assumptions to be applied to the mineral resource deposits in the region.
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.	For Mount Marion and Pernatty, density values were based on historic mining reconciliations combined with bulk density check test work
	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.	No/minimal voids are encountered in the ore zones and underground environment

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Density values are assigned based on oxidation state and lithology.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Resources are classified in line with JORC guidelines utilising a combination of various estimation derived parameters, the input data and geological / mining knowledge.
	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, quality, quantity and distribution of the data).	All relevant factors have been given due weighting during the classification process.
	Whether the result appropriately reflects the Competent Person’s view of the deposit.	This approach considers all relevant factors and reflects the Competent Person’s view of the deposit
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	Resource estimates are peer reviewed by the Corporate technical team. No external reviews have been undertaken.

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report

Mt Martin: Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="3">Sampling techniques</td><td>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.</td><td>A combination of sample types was used to collect material for analysis including underground diamond drilling (DD) and surface diamond drilling (RC). RAB holes were excluded from the estimate and where sufficient diamond drill holes were present, some RC holes were excluded due to inadequate survey and assay methods.
<table>
<tr><th>Lode</th><th>Total Holes</th><th>#DDH</th><th>#RC</th><th>DD Samples</th><th>RC Samples</th><th>Total</th></tr>
<tr><td>1010</td><td>442</td><td>8</td><td>434</td><td>70</td><td>1,787</td><td>1,857</td></tr>
<tr><td>1011</td><td>58</td><td>1</td><td>57</td><td>4</td><td>139</td><td>143</td></tr>
<tr><td>1020</td><td>224</td><td></td><td>224</td><td></td><td>735</td><td>735</td></tr>
<tr><td>1030</td><td>232</td><td></td><td>232</td><td></td><td>580</td><td>580</td></tr>
<tr><td>1040</td><td>68</td><td></td><td>68</td><td></td><td>138</td><td>138</td></tr>
<tr><td>1050</td><td>306</td><td>1</td><td>305</td><td>2</td><td>706</td><td>708</td></tr>
<tr><td>1060</td><td>40</td><td></td><td>40</td><td></td><td>79</td><td>79</td></tr>
<tr><td>1070</td><td>23</td><td></td><td>23</td><td></td><td>43</td><td>43</td></tr>
<tr><td>1080</td><td>87</td><td></td><td>87</td><td></td><td>173</td><td>173</td></tr>
<tr><td>1090</td><td>68</td><td></td><td>68</td><td></td><td>115</td><td>115</td></tr>
<tr><td>1100</td><td>700</td><td>30</td><td>670</td><td>511</td><td>2,787</td><td>3,298</td></tr>
<tr><td>1101</td><td>4</td><td>4</td><td></td><td>31</td><td></td><td>31</td></tr>
<tr><td>1110</td><td>248</td><td>1</td><td>247</td><td>3</td><td>690</td><td>693</td></tr>
<tr><td>1111</td><td>8</td><td></td><td>8</td><td></td><td>50</td><td>50</td></tr>
<tr><td>1120</td><td>408</td><td></td><td>408</td><td></td><td>959</td><td>959</td></tr>
<tr><td>1130</td><td>6</td><td></td><td>6</td><td></td><td>9</td><td>9</td></tr>
<tr><td>1140</td><td>605</td><td>102</td><td>503</td><td>2,014</td><td>4,285</td><td>6,299</td></tr>
<tr><td>1141</td><td>48</td><td>2</td><td>46</td><td>5</td><td>137</td><td>142</td></tr>
<tr><td>1150</td><td>88</td><td>24</td><td>64</td><td>178</td><td>247</td><td>425</td></tr>
<tr><td>1160</td><td>58</td><td>28</td><td>30</td><td>207</td><td>197</td><td>404</td></tr>
<tr><td>1170</td><td>169</td><td>13</td><td>156</td><td>107</td><td>858</td><td>965</td></tr>
</table>
<table>
<tr><th>Lode</th><th>Total Holes</th><th>DDH</th><th>RC</th><th>DD Samples</th><th>RC Samples</th><th>Total</th></tr>
<tr><td>1180</td><td>38</td><td>21</td><td>17</td><td>161</td><td>109</td><td>270</td></tr>
<tr><td>1190</td><td>367</td><td>11</td><td>356</td><td>59</td><td>1,614</td><td>1,673</td></tr>
<tr><td>1200</td><td>51</td><td>2</td><td>49</td><td>6</td><td>158</td><td>164</td></tr>
<tr><td>1210</td><td>31</td><td>2</td><td>29</td><td>7</td><td>69</td><td>76</td></tr>
<tr><td>1211</td><td>2</td><td>2</td><td></td><td>17</td><td></td><td>17</td></tr>
<tr><td>1230</td><td>42</td><td></td><td>42</td><td></td><td>110</td><td>110</td></tr>
<tr><td>1240</td><td>24</td><td>23</td><td>1</td><td>145</td><td>6</td><td>151</td></tr>
<tr><td>1241</td><td>1</td><td>1</td><td></td><td>7</td><td></td><td>7</td></tr>
<tr><td>1250</td><td>35</td><td></td><td>35</td><td></td><td>82</td><td>82</td></tr>
<tr><td>1260</td><td>8</td><td></td><td>8</td><td></td><td>28</td><td>28</td></tr>
<tr><td>1270</td><td>36</td><td>3</td><td>33</td><td>36</td><td>155</td><td>191</td></tr>
<tr><td>1280</td><td>11</td><td>4</td><td>7</td><td>14</td><td>19</td><td>33</td></tr>
<tr><td>1290</td><td>7</td><td></td><td>7</td><td></td><td>35</td><td>35</td></tr>
<tr><td>2010</td><td>36</td><td>2</td><td>34</td><td>8</td><td>119</td><td>127</td></tr>
<tr><td>2011</td><td>9</td><td></td><td>9</td><td></td><td>29</td><td>29</td></tr>
<tr><td>2020</td><td>44</td><td></td><td>44</td><td></td><td>200</td><td>200</td></tr>
<tr><td>2030</td><td>25</td><td></td><td>25</td><td></td><td>118</td><td>118</td></tr>
<tr><td>2031</td><td>6</td><td></td><td>6</td><td></td><td>12</td><td>12</td></tr>
<tr><td>2040</td><td>16</td><td></td><td>16</td><td></td><td>69</td><td>69</td></tr>
<tr><td>2060</td><td>22</td><td></td><td>22</td><td></td><td>59</td><td>59</td></tr>
<tr><td>2070</td><td>12</td><td></td><td>12</td><td></td><td>50</td><td>50</td></tr>
</table>
Pre-Northern Star drilling comprised 285 diamond drill holes and 4,428 reverse circulation (RC) drill holes which includes Mt Martin open pit grade control drilling.</td></tr>
<tr><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>Samples were split using a three-tier riffle splitter split to a 12.5% fraction or to a 12% fraction via a rig-mounted cone splitter at 1 m intervals.
Diamond core was placed in core trays for logging and sampling. Half core samples were nominated by the geologist from diamond core with a minimum sample width of either 20 cm (HQ) or 30 cm (NQ2).</td></tr>
<tr><td>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 30g 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.</td><td>RC sampling was split using a rig mounted cone splitter to deliver a sample of approximately 3 kg
DD drill core was cut in half using an automated core saw, where the mass of material collected will vary on the hole diameter and sampling interval
All samples were delivered to a commercial laboratory where they were dried, crushed to 95% passing 3 mm if required, at this point large samples may be split using a rotary splitter.
For fire assay, pulverisation to 95% passing 75 µm and a 50 g charge was selected.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both RC and Diamond Drilling techniques were used to drill the Mt Martin deposit.
Surface diamond drill holes were completed using NQ2 (47.6 mm) and HQ2 (63.5 mm) coring.
RC Drilling was completed using a 5.75” drill bit, downsized to 5.25” at depth.</td></tr>
</table>

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	Historical drilling did not record sample recovery. Sample recovery and grade relationships cannot be assessed.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	RC drilling contractors adjust their drilling approach to specific conditions to maximize sample recovery. No recovery issues were identified during 2014 - 2015 RC drilling. For diamond drilling the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.
	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.	Historical drilling did not record sample recovery. Sample recovery and grade relationships cannot be assessed, a sample bias cannot be determined.
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 is logged for regolith, lithology, veining, alteration, mineralisation and structure. Structural measurements of specific features are also taken through oriented zones. RC sample chips are logged in 1m intervals for the entire length of each hole. Regolith, lithology, alteration, veining and mineralisation are all recorded. All logging codes for regolith, lithology, veining, alteration, mineralisation and structure is entered into the AcQuire database using suitable pre-set dropdown codes to remove the likelihood of human error.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet.
	The total length and percentage of the relevant intersections logged.	In all instances, the entire drill hole is logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	NQ2 and HQ diameter core is sawn half core using a diamond-blade saw, with one half of the core consistently taken for analysis. Smaller sized core (LTK48 and BQ) are whole core sampled. The un-sampled half of diamond core is retained for check sampling if required. SKO staff collect the sample in pre-numbered calico sample bags which are then submitted to the laboratory for analysis. Delivery of the sample is by a SKO staff member.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC samples are collected at 1m intervals with the samples being riffle split through a three-tier splitter. The samples are collected by the RC drill crews in pre-numbered calico sample bags which are then collected by SKO staff for submission. Delivery of the sample to the laboratory is by a SKO staff member.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Upon delivery to the laboratory, the sample numbers are checked against the sample submission sheet. Sample numbers are recorded and tracked by the laboratory using electronic coding. Sample preparation techniques are considered appropriate for the style of mineralisation being tested for – this technique is industry standard across the Eastern Goldfields.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are available to guide the selection of sample material in the field. Standard procedures are used for all process within the laboratory.
	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.	For RC chips field duplicates are collected and analysed for significant variance to primary results. Field duplicates are taken for diamond drill core samples at a rate of 1 in 30.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material been sampled.
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.	Only nationally accredited laboratories are used for the analysis of the samples collected at SKO. The laboratory oven dries, jaw crushed, and if necessary (if the sample is >3kg), riffle split the sample and then pulverised (the entire 3kg sample), in a ring mill to a nominal 90% passing 75 microns. All recent RC and Diamond core samples are analysed via Fire Assay, which involves a 30g charge (sub-sampled after the pulverisation) of the analytical pulp being fused at 1050°C for 45 minutes with litharge. The resultant metal prill is digested in Aqua regia and the gold content determined by atomic adsorption spectrometry – detection limit is 0.01 ppm Au.
	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.	No geophysical tools were used to determine any element concentrations.

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Criteria	JORC Code explanation	Commentary
	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.	Quality Assurance and Quality Control (QA/QC) samples are routinely submitted by SKO staff and comprise standards, blanks, assay pills, field duplicates, lab duplicates and repeat analyses. The results for these QA/QC samples are routinely analysed by Senior Geologists with any discrepancies dealt with in conjunction with the laboratory prior to the analytical data being imported into the database. There is limited information available on historic QA/QC procedures. SKO has generally accepted the available data at face value and carry out data validation procedures as each deposit is re-evaluated. The analytical techniques used are considered appropriate for the style of mineralisation being tested for – this technique is industry standard across the Eastern Goldfields. Ongoing production data generally confirms the validity of prior sampling and assaying of the mined deposits to within acceptable limits of accuracy.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All data used in the calculation of resources and reserves are compiled in databases which are overseen and validated by senior geologists.
	The use of twinned holes.	Grade control drilling within the Mt Martin pit has overlapped existing historical exploration holes providing comparable mineralised intercepts.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Primary data was collected utilising LogChief. The information is imported into a SQL database server and verified.
	Discuss any adjustment to assay data.	All data used in the calculation of resources and reserves are compiled in databases (underground and open pit) which are overseen and validated by senior geologists. No adjustments have been made to any assay data.
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.	Collar coordinates for surface RC and diamond drill-holes were generally determined by either RTK-GPS or a total station survey instrument. Underground drill-hole locations (Mount Marion and HBJ) were all surveyed using a Leica reflector less total station. Recent surface diamond holes were surveyed during drilling with down-hole single shot cameras and then at the end of the hole by Gyro-Inclinometer at 5 or 10mm intervals. Holes not gyro-surveyed were surveyed using Eastman single shot cameras at 20m intervals. RC drill-holes utilised down-hole single shot camera surveys spaced every 15 to 30m down- hole. Down-hole surveys for underground diamond drill-holes were taken at 15 – 30 m intervals by Reflex single-shot cameras.
	Specification of the grid system used.	The orientation and size of the project determines if the resource estimate is undertaken in local or MGA 94 grid. Each project has a robust conversion between local, magnetic and an MGA grid which is managed by the SKO survey department.
	Quality and adequacy of topographic control.	Topographic control is generated from ground based surveys.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill spacing ranges from 10m x 5m grade control drilling to 100m x 100m at deeper levels of the resource.
	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.	Interpretation of the area is well understood and is supported by the knowledge from open pit and underground operations. However, given the mineralisation is controlled by shear zones the mineralisation continuity is considered to be less understood. The resource is therefore classified on a combination of drill density, data validation, data confidence, estimation quality (slope of regression) and the number of samples used to estimate the resource blocks
	Whether sample compositing has been applied.	No compositing was carried out
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.	Drilling intersections are nominally designed to be as perpendicular to the orebody as far as underground infrastructure constraints / topography allows. Where drilling angles are sub optimal the drill holes have been removed from the estimate.
	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.	It is not considered that drilling orientation has introduced an appreciable sampling bias.
Sample security	The measures taken to ensure sample security.	Samples are delivered to a third-party transport service, who in turn relay them to the independent laboratory contractor. Samples are stored securely until they leave site.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	Site generated resources and reserves and the parent geological data is routinely reviewed by the Northern Star Corporate technical team

APPENDIX B: TABLE 1

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 Mt Martin deposit is situated on freehold land [Location45], which is 100% held by Northern Star (HBJ) Pty. Ltd. a wholly owned subsidiary of Northern Star Resources Limited.
	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.	No known impediments exist, and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The Mt Martin orebody was discovered in 1923 and has been mined both underground and open pit by various owners. Open pit mining ceased in September 1997 after reaching a depth of 110m below the natural surface (250 RL). The commencement of the underground mining is unknown, gold was mined from 4 shafts with the deepest being 165 metres below the surface. In May 2007 Australian Mines acquired Location 45 from Harmony Gold Aust Pty Ltd. Under a separate arrangement, Dioro Exploration NL retained an interest in the Mt Martin Gold Mine for 30 months under a sublease arrangement from Australian Mines. In 2009 Dioro mined down to a maximum depth 115 metres in the central portion of the pit. A total of 743Kt at 1.5g/t Au for 31k ounces of gold was recovered (Australian Mines 2010b). In January 2010 Australian Mines gained told control of the lease when an existing sublease arrangement expired. Westgold Resources Limited acquired the SKO tenement holdings in October 2013 via the acquisition of Alacer Gold's Australian assets. In April 2018 Northern Star Resources acquired the SKO tenement holdings with the purchase of HBJ Minerals Pty Ltd from Westgold.
Geology	Deposit type, geological setting and style of mineralisation.	The Mount Martin Tribute Area is located within a regional scale north-northwest trending Archean Greenstone Belt. Within the Mount Martin - Carnilya area, the greenstone belt comprises a mixed sequence of ultramafic (predominantly komatiitic) and fine-grained, variably sulphidic sedimentary lithologies with subsidiary mafic units. Known gold and nickel mineralisation at the Mount Martin Mine is associated with a series of stacked, westerly dipping, sulphide and quartz-carbonate bearing lodes which are mainly hosted within intensely deformed and altered chloritic schists sandwiched between talc-carbonate ultramafic lithologies.
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length.	A summary of the data present in the Mt Martin project can be found above. The collar locations are presented in plots contained in the NSR 2019 resource report. Drill holes vary in survey dip from +41 to -90, with hole depths ranging from 2 m to 655 m, with an average depth of 30 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All validated drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	The exclusion of information is not material
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.	No drill hole information is being presented in this release.
	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.	No drill hole information is being presented in this release.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No drill hole information is being presented in this release.
Relationship between mineralisation	These relationships are particularly important in the reporting of Exploration Results:	All reported assay results have been length weighted to provide an intersection width. A maximum of 2 m of barren material (considered < 0.1 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 0.1 g/t are considered significant, however, where low grades are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.

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Criteria	JORC Code explanation	Commentary
widths and intercept lengths	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	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').	It is known and has been reported as such.
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.	No drill hole information is being presented in this release.
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.	No drill hole information is being presented in this release.
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.	No drill hole information is being presented in this release.
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).	Exploration drilling is planned to determine extent of mineralisation at depth to the west.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	The database used for the estimation was extracted from the Northern Star's DataShed database management system stored on a secure SQL server.
	Data validation procedures used.	The database used for estimation has been checked visually for errors. Multiple checks have been made on numerical data. These included: • Empty table checks to ensure all relevant fields are populated; • Unique collar location check; • Azimuths greater than 360 degrees; • Negative assays; Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported, this data will not be used in the estimation process. In addition to being Resource Flagged as "Yes" or "No", drill holes are assigned a Data Class, which provides a secondary level of confidence in the data quality. Data Class (DC) values range from 0 to 3, with criteria summarised below: • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. Used to assist in classification OR • Recent data; minor issues with data such as QAQC fail but away from the ore zone. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The competent Person has visited the existing Mount Martin Open Pit

APPENDIX B: TABLE 1

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td></td><td>If no site visits have been undertaken indicate why this is the case.</td><td>The Resource process has been closely overseen by company personnel who have visited the site. The competent person has reviewed the inputs and outcomes of the work, including engagement with persons familiar with the site.</td></tr>
<tr><td>Geological interpretation</td><td>Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.</td><td>Gold mineralisation at Mount Martin is associated with chlorite schists (shear zones) hosted within talc-carbonate ultramafic lithologies. Within these controlling shear zones are a series of stacked, westerly-dipping, sulphide and quartz carbonate bearing lodes which host the majority of the gold mineralisation. The geological and mineralisation interpretation used in this resource is consistent with that mined historically in the open pit. Although other interpretations have been proposed they tend to be variations on the steep westerly-dipping lodes theme adopted for this resource and as such would not represent a significant change in the contained metal.
The confidence in the geological interpretation is high and is supported with information acquired from drilling.
The interpretation of all the Mt Martin project wireframes was conducted using the sectional interpretation method.
Where drilling data was present sectional interpretation was completed at approximately 20 m to 40 m spacing. Wireframes were checked for unrealistic volumes and updated where appropriate.</td></tr>
<tr><td></td><td>Nature of the data used and of any assumptions made.</td><td>All available geological data was used in the interpretation including mapping, drill holes, and structural models.</td></tr>
<tr><td></td><td>The effect, if any, of alternative interpretations on Mineral Resource estimation.</td><td>No alternative interpretations have been completed.</td></tr>
<tr><td></td><td>The use of geology in guiding and controlling Mineral Resource estimation.</td><td>In all aspects of resource estimation, the factual and interpreted geology was used to guide the development of the interpretation.</td></tr>
<tr><td></td><td>The factors affecting continuity both of grade and geology.</td><td>The Mt Martin chloritic schist is continuous over the length of the deposit which terminates against cross cutting faulting to the north and south.</td></tr>
<tr><td>Dimensions</td><td>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.</td><td>The Mount Martin deposit has a strike length of 1 km, a vertical extent of 350m, with the individual, shallow west-south-westerly dipping lodes varying between 2 – 10m true thickness. These lodes make up a mineralised package of ~300 m true thickness (hangingwall to footwall).</td></tr>
<tr><td>Estimation and modelling techniques</td><td>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.</td><td>42 gold lodes have been estimated at Mt Martin which have been divided into 14 separate domains for estimation. Completed variography indicates a predominantly westerly plunge direction with search ranges varying from 35 m to 65 m in the first direction and 15 m to 30 m in the second direction. Seven lodes were estimated used dynamic anisotropy and 35 lodes utilised variography to determine search angles. Three passes were used for estimation with distances based on variography.</td></tr>
<tr><td></td><td>The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.</td><td>Multiple estimation techniques were used to verify the final estimate grade. These included (where possible) OK, ID^2 and ID^3 and Nearest Neighbour estimation.</td></tr>
<tr><td></td><td>The assumptions made regarding recovery of by-products.</td><td>No assumptions are made and only gold is defined for estimation.</td></tr>
<tr><td></td><td>Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).</td><td>No deleterious elements estimated in the model.</td></tr>
<tr><td></td><td>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</td><td>Block size was determined by available supporting data and the degree of geological confidence as well as assumed mining methodology.
<table>
<tr><th>Domain</th><th>XMIN</th><th>YMIN</th><th>ZMIN</th><th>XMAX</th><th>YMAX</th><th>ZMAX</th><th>XINC</th><th>YINC</th><th>ZINC</th><th>#X</th><th>#Y</th><th>#Z</th></tr>
<tr><td>Open Pit</td><td>4600</td><td>14700</td><td>-100</td><td>5500</td><td>16200</td><td>400</td><td>5</td><td>5</td><td>5</td><td>180</td><td>300</td><td>100</td></tr>
<tr><td>Underground</td><td>4600</td><td>14700</td><td>-100</td><td>5500</td><td>16200</td><td>400</td><td>10</td><td>20</td><td>10</td><td>90</td><td>75</td><td>50</td></tr>
</table>
All the varying block sizes are added together after being estimated individually.
Search ellipse dimensions were derived from the variogram model ranges.</td></tr>
<tr><td></td><td>Any assumptions behind modelling of selective mining units.</td><td>No selective mining units are assumed in this estimate.</td></tr>
<tr><td></td><td>Any assumptions about correlation between variables.</td><td>No other elements other than gold have been estimated.</td></tr>
</table>

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
	Description of how the geological interpretation was used to control the resource estimates.	A volume model was generated in Surpac v6.6 using topographic surfaces and mineralised zone wireframes as constraints. The geology model was used as a guide for the creation of the ore lodes: All lodes used the presence of chloritic schist and grade as an indicator of an ore lode. For mine planning purposes a waste model was created by sectional polygon extending at least 20 m from mineralisation
	Discussion of basis for using or not using grade cutting or capping.	The influence of extreme sample distribution outliers in the composited data has been reduced by top-cutting where required. Top-cut analysis was carried out on the composite gold values, by ascertaining where a break in the grade population occurred in the upper percentiles of each ore lode or domain. Where the high grades were deemed to be significantly anomalous for that grade population, a top cut was applied using the method outlined below. The top cut values are applied in several steps, using a technique called influence limitation top capping. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, the following variables were created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) • AU_BC (spatial variable to determine where non-top cut estimate occurred) The top-cut and non-top cut values are estimated using search ranges based on the variogram, and the *_BC values estimated using very small ranges (e.g. 10 x 10 x 10 m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). This process allows blocks close to high grade samples to be estimated with the full un-cut dataset but blocks outside this restricted range are estimated using the top cut dataset. This limits the spread of very high grades but retains the high local value in these blocks, which more closely reflects the style of mineralisation. 33 lodes had a "hard" top cut applied and, 13 lodes and utilised both a "hard" top cut and influence limitation top cuts applied, due to extreme outliers.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Model validation has been carried out including visual comparison of the composites and block model, swath plots of the declustered composites and estimated blocks; global statistics and check for negative or absent grades.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 1.0 g/t cut off within a 1.0 m minimum mining width including +/- 0.5 m dilution MSO's using a $AU1750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No minimum mining assumptions have been made during the resource wireframing or estimation process.
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.	No metallurgical or recovery assumptions have been made during the mineral resource estimate.
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 green fields 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.	No environmental assumptions have been made during the mineral resource estimate.

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Criteria	JORC Code explanation	Commentary
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.	Mount Martin density values were based on historic mining reconciliations combined with bulk density check test work.
	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.	Mined voids within Mt Martin Project area have been assigned a density of zero post estimation.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	There have been assumptions made based on the consistency of bulk density values within weathering horizons logged at Mt Martin. Oxide clays were assigned a bulk density of 1.8 with the transitional zones assigned 2.2 and fresh rock 2.75.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The resource classification has been applied to the mineral resource estimate based on the drilling data spacing, grade and geological continuity, data integrity, and kriging confidence (slope of regression), where appropriate
	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, quality, quantity and distribution of the data).	The classification considers the relative contributions of geological and data quality and confidence, as well as grade confidence and continuity.
	Whether the result appropriately reflects the Competent Person’s view of the deposit.	The classification reflects the view of the Competent Person.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	All resource models have been subjected to internal peer reviews.
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 relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC code
	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.	The statement relates to global estimates of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Historic production records are incomplete, so no comparison or reconciliation has been made.

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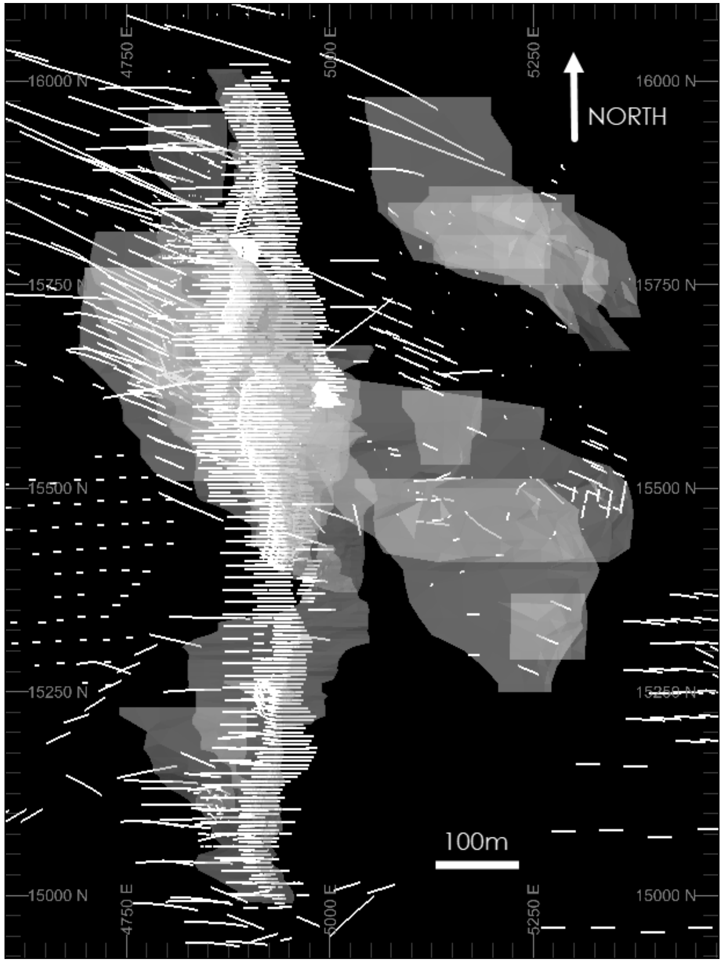

Figure 1. Plan view of the Mt Martin project and the data used in each resource estimate

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report

HBJ (Hampton Boulder Jubilee): Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td>Sampling techniques</td><td>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.</td><td>A combination of sample types was used to collect material for analysis including underground diamond drilling (DD), surface diamond drilling (RC) and face channel (FC) sampling. Sludge samples are routinely taken either side of face samples within ore development; they are not used in the MRE and only for grade control and ore direction purposes.
<table>
<tr><th>Type</th><th># Holes</th><th>Total Meters</th><th># Samples</th></tr>
<tr><td>Diamond drilling</td><td>1,713</td><td>317,223</td><td>213,092</td></tr>
<tr><td>RC drilling</td><td>6,158</td><td>27,396</td><td>31,330</td></tr>
<tr><td>Face Sample</td><td>3,043</td><td>154,497</td><td>140,107</td></tr>
<tr><td>Total</td><td>10,914</td><td>499,116</td><td>384,529</td></tr>
</table></td></tr>
<tr><td></td><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>Diamond drill-core (DD) is geologically logged and then sampled according to geology (minimum sample length of 0.3 m to maximum sample length of 1.2 m) – where consistent geology is sampled, a 1m length is used for sampling the core. Sampling from a standard 5½” RC, three tier riffle splitter (approximately 5kg sample), split to a 12.5% fraction (approximately 3kg) or to a 12% fraction via a rig-mounted cone splitter. All residual material is retained on the ground in rows of 10 or 20 samples. Four-metre composites are obtained via representative scoop / spear sampling of the one-metre residual piles, until required for re-split analysis (samples returning Au >0.2ppm) or eventual disposal. Historical RC drilling is assumed to employ similar practices. An assumed 90% chip recovery (losses to fines) from RC drilling.</td></tr>
<tr><td></td><td>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 30g 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.</td><td>Underground face samples (FS) are taken by chip sampling across the face using a geological hammer, collecting the sample in a calico bag held in a steel frame. Wherever possible the faces are sampled along a channel approx. 1.5m above the floor RL. A standard interval of 1m is used for all face sampling except for samples on lithological contacts, which are marked and sampled at the contact. Sludge sampling is done routinely during underground development but is excluded from the Resource estimate. Resource definition core is sawn half-core with one half sent off for analysis. Grade Control core is whole core sampled and sent off for analysis. Core selected for half core sampling is cut using an Almonte core saw then bagged in pre-determined sample ID calicos; sampling practices ensure that circa 99% of half core sample is collected.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Diamond drilling is used for either testing / targeting deeper mineralised systems or to define the orientation of the host geology. Many of these holes had RC pre-collars generally to a depth of between 60 – 120m, followed by a diamond tail. The majority of diamond drill holes have been drilled at NQ2 size with minor HQ sized core. All diamond holes were surveyed during drilling with downhole cameras, and then at end of hole using a downhole gyro/Devi flex tool at regular intervals (1-10m)’s. Drill hole collars were surveyed by onsite mine surveyors.
RC drilling is used predominantly for defining and testing for near-surface mineralisation and utilises a face sampling hammer with the sample being collected on the inside of the drill-tube. RC drill holes utilise downhole single or multi shot cameras. Drill hole collars were surveyed by onsite mine surveyors.</td></tr>
<tr><td>Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>RC drilling contractors adjust their drilling approach to specific conditions to maximize sample recovery. Moisture content and sample recovery is recorded for each RC sample. No recovery issues were identified during RC drilling programs. Recovery was poor at the very beginning of each hole, as is normal for this type of drilling in overburden. Limited information is available on the drill sample recovery of historic drilling.</td></tr>
<tr><td></td><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>Representation is assured through qualified geologists identifying intervals for sampling which are related directly to observed geology.</td></tr>
<tr><td></td><td>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.</td><td>No defined relationship exists between sample recovery and grade. Nor has sample bias due to preferential loss or gain of fine or coarse material been noted.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
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.	Northern Star surface diamond drill-holes are all orientated and have been logged in detail for geology, veining, alteration, mineralisation and orientated structure. Northern Star underground drill-holes are logged in detail for geology, veining, alteration, mineralisation and structure. Core has been logged in enough detail to allow for the relevant mineral resource estimation techniques to be employed. Surface core is photographed both wet and dry and underground core is photographed wet. All photos are stored on the companies' servers, with the photographs from each hole contained within separate folders. Development faces are mapped geologically for each sample interval. RC chips are geologically logged. Sludge drilling is logged for lithology, mineralisation and vein percentage. All holes are logged in their entirety.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All logging is quantitative where possible and qualitative elsewhere. A photograph is taken of every core tray.
	The total length and percentage of the relevant intersections logged.	In all instances, the entire drill hole is logged to a level of detail to support the Mineral Resource estimate.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	NQ2 and HQ diameter core is sawn half core using a diamond-blade saw, with one half of the core consistently taken for analysis. Smaller sized core (LTK48 and BQ) are whole core sampled. The un-sampled half of diamond core is retained for check sampling if required. HBJ staff collect the sample in pre-numbered calico sample bags which are then submitted to the laboratory for analysis. Delivery of the sample is by an HBJ staff member.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC samples are collected at 1m intervals with the samples being riffle split through a three-tier splitter. The samples are collected by the RC drill crews in pre-numbered calico sample bags which are then collected by HBJ staff for submission. Delivery of the sample to the laboratory is by an HBJ staff member.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Upon delivery to the laboratory, the sample numbers are checked against the sample submission sheet. Sample numbers are recorded and tracked by the laboratory using electronic coding. Sample preparation techniques are considered appropriate for the style of mineralisation being tested for – this technique is industry standard across the Eastern Goldfields.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are available to guide the selection of sample material in the field. Standard procedures are used for all process within the laboratory.
	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.	For RC chips field duplicates are collected and analysed for significant variance to primary results. Field duplicates are taken for diamond drill core samples at a rate of 5% (for half cored samples a quarter core is taken and sent to the lab). This process is being reviewed.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material been sampled.
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.	Only nationally accredited laboratories are used for the analysis of the samples collected at HBJ. The laboratory oven dries, and if necessary (if the sample is >3kg), jaw crush and riffle split down to 3kg, after which the entire 3kg sample is then pulverised in a ring mill to a nominal 90% passing 75 microns. All recent RC and Diamond core samples are analysed via Fire Assay, which involves a 40g charge (sub-sampled after the pulverisation) of the analytical pulp being fused at 1050°C for 45 minutes with litharge. The resultant metal prill is digested in Aqua regia and the gold content determined by atomic adsorption spectrometry – detection limit is 0.01 ppm Au.
	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.	No geophysical tools were used to determine any element concentrations.
	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.	Quality Assurance and Quality Control (QA/QC) samples are routinely submitted by HBJ staff and comprise standards, blanks, assay pills, field duplicates, lab duplicates and repeat analyses. The results for these QA/QC samples are routinely analysed by Senior Geologists with any discrepancies dealt with in conjunction with the laboratory prior to the analytical data being imported into the database. There is limited information available on historic QA/QC procedures. HBJ has generally accepted the available data at face value. Re-evaluation and validation of these data is ongoing. The analytical techniques used are considered appropriate for the style of mineralisation being tested for – this technique is industry standard across the Eastern Goldfields. Ongoing production data generally confirms the validity of prior sampling and assaying of the mined deposits to within acceptable limits of accuracy.

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Criteria	JORC Code explanation	Commentary
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All data used in the calculation of resources and reserves are compiled in databases which are overseen and validated by senior geologists and database administrators.
	The use of twinned holes.	Virtual twinned holes have been drilled in several instances with no significant issues highlighted. Drill hole data is also routinely confirmed by development assay data in the operating environment.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Primary data is collected and entered directly in AcQuire. Inbuilt validation procedures prevent the input of simple errors. The information is stored in a SQL database server and verified.
	Discuss any adjustment to assay data.	All data used in the calculation of resources and reserves are compiled in databases (underground and open pit) which are overseen and validated by senior geologists. No adjustments have been made to any assay data.
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.	Collar coordinates for surface RC and diamond drill-holes were generally determined by either RTK-GPS or a total station survey instrument. Underground drill-hole locations were all surveyed using a Leica reflector less total station. Recent surface diamond holes were surveyed during drilling with down-hole single shot cameras and then at the end of the hole by Gyro-Inclinometer at 1-10m intervals. Holes not gyro-surveyed were surveyed using Eastman single shot cameras at 20m intervals. RC drill-holes utilised down-hole single shot camera surveys spaced every 15 to 30m down- hole. Down-hole surveys for underground diamond drill-holes were taken at 15 – 30m intervals by Reflex single-shot cameras or Deviflex survey tool utilised for down hole surveying.
	Specification of the grid system used.	Data is captured predominately in local grid. Where required, conversion between local, magnetic and an MGA grid has been verified by the HBJ survey department and applied as a calculated field in AcQuire.
	Quality and adequacy of topographic control.	Topographic control is generated from RTK GPS. This methodology is adequate for the resources in question.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill spacing ranges from 10m x 10m grade control drilling to 100m x 100m at the extents of the resource. The majority of the Indicated Resource is estimated using a maximum drill spacing of 40m x 40m, usually closer to 30 x 30 m.
	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.	Interpretation of the area is well understood and is supported by the knowledge from open pit and underground operations. The data spacing and distribution is considered sufficient to support the resource and reserve estimates.
	Whether sample compositing has been applied.	No sample compositing has been applied.
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.	Drilling intersections are nominally designed to be as perpendicular to the orebody as far as underground infrastructure constraints / topography allows. Development sampling is nominally sampled perpendicular to mineralised structure. Drill holes with low intersection angles are excluded from the resource 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.	No sampling bias is considered to have been introduced by the drilling orientation. Where drill holes have been particularly oblique, they have been flagged as unsuitable for resource estimation.
Sample security	The measures taken to ensure sample security.	For samples assayed at the on-site laboratory facilities, samples are delivered to the facility by Company staff. Upon delivery the responsibility for sample security and storage falls to the independent third-party operators of these facilities. Only moisture and mill grade test work are assayed onsite. All NSR samples used in the MRE are assayed off-site. For samples assayed off-site, samples are delivered to a third-party transport service, who in turn relay them to the independent laboratory contractor. Samples are stored securely until they leave site.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	Site generated resources and reserves and the parent geological data is routinely reviewed by the Northern Star Corporate technical team

APPENDIX B: TABLE 1

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.	State Royalty of 2.5% of revenue applies to all tenements, although does not apply to the 16 freehold titles (which host the majority of SKO's Resource inventory). There are a number of minor agreements attached to a select number of tenements and locations with many of these royalty agreements associated with tenements with no current Resources and/or Reserves. Private royalty agreements are in place that relate to production from HBJ open pit at $10/ oz. In addition, a royalty is payable in the form of 1.75% of the total gold ounces produced from the following resources: Shirl Underground, Golden Hope, Bellevue, HBJ Open-pit, Mount Martin open-pit, Mount Martin Stockpiles and any reclaimed tailings. The South Kalgoorlie Operations consists of 35 Mining Leases and 19 Exploration and Prospecting Licences. The Project also includes 9 Miscellaneous Licences, 2 groundwater Licences and 16 Freehold Lots known as the Hampton "Exempted East Locations". The Area of the leases covers approximately 35,638 Hectares with a further 71,861 Hectares of Freehold Land.
	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 leases and licences to operate are granted and in the order of up to 21 years. There are no known impediments to continued operation.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The HBJ 'line of lode' is a 6 km zone of mineralisation that extends from Golden Hope in the south to Celebration in the north. The existing HBJ pit was mined for over 25 years producing approximately 1.6 Mozs Au and was owned by separate companies across the Location 48 and Location 50 tenement boundary. Gold was first discovered in the New Celebration area in 1919 and a short-lived gold rush ensued. Intermittent exploration for gold and nickel was undertaken by a variety of companies in the 1960s and 1970s. The rising gold price further rekindled interest in the area in the 1980s, and open-pit mining at New Celebration started in 1986 by a joint venture comprising Newmont Holdings Limited (subsequently Newcrest; 60%), Hampton Areas Australia Ltd., (25%) and Mt Martin Gold Mines (15%), which merged with Titan Resources in 1993. The New Celebration project includes the Hampton Boulder deposit. In June 2001 Hill 50 Gold agreed to purchase the New Celebration project from Newcrest Mining. In December 2001 Harmony Gold Mining acquired Hill 50 Gold, the transaction giving Harmony Gold Mining a 100% interest in the New Celebration project. The Jubilee deposit located south of the Hampton Boulder deposit was evaluated and mined by Hampton Areas Australia Ltd from 1984 to 1996 with open pit mining starting in 1987. New Hampton Goldfields (New Hampton) acquired the Jubilee deposit in 1996. In May 2001, Harmony Gold Mining acquired New Hampton, and combined the operations of New Hampton's Jubilee operations and associated small open pits with the New Celebration project into the South Kalgoorlie Operations (SKO). In 2007, Dioro Exploration NL (Dioro) acquired the SKO from Harmony Gold (Australia) Pty Ltd (Harmony) via its wholly owned subsidiaries, South Kal Mines Pty Ltd, New Hampton Goldfields Ltd and Aurora Gold (WA) Pty Ltd. The tenement package at SKO was then purchased by Avoca Resources in April 2010, which was subsequently acquired by Alacer Gold Corp. Pty Ltd in early 2011. Westgold Resources Limited acquired the SKO tenement holdings in October 2013 via the acquisition of Alacer Gold's Australian assets. In April 2018 Northern Star Resources acquired the SKO tenement holdings with the purchase of HBJ Minerals Pty Ltd from Westgold.
Geology	Deposit type, geological setting and style of mineralisation.	Stratigraphy for the Ora Banda and Kalgoorlie Domains is relatively well-known and comprise (from stratigraphically lowest) a lower basalt unit, komatiitic to high-magnesian basaltic rocks, an upper basalt unit and overlying felsic volcanic-sedimentary units. Conglomeratic and sandstone units unconformably overlie the upper felsic units adjacent to major shear zones. Layered mafic sills occur within various stratigraphic units and cross-cutting Proterozoic dykes also occur throughout the region. Metamorphic grade ranges from upper greenschist to upper amphibolite facies. The deformation history of the area is generally divided into four main phases, comprising north-directed thrusting with recumbent folding and stratigraphic repetition in D1. The second deformation (D2) resulted in north-northwest trending folds which are reflected in the dominant north-northwest trending fabric of the greenstone belts. Shortening continued during D3 with strike slip movement along northwest to north northwest trending shear zones and D4 brittle faulting. The HBJ orebodies form part of a gold mineralised system along the Boulder-Lefroy shear zone that is over 4 km long and includes the Celebration, Mutooroo, HBJ and Golden Hope open pit and underground mines. The HBJ orebodies are hosted within a steeply-dipping, north-northwest-striking package of mafic, ultramafic and sedimentary rocks and schists that have been intruded by felsic to intermediate porphyries. The area is extensively deformed with numerous north-striking shear zones and dilation of the porphyry intrusions. The main host rock for the Jubilee deposit is the Jubilee Dolerite.

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Criteria	JORC Code explanation	Commentary
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length.	A summary of the data present in the HBJ deposits can be found above. The collar locations are presented in plots contained in the NSR 2019 resource report. Drill holes vary in survey dip from +46 to -88 degrees, with hole depths ranging from 6 m to 1000 m, with an average depth of 190 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All validated drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report.
	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.	The exclusion of information is not material.
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2 m of barren material (considered < 2 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 1.0 g/t are considered significant, however, where low grades are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##.##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	Both the downhole width and true width have been clearly specified when used.
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.	Appropriate plans and section have been included at the end of this table and in the NSR 2019 resource report.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	No other material exploration data has been collected for this area.
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).	Ongoing surface and underground exploration activities will be undertaken to support continuing mining activities at Northern Star Operations
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release and are detailed in the NSR 2019 resource report.

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Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	The data used for the estimation was extracted from the Northern Star's AcQuire database management system stored on a secure SQL server. Data exports are done automatically to ensure reproducibility. The Company employs a database administrator to manage the database. Data entry is validated using extensive procedures built in to AcQuire. These procedures prevent numerical errors including, but not limited to, overlapping samples and azimuths greater than 360 degrees.
	Data validation procedures used.	Prior to data export from AcQuire the following validation procedures are carried out on new data (Post-Northern Star Ownership) - Collar details import checks - start and end dates are supplied, collar has location co-ordinate information, actual end of hole depth versus planned end of hole depth is within tolerance, cost code and location code information are supplied. - Survey details import checks – final survey record is within tolerance with respect to end of hole depth, a survey exits at 0 depth, grid transformations have been performed, no duplicate survey points with the same priority exist. - Geology details import checks - final lithology depth is within tolerance with respect to end of hole depth, structural measurement transformations have been performed, alteration/vein/mineralisation logging does not have overlaps and/or gaps. - Samples/Assay import checks – total sample metres match end of hole depth, no duplicate samples with the same priority exist, sample intervals are continuous, no assay values have negative values, dispatch return date is recorded, no 'not sampled' intervals with assay values, QAQC passed. - Bulk Density/SG details checks – logged information depths are within tolerance with respect to end of hole depth. Errors are corrected where possible. When not possible the data is resource flagged as "No" in the database and the database is re-exported, this data will not be used in the estimation process. All recent drilling and channel data has been validated and assigned Resource Flag "Yes" due to high confidence. However, due to the large volume of historical data (pre-NSR ownership) it was not possible to re-validate all holes and channels to the current KalOps standard before EOFY (assigning Resource Flag and Data Class). Where historical data had failed previous validation measures a Resource Flag of "No" was applied. Where historical data had passed previous validation measures a Resource Flag of "absent" was therefore applied. All Resource Flag absent data has been assumed valid due to its' prior use in estimation, continuity in mineralisation and logging and quality of detail available. To ensure a level of relative confidence in the data is represented based on the above approach, Data Class has also been assigned to all Resource Flagged data, based on the below criteria (used across KalOps): • DC 3 = Recent data; all data high quality, validated and all original data available. • DC 2 = Historic data; may or may not have all data in AcQuire or hard copy available but has proximity to recent drilling which confirms the dip, width and tenor. • DC 2 = Recent data; minor issues with data such as QAQC failure, but not proximal to the ore zone. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, i.e. too far away or too dissimilar dip, width and/or tenor to recent drilling. Not to be used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not to be used in Resource estimate. • DC = absent = No Resource Flag applied yet, used in estimate but treated as DC = 2 The database used for estimation has been checked visually for errors in new and historic data. Each datapoint snapped to during the wireframing process was assessed for its location, sampling and logging validity. Errors detected during visual validation were corrected where possible. All data that failed the visual validation was recorded and excluded from the estimation process prior to compositing.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The CP has visited site regularly
	If no site visits have been undertaken indicate why this is the case.	The CP has visited site regularly
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The mineralisation has been modelled focussing on the structural (shear zone) and lithological (porphyry mainly) controls. Where possible consideration is given to ensure the wireframed data represents a single grade population and high- or low-grade subdomains are treated separately. The interpretation has used RC and diamond drilling as well as underground face sampling/mapping. The large scale (1.9km long and ~40m wide) and agreement between data sources provides confidence in the geological and grade continuity within the deposit. The geological model is continuously updated as mining and drilling progress.
	Nature of the data used and of any assumptions made.	Geological interpretation of the deposit was carried out using a systematic approach to ensure that the resultant estimated Mineral Resource figure is both sufficiently constrained, and representative of the expected sub-surface conditions.

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Criteria	JORC Code explanation	Commentary
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations have been completed.
	The use of geology in guiding and controlling Mineral Resource estimation.	In all aspects of resource estimation, the factual and interpreted geology was used to guide the development of the interpretation.
	The factors affecting continuity both of grade and geology.	Large scale continuity is affected by the orientation of the Boulder Lefroy Fault Zone, and the resultant 'pinch-and -swell' of the mineralised lithologies and alteration.
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 HBJ resource extends over 3km of strike and up to 1km below surface with the individual lodes being up to 40m wide, but often only several metres.
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.	Estimation of gold grade and density has been completed on 47 individual mineralised domains using Datamine RM software. Geostatistical analysis and variography were completed using Snowden's Supervisor software. Each mineralised domain was estimated separately with a hard boundary. Domain extents were defined by the wireframe extents. Where subdomains were present, they exist entirely within the parent wireframe. Subdomains used a combination of hard and soft boundaries between one another to ensure realistic continuity of grade across subdomain contacts. Ordinary Kriging has been used as the interpolation method in all lodes except for where variography analysis was not possible due to lack of data or, where domains had greater than 10% negative slope of regression values. In these instances, inverse distance squared was used as the interpolation method. Estimation was conducted on samples composited to 1 m. No compositing was done across domain boundaries. Statistical analysis was completed for gold for each domain. Where mixed grade populations were observed subdomains were identified and treated as separate estimation domains. Each estimation domain dealt with extreme grade values by applying top cuts. Maximum distance of extrapolation from data points was statistically determined through variography analysis and varies by domain.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	The block model was depleted using surfaces / shapes generated by the HBJ Survey. Validation of the models was completed by visual inspection, statistical comparisons and comparison with previous estimates, with the final model achieving a satisfactory validation.
	The assumptions made regarding recovery of by-products.	No assumptions were made and the only commodity estimated was gold.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements were estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Block size was determined by available supporting data and the degree of geological confidence. A 5 m x 5 m x 5 m block dimension was applied for areas of containing close spaced face sample data and/or drilling data. 10 m x 10 m x 10 m blocks were used outside of these areas. The blocks have been sub-celled to 0.5 m x 1 m x 1 m to ensure the model volume accurately reflects the wireframe volume. All the varying block sizes are added together after being estimated individually. Search ellipse orientation was taken directly from the variogram orientation for each domain. The search ellipse sizes were based on a combination of drill hole spacing and variographic analysis where the first search ellipse range was approximately two-thirds that of the variogram. Various minimum and maximum samples were used in the first search with a maximum of three samples per drill-hole allowed. Three search passes were used each with increasing search ellipse sizes and either the same or reduced minimum and increased maximum samples.
	Any assumptions behind modelling of selective mining units.	No selective mining units were assumed in this estimate.
	Any assumptions about correlation between variables.	No other elements other than gold have been estimated.
	Description of how the geological interpretation was used to control the resource estimates.	A volume model was generated in Datamine Studio RM using topographic surfaces and mineralised wireframes as constraints.

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Criteria	JORC Code explanation	Commentary
	Discussion of basis for using or not using grade cutting or capping.	The influence of extreme grade samples in the composited data has been reduced by top-cutting where required. Top-cut analysis was carried out on the composited gold values using histograms, log probability and mean-variance plots to ascertain where a break in the grade population occurred for each domain. Where the high grades were deemed to be significantly anomalous for that grade population, a top-cut traditional "hard" top cut was applied. Where the break in sample population was small or appeared to be a result of population under-sampling, an influence limitation "soft" top-cut was applied using the process outlined below: A top-cut (AU) and non-top-cut (*_NC) variable created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, the following variables were created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) • AU_BC (spatial variable to determine where non-top cut estimate occurred) The top-cut and non-top cut values are estimated using search ranges based on the variogram, and the *_BC values estimated using very small ranges (e.g. 10 x 10 x 10 m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). In many cases a hard top-cut was first applied followed by a soft top-cut This process allows blocks close to high grade samples to be estimated with the full uncut dataset but blocks outside this restricted range are estimated using the top cut dataset. This limits the spread of very high grades but retains the high local value in these blocks, which more closely reflects the style of mineralisation. Influence limitation top cutting was applied to 35 domains in total. Hard top cuts were also applied to 12 domains, 10 of which also had influence limitation top cutting as well. The decision to apply hard, soft or combination of the two is determined based on the number of composites, grade population, level of under sampling in the tail of the histogram, mineralisation type and confidence in the lode interpretation
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	The flagging of drill holes and blocks is visually validated in section and plan view using Datamine Studio RM software. Drill holes are checked for correct flagging by comparing them to the base data wireframes and the blocks are checked against the input drill hole file as well as against the relevant wireframes for correct flagging and filling. After compositing and grade capping statistics are generated and analysed using Snowden Supervisor software for the raw, composited and capped drill hole files to ensure the nature of the population has not been adversely affected by these processes. After grade estimation the grade block model is visually validated in section and plan view using Datamine Studio RM software by comparing block grades to the input drill hole file grade. For global validation grade variable statistics are generated and analysed using Snowden Supervisor software by comparing the blocks statistics to the cell declustered input drill hole file statistics and other estimation types (ID^2 and NN) to ensure the estimation reasonably reflects the input data. For spatial validation trend plots of block grades by Ordinary Kriging, and Inverse Distance Squared methods along eastings, northings, and RL are completed for each estimation domain using Snowden Supervisor software. A visual validation of the new model vs the old model is undertaken to ensure no unjustified changes have been made. A comparison of tonnes and grade for each domain is made against previous models. Areas of significant variance from the previous model are further investigated.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 1.59 g/t cut off within a 2.5 m minimum mining width (no dilution) MSO's using a $AU1750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No minimum mining assumptions have been made during the resource wireframing or estimation process.

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Criteria	JORC Code explanation	Commentary
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.	No metallurgical or recovery assumptions have been made during the mineral resource estimate.
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 green fields 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.	No environmental assumptions have been made during the mineral resource estimate.
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.	Mean density values were applied to each composite based on its logged lithology. Where there were no measurements for a specific lithology a default of 2.8 was applied. Density was then estimated by Ordinary Kriging using the associated gold estimation parameters for that domain. Post estimation, default density values for the oxide and transition zones were applied, based on regional averages.
	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.	No/minimal voids are encountered in the ore zones and underground environment
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Average bulk density of individual lithologies were taken from the previous estimate and compared against recent bulk density measurements made at HBJ to ensure their validity. Assumptions were also made based on regional averages, on the default densities applied to oxide (1.95) and transition (2.29) material, due to a lack of data in these zones.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The resource classification has been applied to the mineral resource estimate based on the drilling data spacing, grade and geological continuity, data class (measure of confidence and integrity), and kriging confidence (slope of regression).
	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, quality, quantity and distribution of the data).	The classification considers the relative contributions of geological and data quality and confidence, as well as grade confidence and continuity.
	Whether the result appropriately reflects the Competent Person’s view of the deposit.	The classification reflects the view of the Competent Person.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	All resource models have been subjected to internal peer reviews.
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 relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC code
	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.	The statement relates to global estimates of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	The mineral resource model is reconciled to production on an ongoing basis, which confirms that the global total of Measured, Indicated and Inferred material is accurate. No reconciliation factors are applied to the resource estimates post-modelling.

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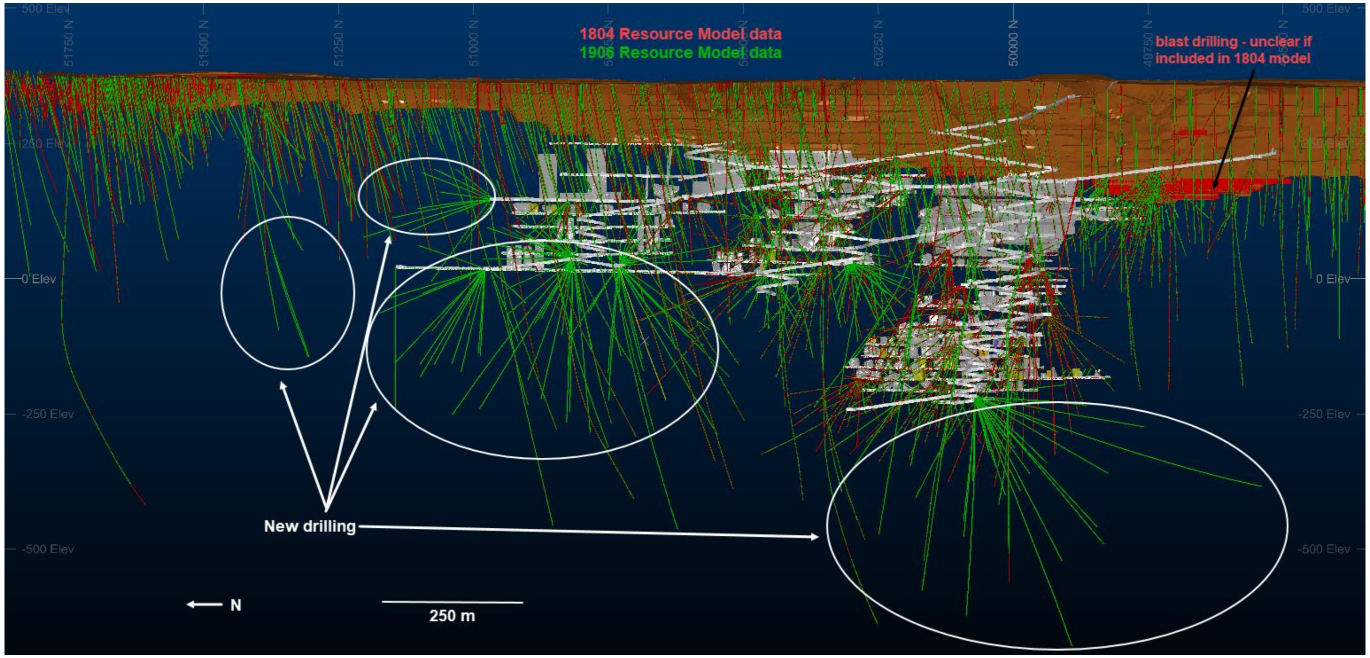

Figure 1. Long section view looking west of the change in drilling used in the Resource Model of the HBJ deposit, coloured by year (1804 in red, 1906 in green).

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star 2019MY resource
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have not been undertaken by the competent person.
	If no site visits have been undertaken indicate why this is the case.	The Reserve process has been closely overseen by company personnel who have visited the site. The competent person has reviewed the inputs and outcomes of the work, including engagement with persons familiar with the site.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	Feasibility Study

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Criteria	JORC Code explanation	Commentary
	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.	Current Underground Reserves are based on Budget level analysis – with a completed 3D design and mine schedule. Modifying Factors were additionally applied to these designs, based upon historical experience and host rock characteristics.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Actual costs and physicals form the basis for Cut Off Grade calculations. Mill recovery is calculated based on historical recoveries achieved. Various cut off grades are calculated including a fully costed cut-off grade (COG), variable cut-off grade (VCOG) and Mill cut-off grade (MCOG). The VCOG is used as the basis for stope design, with areas requiring significant development assessed by detailed financial analysis to confirm their profitability
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).	Mineral Resource is converted to Ore Reserve after completing a detailed mine design and associated financial assessment.
	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.	Mining methodology is based on previous experience. All mining systems within the Reserve statement are standardized, mechanized Western Australian methods. In large disseminated orebodies a sub level open stoping or single level bench stoping production methodology is used. In narrow vein contact hosted domains a conservative narrow bench style mining method is used. Stope shape parameters have been based on historical data or expected stable hydraulic radius dimensions (6-9 HR). Stope shapes represented in the Reserve are ‘Drill and Blast ready’ shapes which have incorporated ‘planned’ mining dilution envelopes. This is an inherent dilution factor which is in response to mining straight line boundaries off a variable mineralised interpretation.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	Each mining area is assessed based on rock mass conditions, structures and historical performance to generate a set of design assumptions for each zone. Level spacing ranges from 20-25m based on rock mass condition with stope strike lengths ranging from 10 – 25m. Pillars are maintained between stopes for stability purposes. Pillars are generally 4.0m in strike length, although in the wider COZ zone, pillar widths reach a maximum size of 9.0m.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	This table one applies to underground mining only. The latest 2019 Resource models were used to generate the Reserves.
	The mining dilution factors used.	Based on historical mine performance, mining dilution of 50% Rock dilution in the stopes in the lower SOZ and Jubilee, 20% Rock dilution in the stopes in the Eastern lodes of the NOZ, SOZ, COZ and South Jubilee and 15% Rock dilution in the stopes in the Western Lodes of the MUT, NOZ and COZ zones additional to minimum mining width is applied.
	The mining recovery factors used.	Mining recovery factor of 90% in the NOZ, COZ and MUT Western Lodes and 80% in all other areas of the mine is applied based on historical data.
	Any minimum mining widths used.	Minimum mining widths have been applied in the various mining methods. The only production style relevant to this constraint is ‘narrow stoping’ – where the minimum width is set at 3.0m in a 20.0m sub level interval.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred blocks are excluded from the reported reserve
	The infrastructure requirements of the selected mining methods.	Infrastructure in place, currently an operating mine
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	South Kalgoorlie Operations has an existing conventional CIL processing plant (Jubilee) in operation since 1987. The plant has a nameplate capacity of 1.2Mtpa. The HBJ host and mineralised domains have been processed through the existing plant for several years.
	Whether the metallurgical process is well-tested technology or novel in nature.	A variable recovery factor is applied to the COG and economic analysis, derived from grade, ranging from 86% - 95% recovery. This is based on the previous 3 years, with a well understood metallurgical performance.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Plus 20 years milling experience with HBJ ores
	Any assumptions or allowances made for deleterious elements.	No deleterious elements are considered, as a long history of processing has shown this to be not a material concern.

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Criteria	JORC Code explanation	Commentary
	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.	Plus 20 years milling experience with HBJ ores
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	SKO operates under and in compliance with a number of operating environmental plans, which cover its environmental impacts and outputs.
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.	All current site infrastructure is suitable to the proposed mining plan.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mine development capital cost based on historical performance on site and life-of-mine forward planning. Plant and equipment capital are based on site experience and the LOM plan
	The methodology used to estimate operating costs.	Operating costs associated with the operation are based on schedule of rates from the current mining contractor on site.
	Allowances made for the content of deleterious elements.	No allowances made
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Corporate guidance
	The source of exchange rates used in the study.	Corporate guidance
	Derivation of transportation charges.	Historic performance
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance
	The allowances made for royalties payable, both Government and private.	All royalties are built into the cost model
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.	AUD$ 1,500/oz gold
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance
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.	It is assumed all gold is sold directly to market at the Corporate gold price guidance of AUD$1,500/oz
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not Applicable
	Price and volume forecasts and the basis for these forecasts.	Corporate guidance
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not Applicable
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.	All costs assumptions are made based on historical performance from the mine and current economic forecast seen as representative of current market conditions
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities have been used with gold price ranges of A$1,500 to A$2,000 per ounce.

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Criteria	JORC Code explanation	Commentary
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	HBJ mine is fully permitted and a major contributor to the local and regional economy. It has no external pressures that impact its operation or which could potentially jeopardise its continuous operation. As new open pits or underground operations develop the site will require separate environmental approvals from the different regulating bodies
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	No Issues.
	Any identified material naturally occurring risks.	No Issues.
	The status of material legal agreements and marketing arrangements.	No Issues.
	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.	No Issues.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	Ore Reserves classifications are derived from the underlying Resource model classifications – i.e. Measured Resource material is converted to either Proved or Probable Reserves, with Indicated Resource material converting to Probable Reserve.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results accurately reflect the competent persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Nil.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Reserve has been internally reviewed in line with Northern Star Resource governance standard for Reserves and Resources. There have been no external reviews of this Ore reserve estimate.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve Estimate is considered high based on current mine and reconciliation performance
	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.	Estimates are global but will be reasonably accurate on a local scale
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Not applicable
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	All currently reported reserve calculations are considered representative on a local scale. Regular mine reconciliations occur to validate and test the accuracy of the estimates at SKO.

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JORC Code, 2012 Edition – Table 1 Report

Pogo Gold Mine – 30 June 2019

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.	The Pogo deposits (Liese, North Zone, East Deeps, South Pogo, Fun Zone, Central Vein and Hill 4021) were sampled using diamond drill holes (DD) completed from both surface and underground campaigns drilled between 1994 and 2019. A total of 5.557 DD holes for 3,212,401 feet (979,140 m) and 50 underground RC holes for 9,046 feet (2,757 m) were drilled to inform the Mineral Resource estimate reported as at 13 June 2019. This methodology continued to be employed in 2018 holes drilled after the Mineral Resource estimate. Other sampling methods employed in sampling the Pogo vein systems include production drilling chip sampling (sludge sampling), muck (stockpile) sampling and sporadic underground face chip sampling. The dataset used to generate Fun Zone Mineral Resource estimate included 171 channel samples with lengths 1.5 ft – 6 ft and 693 sludge holes with length 2 ft – 61 ft. The holes were cleaned out regularly, the intercepts of mineralisation showed strong correlation with diamond drilling and they provided a greater density of data for the estimate. For the other deposits, these samples were excluded from the dataset used to generate the reported Mineral Resource estimate.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Diamond and face channel sampling are sampled based on geological and mineralisation boundaries identified by the geologists during logging and mapping. Geological or mineralisation boundaries identified by geologists are, where possible, not crossed for sampling purposes. Diamond sampling intervals are set at a minimum sample size of 0.5ft (0.15m) and a maximum sampled interval of 5ft (1.52m). Underground RC drilling is sampled on regular 5 ft intervals (1.52 m). Where utilised, sludge holes in Fun Zone mineralisation domains were sampled on 1.5 ft – 6 ft lengths, with holes washed out after each sample. Face channel sampling, used exclusively in the Fun Zone Mineral Resource estimate, is spray-marked for the channel sample line. The vein is then sampled on 1 ft to 3 ft lengths by chiselling chips into a bucket across the entire width of the vein (where practicable) in production. Material is also sampled either side in non-vein material contiguous with the veins. The sampling lengths are measured and plotted on face mapping with assays once received for record keeping and validation.
	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 30g 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.	Industry standard sampling methods were used at Pogo. Diamond with lesser underground RC were the predominant sampling methods used to inform the Resource estimate in this announcement. A minor quantity of sludge hole drilling and face channel samples were used and constituted less than 5% of data used to inform the Resource. All drill core is comprehensively logged and intervals for sampling selected based on geological and mineralogical observations by the geologist. Where practicable, samples are not collected across lithological or mineralisation boundaries. Sampling protocols at Pogo vary dependent on the purpose of the drill hole: • Exploration Core Drilling: Wide-spaced drilling or holes drilled for non-resource conversion purposes are cut using an Almonte core saw and half core submitted for analysis. The non-assayed portion of the core is stored on-site for a period of five years; • Resource Definition Core Drilling: Infill drilling for defining or converting Resources to a higher confidence category are whole core sampled, with the non-assayed portion of the core periodically disposed. • Resource Definition and Production RC (UG): RC Chips are split directly off the rig via the inner return tube through a rotating cone splitter to yield ~3kg sub-samples from 5 ft sample lengths. • Sludge-hole drilling: underground collection of material within production lodes to locally identify mineralisation in structural offsets and structures parallel to the mined development over short distances. Sludge holes included in the Mineral Resources for Fun Zone only were drilled by an underground long hole rig and collected from open holes into buckets on intervals up to 5 ft, with each interval washed out by water prior to sampling. • Face-channelling: underground collection of material at 14 ft advances of the production face. Systematic face sampling was introduced in 2018, however these were not used in the Resource estimate with the exception of the Fun Zone and North Zone in the absence of other data. For Fun Zone, a total of 171 channels were incorporated into the Mineral Resource estimate for a total sample length of 381.5ft. • Resource Definition and Production RC (UG): RC Chips are split directly off the rig via the inner return tube through a rotating cone splitter to yield ~3kg sub-samples from 5 ft sample lengths. For NQ core samples, minimum sample size of 0.5ft (0.15m) and a maximum sampled interval of 5ft (1.52m). For HQ drill core that is whole core sampled, samples are collected at a minimum interval of 4 inches (0.1m) and a maximum of 2.5ft (0.76m). When the HQ samples are half-core cut, the maximum sample is extended to 5ft (1.52m). Quartz vein, fault zones, silica flooding and quartz stockwork zones are sampled plus the adjacent five feet (1.52m) above and below the quartz or fault zone. Samples are crushed to 70% passing 2 mm. A 250-gram split is taken of all sample types, including sludge hole samples, which is then pulverised. A 30-gram sub-sample of all sample types is then selected for fire assay with a gravimetric finish (underground holes) or atomic absorption spectroscopy (AAS) finish (surface holes).

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Criteria	JORC Code explanation	Commentary
	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.).	Drilling has been carried out from both surface and underground. Underground drilling is completed predominantly using NQ2 (50.6mm core diameter) or BQ (36.4mm core diameter) holes, however larger HQ (63.5mm diameter core) and PQ (85.0mm core diameter) holes are completed for long exploration drill holes or when poor ground conditions are encountered or expected. Surface drill holes are typically collared using PQ / HQ diameter tools and reduced to NQ2/NQ2 where necessary. Underground RC drilling (introduced in 2019) is completed using a 4.5-inch diameter face sampling hammer. RC samples are collected directly from the inner return tube on the rig, via a rotating cone splitter to produce a ~3kg sub sample from 5 ft sample lengths. Core drilled between 2009 and 2017 was generally not oriented. Since 2018, orienting of exploration drill holes using the Reflex Act III tool was introduced. Sludge holes, used in the Fun Zone and North Zone Mineral Resource estimate are sampled on 1.5 ft – 6 ft lengths, with holes washed out after each sample. Face channel sampling, used in the Fun Zone and North Zone Mineral Resource estimate, is spray-marked for the channel line and vein contacts. The vein and surrounding material are then sampled on 1 ft – 3 ft lengths by chiselling chips into a bucket across the entire width of the vein in production where practicable, and then sampled either side in non-vein material contiguous with the veins. The sampling lengths are measured and plotted on face mapping with assays once received for record keeping and validation. The following table provide details on the quantity and types of drill core drilled by year at the Pogo deposit as at 13 June 2019:

Feet Drilled by hole Type											
Year	15U	BQ	BQTK	HQ	HQ/NQ	MCR	NQ	NQ/BQ	NQ2	PHB	PHD
Unknown				34002					4385	215	
1994							1374				
1995							2011				
1996											
1997							2000				
1998		1175									
1999		3333			1519		45646.3				
2000			25926.5		1104		30772.5		11455		
2002							31594				
2005							16889.5		22622		
2006							46274	4016	12		
2007							34772.6		35885		
2008				6826			38341.4		99857	80	
2009									105277		
2010								240	101434		
2011							855		162367		
2012	220			28887.6			3620		154904	470	680
2013				96202.3			19655	409	147351	1272	5621.5
2014				81471.4		274.5	96723.2	681	103888	393	6362
2015	296			153492			76270.5		114327	156	2876
2016				109920			1189		135385	371	540
2017				67916.5			1318		162143	371	42
2018				146243.5					241502.2	540	710
2019				18990.1					79194.1		
Feet Drilled Total	516	4508	25,926.5	578,717	2623	274.5	449,306	5346	1,471,802	3418	16,341.5

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Criteria	JORC Code explanation	Commentary
		Face channelling totalled 886 for 7,788.35 ft, 143 for 826.35 ft in 2018 and 693 for 6,640.05 ft in 2019. For Fun Zone, 171 channels were incorporated into the Mineral Resource estimate for 381.5 ft.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	Core recovery is recorded for DD holes. Recovery is measured to the tenth of a foot (~3cm) and was historically recorded in the Recovery tab using Rockware Logplot 7 software. In general, recoveries are excellent and no significant issues with core loss are recognised.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	Core is processed at the Pogo core processing facility. For DD the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor
	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.	There is no known relationship between sample recovery and grade. Overall recoveries are excellent and no significant issues with core loss are recognised.
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.	Core logging is carried out in accordance with Pogo Mines core logging procedures manual, which is an extensive and comprehensive document. Data recorded includes, but is not limited to, lithology, structure, alteration assemblages, sulphide mineralogy, geotechnical parameters (recovery and RQD), and the presence of visible gold. Drill core was logged electronically using Rockware Logplot 7 software and since 2019 on the AcQuire database system. Logging and sampling are carried out according to Pogo Mines protocols and are consistent with industry standards. Lithology is measured to the tenth of a foot (~3cm) scale marked from the closest core block. Rock codes have been set up specifically for the project. Logging is to a sufficient level of detail to support appropriate Mineral Resource estimation and mining studies.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Drill logging is both qualitative (geological features) and quantitative (geotechnical parameters) in nature. Every core tray is photographed wet.
	The total length and percentage of the relevant intersections logged.	All drill holes are logged in full, from start to finish of the hole. All intersections are logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core drilled for Resource Definition is whole core sampled. Core drilled for exploration purposes is cut in half onsite using an industry standard Almonte core saw.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	Underground RC drilling (introduced in 2019) is completed using a 4.5-inch diameter face sampling hammer. RC samples are collected directly from the inner return tube on the rig, via a static cone splitter to produce a ~3kg sub sample from 5 ft sample lengths. Sludge holes were sampled wet and were unsplit prior to a 250 g sub-sample being selected. Face channel samples were sampled dry prior to being coarse crushed, from which a 250 g sub-sample was taken.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	All sample preparation and assaying of Pogo drill core is currently being performed by Bureau Veritas (BV). Pogo sends drill core to BV in Fairbanks where the core is prepared, and a pulp is sent to the BV laboratory in Reno, Nevada or Vancouver, British Columbia for assay. Typically, the gold assays are completed in Reno and the multi-element assays are completed in Vancouver. Sample preparation includes drying, crushing to 70% passing 2 mm, splitting of a 250 g subsample, and pulverising to 85% passing 75 µm. The sample preparation techniques are considered appropriate for the style of mineralisation.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Pogo Mine uses an industry standard QAQC programme involving standards, blanks and field duplicates which are introduced in the assay batches at an approximate rate of one control sample per eight normal samples. QC results are analysed immediately upon return of a sample batch and reported to management monthly. Overall results demonstrate no significant QAQC issues with the analytical laboratory and no systematic bias observed. Protocols are in place to deal with QAQC results that fail. In addition to Pogo QAQC, the analytical laboratory is ISO certified and conducts rigorous internal QAQC checks. Internal QAQC reports provided to Pogo personnel do not indicate any issues with the quality of the analysis provided.

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Criteria	JORC Code explanation	Commentary
	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.	Field duplicates are submitted when half core is taken to ensure that the sampling is representative of the in-situ material being collected. Similarly, field duplicates are collected where RC drilling is employed.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Duplicate sample results correlate well, hence sample sizes are considered to be acceptable to accurately represent the gold mineralisation at Pogo Mine. Sample sizes are considered to be appropriate and correctly represent the style and type of mineralisation.
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.	The samples are analysed using industry standard analytical techniques. Historically, underground holes were analysed for gold by a 30 g fire assay with a gravimetric finish. In holes drilled for exploration purposes, gold content is determined by 30 g fire assay with atomic absorption finish (AAS). Since 2019, all underground holes were analysed using the AAS method. Exploration and underground results analysed by fire assay with the AAS finish returning > 10 ppm (0.292 oz/ton) gold are re-assayed by fire assay with gravimetric finish Select samples are assayed for forty-five elements multi-acid digestion and ICP-MS/ES finish. The technique is considered total and appropriate for the style of mineralisation under consideration.
	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.	No geophysical tools were used in this Resource estimate as at 30 June 2018 nor are presented in this release.
	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.	Quality control samples are inserted into the sample stream. A mixture of both Certified Reference Materials and non-certified standards, blanks and duplicates are inserted randomly, however aim to achieve an insertion rate of approximately one in every eight samples. The Pogo Mine both generates its own in-house standards from ore grade material from the mine and uses Certified reference Materials (CRMS) sourced from CDN Laboratories. In-house standards are prepared at the Pogo assay laboratory, with a round-robin approach to determine the recommended value and acceptable limits. Blanks are also produced in-house and are generated from a local source of barren basalt and crushed to nominal one-inch size and inserted into sample bags prior to including into the laboratory submittal. Sand is also used as a blank. Monitoring of QA/QC results is performed by the resource geologists upon importing the individual assay certificates into the drill hole database. When failures occur, the resource geologists notify the geologist responsible for the drill hole or the core processing facility supervisor.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	Significant intersections are routinely inspected by alternative company personnel. Core photographs of significant intersections reviewed to ensure mineralised zones are consistent with known Pogo mineralisation styles.
	The use of twinned holes.	No twinned holes have been complete at Pogo.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	All diamond core is logged in detail. Logging takes place at the core processing facility. Core logging (geological and geotechnical) was historically completed using Logplot 7 software. Since Northern Star acquisition, data capture has transition to the AcQuire database and logging systems. The core logging procedures manual provides guidance to the user. All Pogo data is stored as in industry-standard AcQuire database. Validation protocols are built into the importation process ensure data integrity.
	Discuss any adjustment to assay data.	No adjustments were made to the assay data.
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.	Drill rigs are aligned using the Reflex TN14 Gyrocompass. Underground collar locations underground is surveyed after completion of the drill hole using a Leica 1200 series survey station. On surface, collar locations are surveyed using a Leica RTK-GPS survey station. Downhole surveys for underground drill holes are collected at 50 ft downhole from the collar and every 100 ft thereafter using a Reflex® EZ-Trac multi-shot survey instrument. Surface drill holes are survey every 200 ft. A final survey is taken at the end of all drill holes. Deviation at the initial survey is checked against plan and the hole is redrilled if there is excessive deviation (>5%).
	Specification of the grid system used.	The grid system used is the North American Datum of NAD83 (NAD83) AKSP-3.
	Quality and adequacy of topographic control.	High quality LiDAR topographic mapping is utilised at Pogo.

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Criteria	JORC Code explanation	Commentary
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing is highly variable. Well-drilled areas are tested by drilling on approximately 20 by 20 feet patterns, extending out to 200 feet at the peripheries of the deposits. The Hill 4021 deposit contains drill spacing up to a maximum of 600ft by 600ft.
	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 drill hole spacing, combined with estimation quality parameters such as slope of regression and average distance to sample, were used to classify the Mineral Resource estimate. The data spacing, and distribution is considered sufficient to support the reporting of Indicated and Inferred Mineral Resources.
	Whether sample compositing has been applied.	No compositing was applied prior to submission of samples for analysis.
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.	Where practicable, the drilling was designed to intersect the mineralisation as perpendicular as possible to the dominant vein geometries. In some circumstances, the lack of drill positions resulted in holes that were oblique to the mineralisation.
	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 Competent Persons believe that no bias has been introduced to the data, as no single potentially bias inducing orientation dominates in any given area.
Sample security	The measures taken to ensure sample security.	Chain of custody is managed by Pogo Mine personnel. All core samples are received intact and in their entirety in their core trays at the Company's secure core processing facility. All sampling and work on the samples is carried out within the confines of this secure facility. Pogo uses pre-numbered sample ticket books for sample numbers. The drill hole number, sample interval, and date are recorded on each ticket and the tear-off ticket is labelled with the sample interval and stapled onto the core box. Core is placed in bags with the sample number marked in permanent marker and the bar code stapled to the bag. After sampling is complete, the sample bags are scanned and placed in rice bags labelled with the drill hole number and the sample sequence, ready for submission to the laboratory. Bags are sealed with a zip-tie. Samples are transported via road to the sample preparation facility in Fairbanks, Alaska. Upon receipt, any issues with sample condition is reported to Pogo personnel.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	In March 2018, Sumitomo Metal Mining Pogo LLC (SMM Pogo) commissioned Mine Technical Services Ltd. (MTS) to complete a review audit of standard procedures currently in use at the Pogo Mine in Central Alaska. Drilling, logging, sampling, analytical, QA/QC, database, modelling, density, ore control, resource estimation, mine planning, metallurgy and reconciliation procedures were audited. While minor recommendations for improvement were made, sampling techniques and data were generally found to be well-considered and consistent with industry good practise. CSA Global and Northern Star Resources personnel completed validation of the database for internal consistency and any obvious errors prior to preparation of the Mineral Resource estimate, which incorporates results acquired prior to 2018. Northern Star have completed validation checks of all data reported in this release. Checks were completed for overlapping intervals, sample intervals extending beyond the hole depth, from > to intervals, and missing from or to values. Some issues were rectified. Various other potential issues such as missing surveys, missing sample data, and missing interval etc. were also identified for further review.

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 total tenement area comprising the Pogo project consists of 1,259 state mining claims (17,079 ha) in addition to the mine lease claim (641 ha) and the mill site lease (1,385 ha). The Pogo operation is 100% owned by Northern Star Resources. There are no known royalties on the area subject the resource reported in this release.
	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.	Detailed legal due diligence completed as part of the Pogo acquisition demonstrates that the tenure is in good standing and secure. Pogo is a fully permitted and operational mine, and there are no foreseen permitting issues that will prevent development of the resource or any future exploration activities.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The first modern-day exploration was conducted in the Pogo area by WGM Inc, in 1981, where strong gold-arsenic-tungsten anomalies were identified in stream sediment samples collected from the Pogo and Liese Creeks during regional reconnaissance surveys. WGM staked mining claims over the area. In 1991, the area was incorporated into the Stone Boy Joint Venture, which consisted of large claim groups focused on the Chena, Salcha and Goodpaster River basins. As part of the Stone Boy JV, exploration was conducted by WGM and financed by Sumitomo Mining Metal Corporation Ltd. and others (that later withdrew) as part of an earn-in agreement. Regional grid-based soil sampling was completed between 1991 and 1994, with three diamond drill holes funded by the Japan Oil Gas and Metals National

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Criteria	JORC Code explanation	Commentary
		Corporation drilled in 1994 to test a prominent gold-in soil anomaly. Based on successful anomalism returned in the initial three holes, a further 13 were drilled in the Liese Creek are in 1995, one of which was the discovery hole for the Liese vein system and graded 22.7ft at 1.838opt (6.92m @ 63.0gpt). In 1997, Sumitomo signed an agreement with Teck Resources Ltd. to acquire a 40% interest in the Pogo claims and assumed operatorship of the project in 1998. Further surface definition drilling was completed between 1998 and 2004, with the mining operation commencing in 2006.
Geology	Deposit type, geological setting and style of mineralisation.	The Project is located in the Tintina Mineral Belt, which is a 200 km-wide, 1,200 km-long arc, broadly bounded by the Tintina-Kaltag fault systems to the north and the Denali-Fairwell fault systems to the south. The region is containing numerous economic deposits of gold in addition to copper, lead, zinc, silver and tungsten deposits. The lithological units in the Pogo deposit area are dominantly high grade metamorphics and later felsic to intermediate intrusive units. Key metamorphic rocks include biotite feldspar gneiss, augen gneiss and mafic schist derived from both sedimentary and igneous protoliths. Metamorphic mineral assemblages observed consist of quartz, feldspar, biotite, chlorite, muscovite, sillimanite, andalusite and garnet. The 50km long Goodpaster batholith (granite-tonalite-diorite) is the dominant intrusive complex in the district. Locally small felsic to intermediate stocks and dykes are present. The principal mineralisation is hosted in biotite-quartz-feldspar paragneiss and orthogneiss, although all other lithologies are cut. Where the veins cross intrusives, they tend to split and become stockwork zones. Gold at Pogo is predominantly hosted within laminated quartz veins ranging in thickness from <0.5m to >10m. Mineralised veins contain around 3% sulphides (arsenopyrite, pyrite, pyrrhotite, loellingite, chalcopyrite, bismuthinite, sphalerite, galena, molybdenite, tetradymite, maldonite) and, a variety of Bi-Pb-Ag sulphosalts. The Pogo gold deposit is considered to be an example of a Reduced Intrusive Related Gold Deposit (RIRGD), characterised by a low sulphide content, (typically <5%) and a reduced ore mineral assemblage, that typically comprises pyrite and lacks primary magnetite or hematite. In brief, these deposits typically have the following characteristics; o Mineralisation occurs as sheeted vein deposits or stockwork assemblages and often combines gold with variably elevated Bi, W, As, Mo, Te, and/or Sb, but low concentrations of base metals o Restricted and commonly weak proximal hydrothermal alteration o Spatially and temporally related to reduced intrusions of intermediate to felsic composition.
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: 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.	Tables with the drill hole information accompany this release.
	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.	Material information for the finalised drilling completed to the 1st of June 2019 has been provided with this report.
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.	No exploration results are reported with this release.
	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.	No exploration results are reported with this release.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	Not applicable given metal equivalent values are not being reported.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results.	No exploration results are reported with this release.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	No exploration results are reported with this release.
	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').	

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Criteria	JORC Code explanation	Commentary
Diagrams	Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	Diagrams have been included in the body of the announcement.
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.	No exploration results are reported with this release.
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.	Nil
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).	In-fill drilling on the Central lode system has commenced on 30m x 30m centers from multiple surface drill pads. At the time of this announcement, 8 drill rigs were in operation at Pogo underground focusing on Resource conversion, definition and extension of in-mine mineralisation.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Diagrams have been included in this announcement.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Historically, geologic logs saved in Logplot 7 format are imported directly using GeoLogger. GeoLogger, a Microsoft® Access application developed by GEMS for use by Pogo, imports samples, geologic logs and down-hole surveys into the drill hole database. Collar surveys are entered directly into the database in the header table by the geologist responsible for the drill hole. Down-hole surveys are recorded on slips of paper into GeoLogger and a geologist marks the survey as acceptable. The data entry procedures for samples, geologic logs, and down-hole surveys are well documented in the Pogo logging manual. Since late 2018, data was transitioned to an Acquire database. A comprehensive audit and validation were undertaken upon transitioning between the historic database and the AcQuire database. The data entry procedures and use of templates minimise the chance of the data being corrupted.
	Data validation procedures used.	All drill intersection information used in the preparation of this release has been validation by the Competent Person. Validation included, but was not limited to, review of the database, core photographs and review of the assay certificates. Intervals were manually checked to ensure they truly reflect the mineralised zones. In addition, all data was validated prior to preparation of this Mineral Resource estimate as at 30 June 2018. Drill hole data relating to the 30 June 2019 Mineral Resource was provided as csv files extracted from the database by a Senior Data Specialist to perform a series of validation exercises. Overlapping intervals, intervals that extend beyond the hole depth, intervals where from > to and missing from or to values were rectified.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	A site visit was completed by the CSA Competent Person from 25 June through 1 July 2018. The NST competent person has spent conducted multiple site visits between June 2018 and July 2019. Detailed review of systems and practices were undertaken. Underground workings, drill rigs and core yard facilities were inspected. Several areas for improvement in the current systems were noted, however no issues were identified that would preclude the reporting of Mineral Resource estimate in accordance with the JORC Code.
	If no site visits have been undertaken indicate why this is the case.	Not applicable, as site visits were undertaken.
	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	Seven major zones were modelled to support the Mineral Resource estimate, namely: Liese, East Deeps, North Zone, South Zone, Fun Zone, Central Veins and Hill 4021.

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Criteria	JORC Code explanation	Commentary
Geological interpretation		There is a reasonable confidence in the interpretation, which divides the deposit into numerous lenses of mineralisation for each deposit area. It is expected that the interpretation is likely to materially change on a local basis, given the structural complexity, however a higher level of confidence exists in the broader mineralisation interpretations. Liese – Quartz veins were modelled based on lithological logging; however 2 g/t Au intervals were selected in the absence of logged quartz veins. 341 lodes were modelled. Eastern Deeps – Quartz veins were modelled based on lithological logging; however 4 g/t Au intervals were selected in the absence of logged quartz veins. 36 lodes were modelled, two very significant in terms of volume. North Zone – Quartz veins were modelled based on logging and face mapping; however 4 g/t Au intervals were selected in the absence of logged quartz veins. 7 main lodes were modelled. South Pogo – Quartz veins were modelled based on lithological logging; however nominal 2 g/t Au intervals were selected in the absence of logged quartz veins. 46 lodes were modelled. Fun Zone – Quartz veins were modelled based on lithological logging; however 4 g/t Au intervals were selected in the absence of logged quartz veins. 106 lodes were modelled. Central Zone – Quartz veins were modelled based on lithological logging; however nominal 2 g/t Au intervals were selected in the absence of logged quartz veins. 69 lodes were modelled. Hill 4021 – Two main structures and their respective offsets were modelled, in addition to 30 minor lodes.
	Nature of the data used and of any assumptions made.	Drill hole logging and Au grades have been used to assist in the interpretation of the mineralisation. It is assumed that the logging data is accurate. North Zone interpretation made extensive use of development and face mapping. The Hill 4021 interpretation used surface mapping ion conjunction with the drill data.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Alternative interpretations are probable for the less continuous lenses at each deposit. A higher confidence exists in the more significant continuous lenses, which are often supported by mining. Alternative interpretations for these lenses are generally not plausible.
	The use of geology in guiding and controlling Mineral Resource estimation.	The structural framework, which is relatively well-known after many years of mining, has guided interpretation.
	The factors affecting continuity both of grade and geology.	Mineralisation is hosted in quartz veins – which have filled dilational zones within the brittle host rock sequence. Main mineralising systems are variably truncated or offset by meso- to macro-scale faulting, which is evidenced in the multiple lode interpretation for each of the main mineralised systems within the Pogo deposit. Mineralisation also occurs as a stockwork system. Continuity of the veins (geological continuity) and stockwork is governed by structural deformation porosity. The mineralisation displays a moderate nugget component with significant short-range grade variability.
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.	Liese – The generally shallowly north-westerly dipping Mineral Resource extends approximately 1,300 m in a north-easterly direction along strike and 1,300 m down dip. Eastern Deeps – The shallow to moderately north-westerly dipping Mineral Resource extends approximately 530 m in a north-easterly direction along strike, and 600 m down dip. North Zone – The steeply east dipping Mineral Resource extends approximately 760 m in a northerly direction along strike, 300 m in a westerly direction across strike, and 610 m down dip. A flatter component, dipping north, extends 240m by 180m. South Pogo – The moderately north-westerly dipping Mineral Resource extends approximately 720 m in a north-easterly direction along strike, and 660 m down dip. Fun Zone – the generally shallow-to-moderately-westerly dipping Mineral Resource extends approximately 880 m in a westerly direction across strike, 650 m in a northerly direction across-strike and 915 m down dip. Central Zone - The shallow to moderately north-westerly dipping Mineral Resource extends approximately 750 m in a north-easterly direction along strike, and 500 m down dip. Hill 4021 – The Hill 4021 prospect consists of two extensive, shallow dipping mineralised structures that are 2,000m by 500m.
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.	Vein wireframes were used to select drill hole samples, and the database table minzon was assigned the domain code in the field minzon. Based on the drill hole coding, samples from within the mineralisation wireframes were used to conduct a sample length analysis. Based on the review, a 4 ft composite length was selected for all deposits. Semi variograms were modelled in SupervisorTM for the domain groups. The semi variogram models predominantly display low nuggets, a short-range spherical structure that generally accounts for a high proportion of the total variance for all variables and a long-range spherical structure.

Criteria	JORC Code explanation	Commentary
		Kriging Neighbourhood Analysis (KNA) was used for all deposits to optimise search parameters. Search parameters for each deposit are summarised below. o Liese – Min 6 Max 24 samples. SE 1/1 of maximum range in all directions first pass. Second pass used 2 times range, third pass used 4 times range. Fourth pass used 20 times range for block filling with Min 2 Max 24 samples. Block discretisation scheme is 4 by 4 by 2 (X by Y by Z). o Eastern Deeps – Min 4 Max 30 samples. SE 2/3 of maximum range in all directions first pass. Second pass used the full range. Third pass 1.5 range. Maximum drill hole constraint not removed for third. Just Au estimated. As, Bi, Hg exist but not estimated. Ordinary kriging. Hard boundaries between all the different lodes. Sichel mean applied to blocks not informed by the third pass o North Zone – Sub-domains were grouped according to their geological characteristics and orientation, with resultant variograms produced and used in the estimation process. Gold grades were estimated using id2, Ordinary Kriging and nearest neighbour (NN) estimates, with final reported grades assigned after validation to ensure no over estimation occurs. o South Pogo – first and second passes min between 4 and 6 through to max between 12 and 24 samples (estimation domain dependent), max 3 samples per hole; third pass min 3 samples per hole. First pass 1 times maximum range in all anisotropic directions, second pass 2 times range, third pass 875 ft. Discretisation 2 by 4 by 2 (X by Y by Z). Just Au estimated. As Bi, Hg exist but not estimated. Sichel mean applied to blocks not informed by third pass. Liese 2 extension, which was updated internal to the South Pogo model, used first and second passes min 6 and max 14 samples, max 3 samples per hole; third pass min 2 and max 16 samples, max 2 samples per hole. First pass 1 times maximum range in all anisotropic directions, second pass 2 times range, third pass 1,000 ft. Discretisation 2 by 4 by 2 (X by Y by Z). Just Au estimated. As Bi, Hg exist but not estimated. Sichel mean applied to blocks not informed by third pass o Fun Zone – for only lodes 60, 61, 62, 68, 69 and 106 of domain 7, channel samples composited on 3 ft were combined with diamond drilling composites to estimate only these lodes from which the channel samples were taken. The estimate was conducted in a single pass equal to the short-range structure (~1/3 of the full range) of the domain variogram modelled on the diamond drilling composites with anisotropies applied, prior to estimation from the diamond drilling composites – min 8 and max 20 samples, max 3 samples per channel sample. Discretisation 2 by 4 by 2 (X by Y by Z). Just Au estimated. o Fun Zone – blocks in lodes 60, 61, 62, 68, 69 and 106 of domain 7 not estimated by the channel-sample short-range first AND ALL OTHER LODES, were estimated by three passes using diamond drilling composites. The first pass used min 8 and max 20 samples, max 3 samples per hole; second pass min 6 and max 20 samples, max 4 samples per hole; third pass min 2 and max 20 samples, max 2 samples per hole. First pass 1 times maximum range in all anisotropic directions, second pass 2 times range, third pass 1,500 ft. Discretisation 2 by 4 by 2 (X by Y by Z). Just Au estimated. As Bi, Hg exist but not estimated. Sichel mean applied to blocks not informed by third pass. o Central Zone - Min 6 Max 16 samples. SE 1/1 of maximum range in all directions first pass. Second pass used 2 times range; third pass used 4 times range. Fourth pass used 20 times range for block filling with Min 2 Max 16 samples. Block discretisation scheme is 4 by 4 by 2 (X by Y by Z). o Hill 4021 – ID2 estimation in to 5' parent blocks, using two passes, 200' with a minimum of 2 samples and 400' with a minimum of 2 samples. Not all block was estimated, the remainder were set to oz/t. Samples were composited to one sample per lode (seam composites) Block models were constructed using Surpac, Datamine and Vulcan software and coded by the object number from the vein wireframes to form individual mineralisation domains for each object. Gold in oz per short ton was estimated into the au_cut field. Estimation of grades for the vein domain was undertaken by Ordinary Kriging using top-capped composites restricted to the corresponding mineralisation domain in the block model minzon field.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	The current Mineral Resource estimate is an update to the previous Mineral Resource estimate of June 2018, which was the first to be reported in accordance with the JORC Code. There was a previous foreign estimate dated December 2017. The current estimate accounts for both mining depletion and the addition of extensional and infill drilling. Consequently, the 2018 and 2019 estimates are not directly comparable, however the 2019 estimate grades and tonnages are in line with expectations based upon the substantial amount of additional drilling available.
	The assumptions made regarding recovery of by-products.	No assumptions have been made regarding the recovery of by-products.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	Deleterious elements are not modelled, nor do they require modelling at present.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The block sizes in relation to the average sample spacing are summarised below. o Liese – 20 Y by 20 X by 10 Z (feet) block. Drill spacing 15 to 200 feet. Mean approx. 40 feet. o Eastern Deeps – 40 Y by 10 X by 10 Z (feet) block. Drill spacing 15 to 200 feet. Mean approx. 40 feet. o North Zone – 10 Y by 15 X by 15 Z (feet) block size Drill spacing highly variable from 60 to 200 feet. Mean approx. 80 feet. o South Pogo – 20 Y by 20 X by 10 Z (feet) block size. Drill spacing highly variable from 60 to 200 feet. Mean approx. 80 feet. o Fun Zone – 20 Y by 20 X by 10 Z (feet) block. Drill spacing 10 to 200 feet. Mean approx. 80 feet. Face-channel samples were taken on 14 ft advances of the production face and as close to normal as possible to the apparent dip-plane of veins within the production face o Central Zone - 20 Y by 20 X by 10 Z (feet) block size. Drill spacing highly variable from 30 to 200 feet. Mean approx. 80 feet. o Hill 4021 – 25 by 25 by 25 (feet) sub celled to 1 x1 x 1 (feet)

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Criteria	JORC Code explanation	Commentary
	Any assumptions behind modelling of selective mining units.	No assumptions have been made regarding selective mining units.
	Any assumptions about correlation between variables.	No assumptions have been made regarding correlation between variables.
	Description of how the geological interpretation was used to control the Resource estimates.	Drill hole sample data was flagged using domain codes generated from the mineralisation interpretations, which were completed with due consideration of the structural framework at Pogo. Mineralisation boundaries were treated as hard boundaries for grade estimation.
	Discussion of basis for using or not using grade cutting or capping.	A review of grade outliers was undertaken for each deposit to ensure that extreme grades are treated appropriately during grade interpolation. Although extreme grade outliers within the grade populations of variables are real, they are potentially not representative of the volume they inform during estimation. If these values are not cut, they have the potential to result in significant grade over-estimation on a local basis. The cutting strategy was considered and applied as follows: o Review histograms and log-probability plots for values beyond a lognormal distribution o Review mean-variance plots to ensure that potential top-cuts did not have significant impact on the mean and variance o Cut the values from the populations for the domain for statistical assessment o Reset the data exceeding the maximum value, which were cut from the statistical assessment, to that maximum. Cutting was applied on a lode by lode basis.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Block model validation was completed using visual methods in section and 3D with comparisons made between the input raw drill hole data, composites and blocks, and numerical validation methods, such as histogram, log-probability and swath plots. The validation showed the strong conditional bias predicted from the estimation approach, but the block model estimates appropriately reflect the composites, showing a reasonable local estimate.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The Mineral Resources have been reported at a diluted cut-off of 3.8 g/t Au (0.11 oz/short ton) inside simulated Mineable Shape Optimiser (MSO) stopes at a minimum width of 8ft. This, in the opinion of the Competent Person, is a suitable lower cut-off as required by the reasonable prospects hurdle. Hill 4021 open pit component is reported inside a whittle shell and at a cut-off of 0.82oz/ short ton
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	Pogo is an underground gold mine producing 900 ktpa to produce between 200 to 300 koz of gold per annum. After significant time validating underground workings, including stopes and development, the block model was coded with 'mined = 1' where sub-block centroids were inside any of the solid wireframes. These wireframes are not a true reflection of the workings received, as the validation removed many triangles to allow the objects to become valid for coding the block model. However, CSA Global estimates from visual review the valid object are likely to be within 98% of the volume of the original wireframes. Grades and densities with 'mined = 1' were not reset, which allows the model to be reconciled against previous MREs. Mined areas were not reported.
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.	Pogo is an underground gold mine and CIL processing plant. Gold recovery is currently ~90%. There are no indications in the available data that metallurgical factors change in the material estimated in this Resource model.
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 green fields 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.	Pogo is an operating mine that is fully permitted in accordance with United States federal laws and regulations in addition to Alaskan state laws and regulations. Waste and residual process material is used as either components in rockfill, paste fill or stored on the dry stack tailings facility. There is currently adequate storage capacity at site that would enable waste disposal of the material that potentially may be generated by extraction of future economic material in the Resource estimate.

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Criteria	JORC Code explanation	Commentary
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.	A density of 2.68 g/cm3, or 0.0835 short ton/ft3 was used for the mineralisation.
	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 density value has been based on test work conducted on 121 samples taken from the operating mine, across each of the main mineralised zones. The weighted average of these samples was determined and has been chosen as the applied density.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	The lithologies which host the gold mineralisation contain a significant abundance of quartz. There is no major lithological variation which would justify the assignment of different densities for different materials.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The Mineral Resource has been classified as both Indicated and Inferred on a semi qualitative basis, following due consideration of all criteria contained in Section 1 and section 2 of JORC Table 1, and statistical parameters pertaining to the estimate quality; including estimate slope of regression, minimum and average distances to informing samples, number of informing samples and search pass number.
	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, quality, quantity and distribution of the data).	Appropriate account has been taken of all relevant criteria including data integrity, data quantity, geological continuity, and grade continuity.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The Mineral Resource estimate appropriately reflects the Competent Person's views of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The current model has not been audited by an independent third party but Liese, South Pogo, East Deeps, Fun Zone and Central vein models have been subject to CSA Global's internal peer review processes.
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 Mineral Resource accuracy is communicated through the classification assigned to this Mineral Resource. The Mineral Resource estimate has been classified in accordance with the JORC Code, 2012 Edition using a qualitative approach. All factors that have been considered have been adequately communicated in Section 1 and Section 3 of this Table.
	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.	The statement relates to global estimates of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Global reconciliation between historic mine production and the Resource estimate indicated the model is robust.

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	Northern Star MY2019 Resource
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been undertaken by the competent person and the competent person is currently based at the site.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	Life of mine planning to pre-feasibility level and budget model at an operating site.

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Criteria	JORC Code explanation	Commentary
	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.	Life of mine planning to pre-feasibility level and budget model at an operating site.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	Budget costs and physicals form the basis for Cut Off Grade calculations. Mill recovery is calculated based on historical recoveries achieved. The cut-off grade is determined by budgeted costs associated with ore development, production, processing and associated administration costs. Financial assessment is further completed on mining areas.
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).	Mineral Resource is converted to Ore Reserve after completing a detailed design and associated financial assessment.
	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.	Selected mining method deemed appropriate as it is currently in operation at Pogo.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	Design parameters vary between areas of the mine. Stoping is generally based on 45 foot sublevels with stope strike used to limit hydraulic radius. Paste is used to fill mined areas. This method is currently in operation.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	Not applicable - this table one applies to underground mining only.
	The mining dilution factors used.	Stoping dilution varies through the mine depending on observed performance to date. All designs have a minimum of 2 foot footwall and 3 foot hangingwall dilution designed along with additional factors ranging from 8% in areas of better ground conditions up to 66% for some remnant areas. Except in remnant mine areas, dilution for ore development is calculated as zero, and any overbreak grade is expected to be equivalent to the designed development grade. In remnant areas non ore dilution is assumed of up to 50%.
	The mining recovery factors used.	Stoping recovery varies through the mine depending on observed performance to date. Recovery factors range from 95% in areas of better ground conditions down to 66% for some remnant areas where there is some execution risk. Except in remnant mine areas, recovery for ore development is estimated at 100%. In remnant areas recovery is assumed as low as 66% where there is some execution risk.
	Any minimum mining widths used.	The minimum mining width, before designed dilution (5 foot) is the vein width. A 40 degree stope FW angle to ensure ore recover has been assumed.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred blocks are excluded from the reported reserve.
	The infrastructure requirements of the selected mining methods.	Infrastructure in place, currently an operating mine.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	All Pogo UG ore is treated at the Pogo milling facilities. These facilities are currently designed to handle approximately 1.2 million Short Tons of feed per annum. The plant has the capability to treat both partially refractory and free milling ores, through both gravity and flotation circuit and associated fine grind circuit (including carbon-in-leach (CIL) gold recovery). The plant is made up of grinding, gravity gold recovery, flotation, fine grind, CIL, elution and gold recovery circuits.
	Whether the metallurgical process is well-tested technology or novel in nature.	Milling experience gained over plus 10 years operation.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Milling experience gained over plus 10 years operation.
	Any assumptions or allowances made for deleterious elements.	No assumption made.
	The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody.	Milling experience gained over plus 10 years operation.

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Criteria	JORC Code explanation	Commentary
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Pogo operations are currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are granted.
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.	All current site infrastructure is suitable to the proposed mining plan.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mine development capital cost based on expected performance on site and life-of-mine forward planning. Plant and equipment capital are based on site experience and the LOM plan.
	The methodology used to estimate operating costs.	All operating costs are projected forward on a first principals modelling basis and evaluated against current performance.
	Allowances made for the content of deleterious elements.	No allowances made.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Corporate guidance.
	The source of exchange rates used in the study.	Corporate guidance.
	Derivation of transportation charges.	Historic performance.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance.
	The allowances made for royalties payable, both Government and private.	All royalties are built into the cost model.
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.	US$1,150/oz gold.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	It is assumed all gold is sold directly to market at the Corporate gold price guidance of US$1,150/oz.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not Applicable.
	Price and volume forecasts and the basis for these forecasts.	Corporate guidance.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not Applicable.
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.	No NPV has been generated. Existing and forecast costs have been projected forward in the operating budget model.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities have not been undertaken.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.

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Criteria	JORC Code explanation	Commentary
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 Issues.
	The status of material legal agreements and marketing arrangements.	No Issues.
	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.	Pogo operations are currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are granted.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	Ore Reserves classifications are derived from the underlying resource model classifications with additional assessment – a Measured Resource is converted to either Proved or Probable Reserves, with Indicated Resource material converting to Probable Reserve.
	Whether the result appropriately reflects the Competent Person’s view of the deposit.	The results accurately reflect the competent persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Nil.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Reserve has been internally reviewed in line with Northern Star Resource governance standard for Reserves and Resources. There have been no external reviews of this Ore reserve estimate.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve Estimate on a global basis is considered high based on current mine performance.
	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.	Estimates are largely global in nature.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Not applicable.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Mine performance has been used in the generation of modifying factors applied to develop a Reserve.

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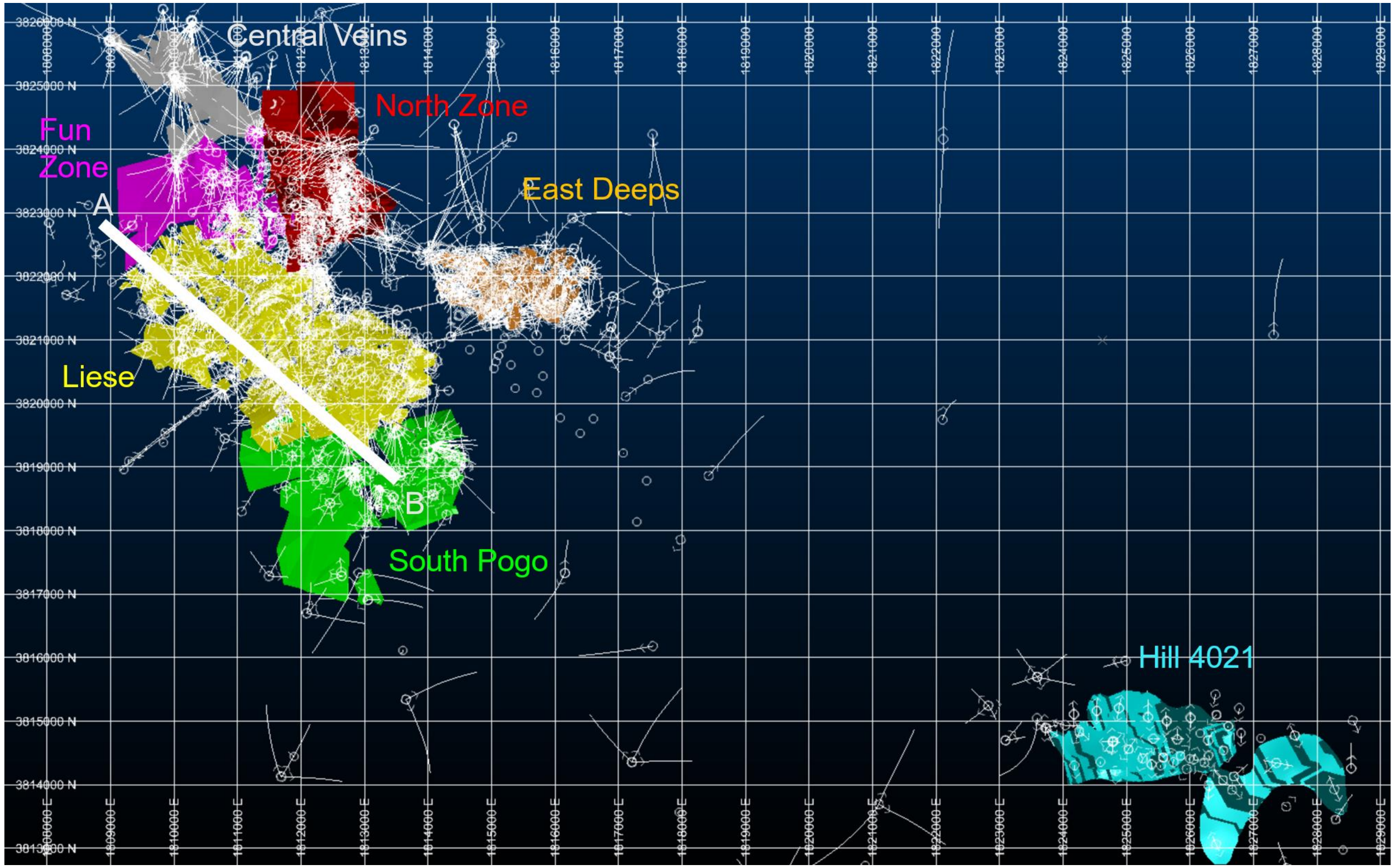

Plan view of the Pogo deposit and drill holes with development shown. Units are shown in feet. Grid is 1,000ft squares.

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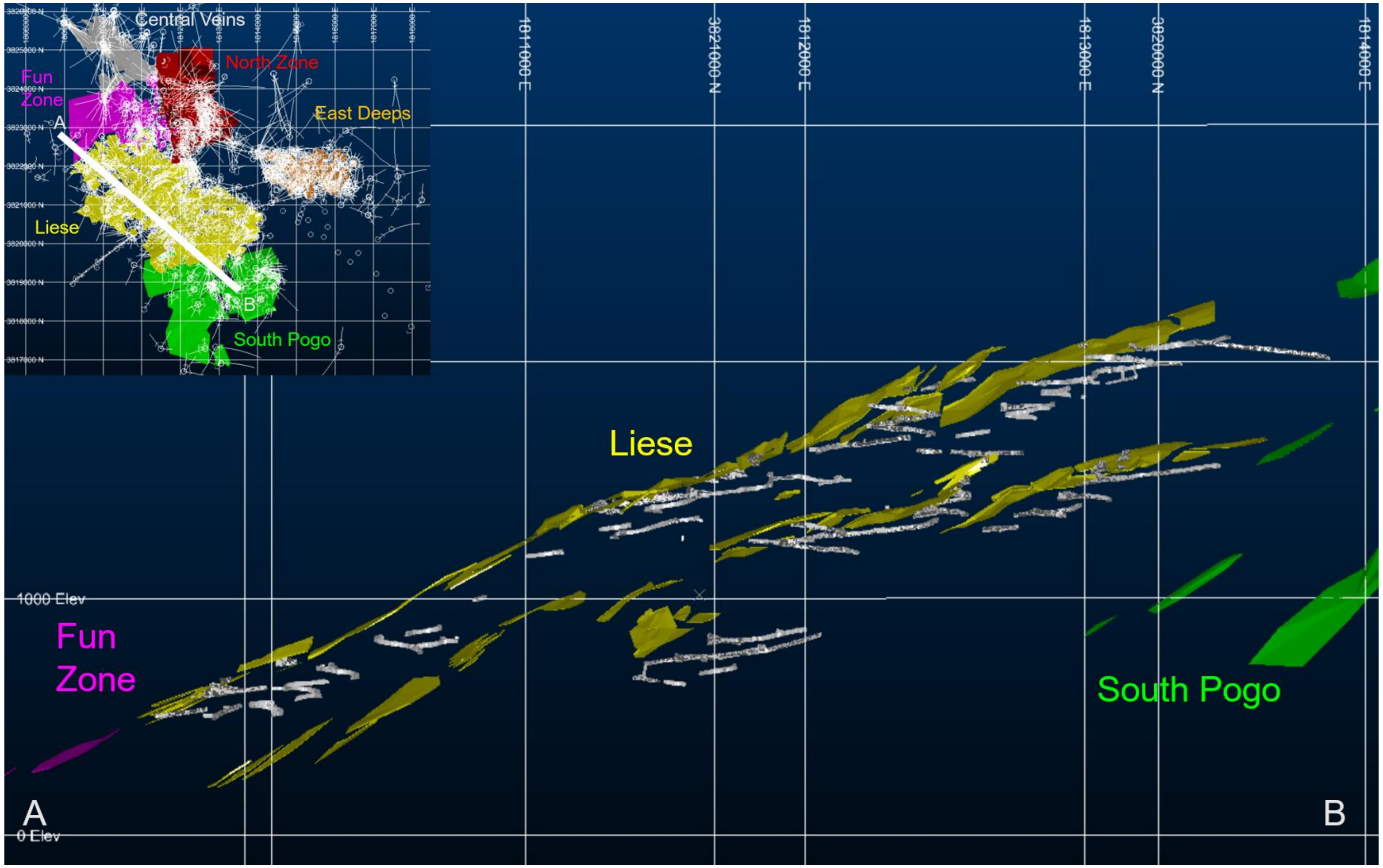

(ABOVE): Representative cross section through the Pogo deposit. Existing development is shown in white.

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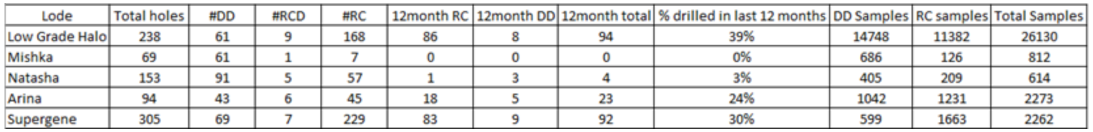
JORC Code, 2012 Edition – Table 1 Report

Paradigm: Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="3">Sampling techniques</td><td>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.</td><td>Sampling was completed using a combination of Reverse Circulation (RC), Rotary Air Blast (RAB) and Diamond (DD) drilling. RAB drilling was excluded in resource estimation work.
Face sampling (FS) was conducted during underground mining between the early 2000's and 2007, however, to date these channels have not been validated and were therefore omitted from any resource estimation.
The database compiled by NSR for resource estimation contains the following drill quantities per ore lode and screen captures at the end of the table display the data density in plan view:

<table>
<tr><th>Lode</th><th>Total holes</th><th>#DD</th><th>#RCD</th><th>#RC</th><th>12month RC</th><th>12month DD</th><th>12month total</th><th>% drilled in last 12 months</th><th>DD Samples</th><th>RC samples</th><th>Total Samples</th></tr>
<tr><td>Low Grade Halo</td><td>238</td><td>61</td><td>9</td><td>168</td><td>86</td><td>8</td><td>94</td><td>39%</td><td>14748</td><td>11382</td><td>26130</td></tr>
<tr><td>Mishka</td><td>69</td><td>61</td><td>1</td><td>7</td><td>0</td><td>0</td><td>0</td><td>0%</td><td>686</td><td>126</td><td>812</td></tr>
<tr><td>Natasha</td><td>153</td><td>91</td><td>5</td><td>57</td><td>1</td><td>3</td><td>4</td><td>3%</td><td>405</td><td>209</td><td>614</td></tr>
<tr><td>Arina</td><td>94</td><td>43</td><td>6</td><td>45</td><td>18</td><td>5</td><td>23</td><td>24%</td><td>1042</td><td>1231</td><td>2273</td></tr>
<tr><td>Supergene</td><td>305</td><td>69</td><td>7</td><td>229</td><td>83</td><td>9</td><td>92</td><td>30%</td><td>599</td><td>1663</td><td>2262</td></tr>
</table></td></tr>
<tr><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>RC samples were split using a rig-mounted cone splitter on 1m intervals to obtain a sample for assay.
Diamond core was placed in core trays for logging and sampling. Half core samples were nominated by the geologist from diamond core with a minimum sample width of either 20 cm (HQ) or 30 cm (NQ2).</td></tr>
<tr><td>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 30g 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.</td><td>RC sampling was split using a rig mounted cone splitter to deliver a sample of approximately 3 kg
DD drill core was cut in half using an automated core saw, where the mass of material collected will vary on the hole diameter and sampling interval
All samples were delivered to a commercial laboratory where they were dried, crushed to 95% passing 3 mm if required, at this point large samples may be split using a rotary splitter, pulverisation to 95% passing 75 µm, a 50 g charge was selected for fire assay.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both RC and Diamond Drilling techniques were used at the Paradigm project.
Diamond drill holes completed pre-2014 were predominantly NQ2 (50.5 mm). All resource definition holes completed post 2014up to 2016 were drilled using HQ (63.5 mm) diameter core. 2017 drill holes have been predominately HQ from surface with NQ tails. 2018 drill holes have been HQ.
Core was orientated using the Reflex ACT Core orientation system.
RC Drilling was completed using a 5.5" drill bit.
In limited cases RC pre-collars were drilled followed by diamond tails. Pre-collar depth was to 180 m or less if approaching known mineralisation.</td></tr>
<tr><td rowspan="3">Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>Moisture content and sample recovery is recorded for each RC sample. Sample recovery is recorded for DD sampling.</td></tr>
<tr><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>RC drilling contractors adjust their drilling approach to specific conditions to maximize sample recovery. No recovery issues were identified during 2014 - 2018 RC drilling. Recovery is poor at the very beginning of each hole, as is normal for this type of drilling in overburden.
For diamond drilling the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.</td></tr>
<tr><td>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.</td><td>No relationship or bias has identified between grade and sample recovery. Average recovery for DD from 2015 – 2018 is 98.6% and average recovery for RC from 2014 to present is 98%.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
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 is logged for regolith, lithology, veining, alteration, mineralisation and structure. Structural measurements of specific features are also taken through oriented zones. A re-sampling program was conducted after geological review of minor quartz stockwork veining which carried grade in the hangingwall and footwall of Arina. It was determined that the minimum samples length (0.3 m) was required for all host rock veining, to ensure any mineralisation was not diluted in the default 1 m samples. RC sample chips are logged in 1m intervals for the entire length of each hole. Regolith, lithology, alteration, veining and mineralisation are all recorded. All logging codes for regolith, lithology, veining, alteration, mineralisation and structure is entered into the AcQuire database using suitable pre-set dropdown codes to remove the likelihood of human error.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All logging is primarily qualitative. A wet and dry photograph is taken of every core tray.
	The total length and percentage of the relevant intersections logged.	In all instances, the entire drill hole is logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core is cut using an automated core saw. In most cases, half the core is taken for sampling with the remaining half being stored for later reference. Full core sampling is taken where data density of half core stored is sufficient for auditing purposes.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	All RC samples are split using a rig-mounted cone splitter to collect a 1 m sample weighing 3-4 kg. All samples were intended and assumed to be dry and moisture content was recorded for every sample.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Preparation of NSR samples was conducted at Genalysis, Bureau Veritas, MinAnalytical and ALS preparation facilities, commencing with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3 kg (typically 1.5 kg) at a nominal <3 mm particle size. The entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% passing 75 µm, using a Labtechnics LM5 bowl pulveriser. 300 g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets. The sample preparation is considered appropriate for the deposit.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are utilised to guide the selection of sample material in the field. Standard procedures are used for all processes within the laboratory. Grind checks are performed at both the crushing stage (3 mm) and pulverising stage (75 µm), requiring 90% of material to pass through the relevant size.
	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.	Field duplicates were taken for RC samples on a ratio of 1 in 20. Umpire sampling programs are carried out on an ad-hoc basis. A re-sampling program has been conducted to provide a representative collection of in-situ material after changing interpretation and receival of first pass results indicated grading structures were not originally sampled/sampled with excessive dilution.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the material being sampled. Metallurgical testing conducted in July 2016 indicated high gold recoveries (see more details below). Grind versus recovery variability test work to determine sensitivity of grind to gold recovery is a recommendation from the 2018 test work.
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.	A 40 gm (BV) & 50 gm (Minan) Fire assay charge is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO_3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine any element concentrations.

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Criteria	JORC Code explanation	Commentary
	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 materials (CRMs) are inserted into the sample sequence at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a nominal rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t if received are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades at the pulverising stage. Field Duplicates are taken at a ratio of 1 per 20 holes and submitted for analysis based on a range of primary assay results skewed towards anomalous gold grades. No Field duplicates are submitted for diamond core. Pulp duplicates are taken at a ratio of 1 per 20 samples. No bias has been established through the use of these procedures. 3 Independent laboratory checks of MinAnalytical, 1 of ALS and 1 of Genalysis have been completed in the last year. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs. The QA studies indicate that accuracy and precision are within industry accepted limits.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off
	The use of twinned holes.	Twinned holes were only drilled in circumstances of lost equipment for this project. Twinned holes to test reproducibility of specific historic drill holes has not been conducted, however the density of drill holes completed by NSR at Paradigm since 2014 has provided sufficient confidence in historic assays for their inclusion (where the collar, survey and geology have also been validated) in the resource estimate.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging is directly entered into an Acquire database. Assay files are received in csv format and loaded directly into the database by the project's responsible geologist with an Acquire importer object. Hardcopy and un-editable electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data.
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.	A planned hole is pegged using a Differential GPS by the field assistants. The final collar is picked up after hole completion by Cardno Survey with a Real Time Kinematic Differential Global Positioning System (RTKDGPS) in the MGA 94_51 grid. During drilling single-shot surveys are conducted every 30 m to ensure the hole remains close to design. This is performed using the Reflex Ez-Trac system which measures the gravitational dip and magnetic azimuth results are uploaded directly from the Reflex software export into the Acquire database. At the completion of diamond drilling the DeviFlex RAPID continuous in-rod survey instrument taking readings every 2 seconds, In and Out runs and reported in 3 m intervals was also used along with DeviSight GPS compass for surface alignment application True North Azimuth, DIP, latitude and longitude coordinates for set up.
	Specification of the grid system used.	Collar coordinates are recorded in MGA94 Zone 51.
	Quality and adequacy of topographic control.	The Real Time Kinematic Differential Global Positioning System (RTKDGPS) returns reliable elevation data which has been confirmed against a high resolution Digital Terrain Model survey performed by Arvista in 2015.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing across the area varies from approximately 20 m to 100 m spacing.
	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.	With the aim of upgrading the resource confidence from Inferred to Indicated category, Resource Definition drill spacing for surface mining options was typically 20 m x 20 m, and for underground mining options was typically 40 m x 40 m. This drill spacing has been determined based on previous resource definition drilling programs and analysis of the grade continuity at Paradigm using variography studies. Surrounding exploration drilling can be spaced up to 160 m apart.
	Whether sample compositing has been applied.	4m RC composites have been used for initial targeting in some circumstances. 1 m RC splits were collected and sent to the laboratory dependent on composite results.

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Criteria	JORC Code explanation	Commentary
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 orientation of the historically mined ore bodies (Natasha and Mishka via both open pit and underground mining) is well known and suggests the drilling direction originally undertaken by NSR during resource definition drilling was perpendicular to the orientation of mineralisation. However, the unexploited ore bodies of Arina and surrounding ore lodes have proven difficult to ascertain their orientation, due to the complexity of the deposit and evidence of multiple mineralisation orientations. Throughout the resource definition programs, the drill orientations were reviewed and adjusted as required, to ensure adequate coverage of perpendicular drill holes intersecting ore lodes. See appendix for picture of orebodies.
	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.	No sampling bias is considered to have been introduced by the drilling orientation. Drill holes which are considered too oblique have been flagged as unsuitable for resource estimation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits have been undertaken of the data and sampling practices at this stage.

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.	All drilling in this report are located within Mining Lease M16/548 which is owned by Northern Star Resources Ltd. There are no private royalty agreements applicable to this tenement.
	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.	No known impediments exist, and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The Carbine - Paradigm area has been explored since the late 1800's. Numerous companies, including BHP, Newcrest, Centaur Mining, Goldfields Exploration, Placer Dome and Barrick have been active in the area.
Geology	Deposit type, geological setting and style of mineralisation.	The Carbine area is considered the northern extension of the regionally significant Zuleika Shear Zone. The tenements are in the Norseman-Wiluna Archaean greenstone belt in the Eastern Goldfields province of the Yilgarn Craton, Western Australia. Gold mineralisation in the Zuleika Shear Zone and adjacent greenstone sequences occurs in all rock types, although historical and recent production is dominated by two predominant styles: • Brittle D2 faults with laminated (multiple crack-seal) quartz veining containing gold and trace base metal sulphides (galena, sphalerite, chalcopyrite, scheelite), • Brittle quartz vein stockworks developed within granophyric gabbro within the Powder Sill At the Paradigm deposit, gold is hosted in veins and disseminated sulphides associated with shearing along the large scale Lincancunbur fault, adjacent fine-grained stratigraphic horizons and associated structures. A geology model of the Paradigm area was created in 2018 using multi-element, logging and structural data. This included defining key lithological boundaries and large scale local deformation. This has aided the new interpretation of the Arina lode and surrounding halo mineralisation.
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length.	A summary of the holes made available for resource estimation is included above. The collar locations are presented in plots contained in the NSR 2018 resource report. Drill holes vary in survey dip from -45 to -90, with hole depths ranging from 30m to 727.4m and having an average depth of 173.53m. The assay data acquired from these holes are described in the NSR 2018 resource report. All of the drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report. The Paradigm resource is based predominantly on historic validated drilling with the addition of recent drilling to validate, infill and extend. The Paradigm resource contains 55% historic drilling pre-NSR (early 2000's) and 45% recent NSR drilling.

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Criteria	JORC Code explanation	Commentary
	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.	The exclusion of information is not material.
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 1 m of internal dilution (considered < 0.5 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 1.0 g/t are considered significant, however, where low grades are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##. ##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
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.	Appropriate plans and section have been included in the body of this report. The drill hole plans in the report illustrates the distribution of the drilling over the Mineral Resource areas.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	Metallurgical testing conducted in July 2016 used 6 composite sample intervals and metallurgical testing conducted in February 2018 included 3 Arina composites and one Natasha composite. A further 23 samples from recent RC drilling that targeted the potential open pit were collected for metallurgical testing in mid-2018, however the results for these are still pending. 295 bulk density measurements have been completed on diamond drill holes using the water displacement technique since 2015. 4 geotechnical holes have been drilled targeting the hangingwall, footwall of Arina and the walls of the potential open pit. These holes were independently logged, and several samples collected by a geotechnical engineer from Dempers-Seymour. 17 holes drilled in 2018 were optical & acoustic tele viewer surveyed. Of these, 8 have had structural interpretation completed in sections selected by an NSR geologist according to imagery and assay results.
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).	Further drilling is planned to target extensions and at depth.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

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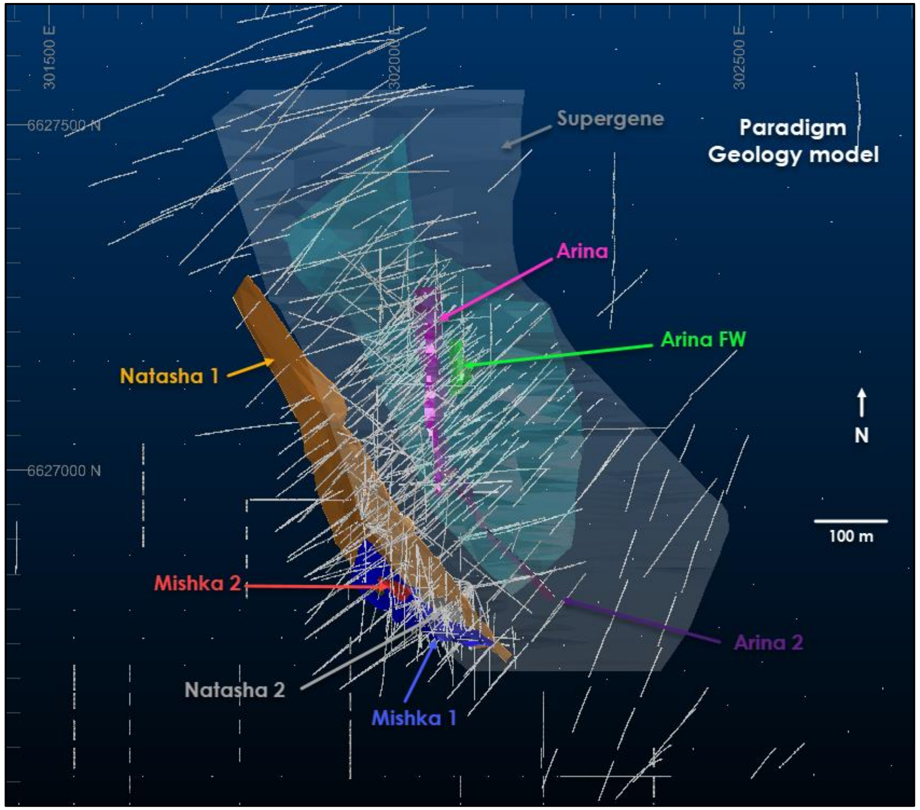

Figure 1. Plan view of Paradigm Geology Ore Domains and drill holes used in the resource estimate

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Northern Star personnel have validated the database during the interpretation of the mineralisation, with any drill holes containing dubious data excluded from the MRE. All face data has been excluded.
	Data validation procedures used.	Data validation procedures involve several steps. First a check of the individual collar, survey, geology and assay data was performed by a geologist, then a project geologist validated all data based on suitability for use in estimation, assigning either a "Res_Flag" Yes or No in AcQuire. Holes assigned Res-Flag No are excluded from the data using exclude tables, as not all historical data has not yet been assigned Res_Flag in AcQuire. Historical data which has not been validated has been removed, including all RAB holes.

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Criteria	JORC Code explanation	Commentary
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Northern Star CP has been based on site and involved with the logging, assaying and interpretation processes throughout the last year.
	If no site visits have been undertaken indicate why this is the case.	As above
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The geological interpretation has had multiple iterations since the last resource model update, following infill drilling in the Arina and surrounding areas. A robust geological model was developed by exploration geologists and subsequent collaboration led to interpretation of ore domains by resource development geologists. These ore domains were statistically tested before completion, to determine their suitability for estimation. The geology model as used as a guide for sub domaining following analysis as well, which has resulted in high confidence in the geological interpretation used for Paradigm.
	Nature of the data used and of any assumptions made.	Open pit mapping along with diamond drill core lithology, structure, alteration and mineralisation logs have been used to generate the mineralisation model. The primary assumption is that the mineralisation is hosted within structurally controlled quartz veins within the Arina, Natasha and Mishka ore lodes, which is considered robust. A halo lode surrounding Arina has been interpreted, based on recent infill drilling which indicated that mineralisation was present in short range, multiple orientation veins as well as a small percentage present within the host rock. This assumption was tested extensively using non-linear estimation and proven to be robust.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	The Arina interpretation was changed following infill drilling and drilling to the north, identifying an extension of Arina north of the current resource. An additional Arina South lode has also been added to the south, at a more north-west striking orientation, analogous to Natasha. Alternative interpretations were trialed for the halo lode surrounding Arina. Initially footwall and hangingwall lodes to Arina were created, however, only the footwall lode was determined to have sufficient grade continuity. A halo was then interpreted surrounding all three Arina lodes; previously this area was a combination of low confidence small short-range ore lodes and waste. By estimating the halo using several Categorical Indicator Kriging techniques, additional ounces were added to the resource. The Supergene zone was also reinterpreted. Following the geology model update, it was determined there was not a true geological supergene zone present, rather, the mineralisation in the transition and oxide zones was the oxidised version of Arina with some lateral movement following weathering, and the location was loosely controlled by geological structures. Contact analysis between the Supergene and Arina lodes have confirmed this soft boundary. The exploration structural model was also used as a guide for sub domaining based on grade; this allowed additional ounces to be added the Mineral Resource. Mishka 2 ore lode has been reinterpreted following data validation and additional data from the 2017 drilling, this has resulted in additional ounces to the resource estimate.
	The use of geology in guiding and controlling Mineral Resource estimation.	The updated geology model was used as a guide for the ore domains, as well as sub domaining based on grade; this includes lithology contacts, fault structures, deformation and dolerite intrusions.
	The factors affecting continuity both of grade and geology.	The Natasha and Mishka structures are considered to be continuous over the length of the deposit, based on previous mining and drilling. Both are open to the north west and appear to terminate with each other in the south, where the historical open pit is located. The Arina structure is considered to be continuous over the length of the deposit, a lack of drill density to the north has resulted in the interpretation being shortened with either quartz or the controlling structure used to guide this interpretation. The grade continuity is not as consistent and as such, the mineralisation has been sub-domained based on consistent grade zones, with these sub-domains used as hard boundaries during the estimation.
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 Paradigm Deposit has three lode orientations, Mishka (WNW), Natasha (NW), Arina, Halo and Supergene (NNW). The Supergene contains one ore lode which extends above the Arina lode within the transition and oxide zones. It is bounded by the Natasha fault in the west, a lack of data density in the east and the historical pit in the south. The Supergene is not closed to the south; additional drilling is planned to test this continuity. It averages ~10 m in width, extends ~225 m across dip and ~950 m down dip strike. The Halo contains one ore lode which surround the Arina lodes and meets the Supergene domain at the top of fresh boundary. It is driven by data density and therefore pinches closed in the north and limited in the south to the historic pit extent, like the Supergene domain. The halo across dip extent is ~25 m and down dip is ~650 m. Mishka comprises 2 sub-parallel lodes, the largest of which is approximately 260 m along strike, 180 m down dip with a width ranging from 1 to 10 m. Natasha comprises 4 sub-parallel lodes, the largest of which is approximately 500 m along strike, 300 m down-dip with a width ranging from 1 to 8 m. Arina is comprised of three ore lodes; Arina, Arina FW which strike NNW and Arina 2 (in the south) which strikes WNW. The Arina width averages ~10 m and down dip extent is ~250 m, the Arina FW averages ~20 m width and down dip extent is ~75 m and the Arina 2 width averages ~10 m and down dip extent is ~200 m.
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 of gold has been completed using Ordinary Kriging (OK) unless otherwise stated, and the Halo used Categorical Indicator Kriging. All estimation was completed using Datamine RM software. Details on the estimation by domain is summarised below: • Supergene – was divided into two grade subdomains; high located along above the Arina ore lode and low which surrounded the high-grade domain. Boundary analysis was completed on the Supergene, Arina, Arina FW, Arina 2, Natasha and the Halo. A soft boundary is only present between Supergene and Arina, but no other ore lodes. Each domain was analysed for top cuts and had variography completed separately. The high-grade domain indicated grade continuity was NNE, while the low grade was WNW, with ranges of ~100 m in direction 1, ~85 m in direction 2 for the low grade and ~45 m in direction 2 for the high-grade domain. Three passes were used for

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Criteria	JORC Code explanation	Commentary
		estimation with distances based on the variography; the first pass had a minimum of 7 samples (high-grade) and 10 samples (low grade) and maximum of 15 samples. Estimation was completed using a soft boundary between the low and high-grade domains. • Arina - was divided into two subdomains based varying plunge direction above and below a fault, all data was analysed for top cuts and a soft boundary as used during estimation. Above the fault the mineralisation appears to plunge to the east and has search ranges of ~65 m in direction 1 and ~40 m in direction 2. Below the fault mineralisation appears to plunge to the west and has search ranges of ~85 m in direction 1 and ~60 m in direction 2. Three passes were used for estimation with distances based on the variography; the first pass had a minimum of 6 samples and maximum of 10 samples (above domain) and 15 (below). • Arina 2 – includes one domain which was top cut and had variographic analysis completed which indicates a shallow plunge to the north, similar to Arina. However, this was likely influenced by data density to the north, so isotropic search ranges were used instead (40m in all direction) and ID3 estimation was used to avoid over estimation. Three passes were used; the first pass had a minimum of 4 samples and maximum of 7 samples. • Arina FW – includes one domain which was top cut and had variographic analysis completed, which indicates a shallow plunge to the north, similar to Arina. Search ranges of ~55 m in direction 1 and ~22 m in direction 2 were used with minimum of 6 samples and maximum of 10 samples in the first pass. • Natasha 1 – includes one domain which was top cut and had variographic analysis completed, which indicates and shallow plunge to the south. Natasha 1 appears to incorporate several narrow high-grade south plunging zones within the large ore domain, which was reflected in the narrow variography extents; ~67 m in direction 1 and ~27 m in direction 1. Three passes were used; the first pass had a minimum of 4 samples and maximum of 10 samples. • Natasha 2 – includes one domain which was top cut and had variographic analysis completed, which indicates a steep plunge to the south-west and has ranges of 40 m in direction 1 and 30 m in direction 2. Minimum samples of 5 and maximum of 10 samples were used. • Natasha 3 and 4 - small domains (one each) which did not require top-cutting and had insufficient data for variographic analysis. ID2 estimation was used with ranges of isotropic ranges of 20 m for Natasha 3 and 65 m for Natasha 4. A minimum of 2 samples and maximum of 10 samples were used to ensure the domain volumes were estimated, both domains were assigned Inferred and Unclassified categories due to the lack of data available. • Mishka 1 – includes one domain which was top cut and had variographic analysis completed, which indicates a steep plunge to the north-west and has ranges of ~130 m in direction 1 and 40 m in direction 2. A minimum of 4 samples and maximum of 10 in the first pass, three passes used. • Mishka 2 – small domain which was top cut but had insufficient data to complete variographic analysis. ID2 estimation was used and search orientations from Mishka 1. Isotropic ranges of 30 m x 30 m 30 m were used with a minimum of 2 and maximum of 10 samples in the first pass. • Halo – estimated using Categorical Indicator Kriging. Originally probability analysis was completed on composites based on whether lithology has been assigned a vein or not (Categorical). A wireframe is then created where the selected probability of veining is present; this wireframe is used to select composites within, which is then used to complete another probability analysis this time based on grade (>1 g/t or <1 g/t). The same approach is completed for the equivalent non-vein wireframe, with grade probability analysis completed based on whether the host rock was >0.5 g/t or <0.5 g/t. This resulted in four wireframes/volume models for estimation; probability of high or low-grade veining and probability of high or low-grade host rock. Top cutting and variographic analysis were completed on all four data sets within these wireframes. The variography indicated the high grade and low-grade veins and high-grade host data exhibit a moderate plunge to the north and steep dipping to the west, while the low-grade host data (the largest volume of the Halo domain) exhibited both moderate dips to both the west and east, while plunging shallowly to the north. Search ranges for each estimate were based on variography ranges; the low and high-grade vein had ranges of ~110 m in first direction and ~65 m in second direction. The high-grade host had ranges of ~ 35 m in first direction and ~25 m in second direction, the low-grade host has ranges of ~140 m in first direction and ~100 m in the second direction. Minimum samples of 7 and maximum of 10 are used for the host estimations; minimum samples of 4 and maximum of 7 are used in the vein estimations.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	The MY18 model was used as a check estimate; each relevant domain was compared with its equivalent domain before completion to determine how the new interpretation and/or data validation had impacted the updated resource estimate. As-built wireframes have been used as a guide for interpretation, however due to a slight mismatch between face locations and as-builts there was not sufficient confidence to use them as accurate depletion shapes, with more conservative shapes surrounding the as-builts (i.e. incorporating all the Natasha lode) created to deplete the model.
	The assumptions made regarding recovery of by-products.	No assumptions have been made regarding recovery of any by-products.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements have been considered and therefore estimated for this deposit.

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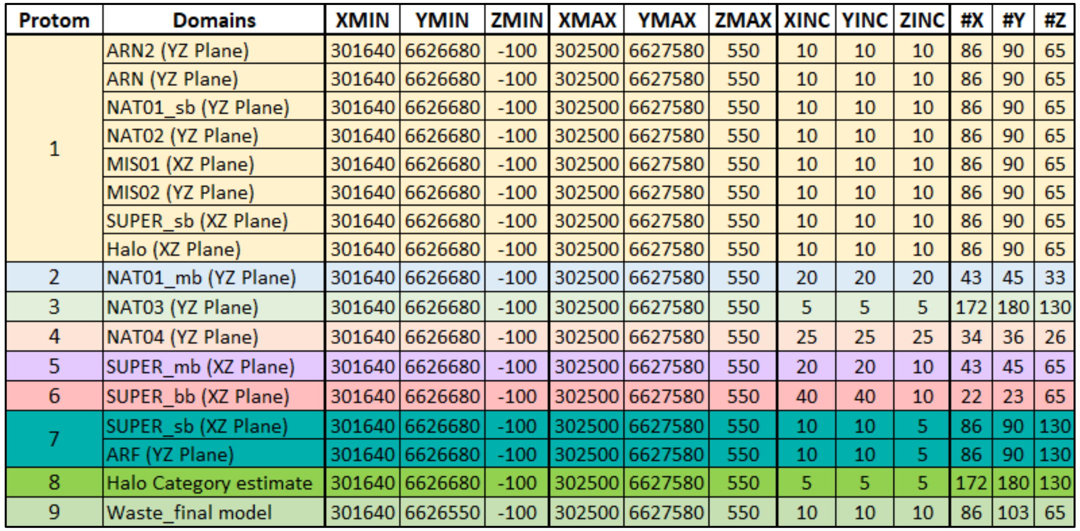
Criteria	JORC Code explanation	Commentary
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Data spacing varies considerably within the deposit, ranging from close spaced 10 m (along strike) to 15 m (down dip) spacing through to 100 m (along strike) to 100 m (down dip) spacing and greater. Gold grades are estimated at the parent block scale and multiple volume models were created to reflect the data spacing (see table below).



Protom	Domains	XMIN	YMIN	ZMIN	XMAX	YMAX	ZMAX	XINC	YINC	ZINC	#X	#Y	#Z
1	ARN2 (YZ Plane)	301640	6626680	-100	302500	6627580	550	10	10	10	86	90	65
	ARN (YZ Plane)	301640	6626680	-100	302500	6627580	550	10	10	10	86	90	65
	NAT01_sb (YZ Plane)	301640	6626680	-100	302500	6627580	550	10	10	10	86	90	65
	NAT02 (YZ Plane)	301640	6626680	-100	302500	6627580	550	10	10	10	86	90	65
	MIS01 (XZ Plane)	301640	6626680	-100	302500	6627580	550	10	10	10	86	90	65
	MIS02 (YZ Plane)	301640	6626680	-100	302500	6627580	550	10	10	10	86	90	65
	SUPER_sb (XZ Plane)	301640	6626680	-100	302500	6627580	550	10	10	10	86	90	65
	Halo (XZ Plane)	301640	6626680	-100	302500	6627580	550	10	10	10	86	90	65
2	NAT01_mb (YZ Plane)	301640	6626680	-100	302500	6627580	550	20	20	20	43	45	33
3	NAT03 (YZ Plane)	301640	6626680	-100	302500	6627580	550	5	5	5	172	180	130
4	NAT04 (YZ Plane)	301640	6626680	-100	302500	6627580	550	25	25	25	34	36	26
5	SUPER_mb (XZ Plane)	301640	6626680	-100	302500	6627580	550	20	20	10	43	45	65
6	SUPER_bb (XZ Plane)	301640	6626680	-100	302500	6627580	550	40	40	10	22	23	65
7	SUPER_sb (XZ Plane)	301640	6626680	-100	302500	6627580	550	10	10	5	86	90	130
	ARF (YZ Plane)	301640	6626680	-100	302500	6627580	550	10	10	5	86	90	130
8	Halo Category estimate	301640	6626680	-100	302500	6627580	550	5	5	5	172	180	130
9	Waste_final model	301640	6626550	-100	302500	6627580	550	10	10	10	86	103	65

Search ellipse dimensions were derived from the variogram model ranges, or isotropic ranges based on data density where insufficient data was present for variographic analysis.

Criteria	JORC Code explanation	Commentary
	Any assumptions behind modelling of selective mining units.	No selective mining units are assumed in this estimate.
	Any assumptions about correlation between variables.	No other elements other than gold have been estimated.
	Description of how the geological interpretation was used to control the resource estimates.	Ore wireframes were created as solids in Maptek Vulcan v9.1 software. The geology model was used as a guide for the creation of the ore lodes: • The Natasha fault was used as a boundary for the Supergene domain • Deformation was used as guide for the location of Arina and the Halo • All lodes except the Halo and Supergene used the presence of veining and grade as an indicator of an ore lode. The Supergene used predominantly grade located above the top of fresh boundary. • The geology model as used as a guide for sub domaining following analysis as well, which has resulted in high confidence in the geological interpretation used for Paradigm. • The flat north dipping faulting was used as a boundary for orientation sub domaining in Arina

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Criteria	JORC Code explanation	Commentary
	Discussion of basis for using or not using grade cutting or capping.	The influence of extreme sample distribution outliers in the composited data has been reduced by top-cutting where required. Top-cut analysis was carried out on the composite gold values, by ascertaining where a break in the grade population occurred in the upper percentiles of each ore lode or domain. Where the high grades were deemed to be significantly anomalous for that grade population, a top cut was applied using the method outlined below. The top cut values are applied in several steps, using a technique called influence limitation top cupping. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, the following variables were created and estimated: • AU (top cut gold) • AU_NC (non- top-cut gold) • AU_BC (spatial variable to determine where non-top cut estimate occurred) The top-cut and non-top cut values are estimated using search ranges based on the variogram, and the *_BC values estimated using very small ranges (e.g. 5 x 5 x 5 m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU). This process allows blocks close to high grade samples to be estimated with the full uncut dataset but blocks outside this restricted range are estimated using the top cut dataset. This limits the spread of very high grades but retains the high local value in these blocks, which more closely reflects the style of mineralisation. Arina and Arina 2 ore lodes had both a “hard” top cut and influence limitation top cuts applied, due to extreme outliers.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Model validation has been carried out including visual comparison of the composites and block model, swath plots of the declustered composites and estimated blocks; global statistics and check for negative or absent grades.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	The tonnes have been estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 1 g/t cut off for the open pit resource and 2.67 g/t cut off within 1 m minimum mining width and +/- 0.5 m dilution MSO’s for the underground resource; both used a $AU1750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No minimum mining assumptions have been made during the resource wireframing or estimation process.
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.	No metallurgical or recovery assumptions have been made during the mineral resource estimate.
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 green fields 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.	No environmental assumptions have been made during the mineral resource estimate.

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Criteria	JORC Code explanation	Commentary
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 was applied following statistical analysis of the measurements taken following recent diamond drilling programs. In the supergene domain, which was interpreted above the top of fresh boundary, the proportion of lithologies were determined, and the equivalent mean densities applied to these lithologies from the 421 measurements available (including fresh only 3 samples were recorded in the transition). Because the total mean bulk density values were skewed by the majority of fresh measurements, the few values from the transition and oxide were used as a default where lithologies did not have any measurements. i.e. the default of 2.55 was used rather than 2.7. In the fresh domains (all other ore lode), the major lithologies were determined and the equivalent mean bulk densities values applied from the 334 measurements available. Where a lithology was rare, the default mean bulk density of 2.71 was applied. The bulk density was then estimated using the equivalent gold estimation parameters or that domain and validated visually and statistically.
	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.	Bulk density measurements were taken using the Archimedes technique onsite; 421 measurements were taken, the majority of which were taken from the 2015, 2016, 2017 and 2018 diamond drill programs (271).
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	There have been assumptions made based on the consistency of bulk density values within lithologies logged at Paradigm, and in the case of the Supergene domain, based on limited data. Following discussions with the project geologists, the application of a relatively high bulk density mean (2.55) as a default to the Supergene zone (compared to industry averages for the goldfields) was determined to be suitable, based on the limited weathering profile and rock competency present at Paradigm.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The resource classification has been applied to the mineral resource estimate based on the drilling data spacing, grade and geological continuity, data integrity, and kriging confidence (slope of regression).
	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, quality, quantity and distribution of the data).	The classification considers the relative contributions of geological and data quality and confidence, as well as grade confidence and continuity.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The classification reflects the view of the Competent Person.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	This Mineral Resource estimate for the combined Paradigm Deposit has not been audited by an external party.
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 relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC code
	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.	The statement relates to global estimates of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Historic production records are incomplete, so no comparison or reconciliation has been made.

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	The Mineral Resource estimate for the Paradigm Project used as a basis for the conversion to the Ore Reserve estimate reported was compiled by Northern Star Resources (NSR).
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve.

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Criteria	JORC Code explanation	Commentary
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	A site visit has been completed, and covered aspects including site access, assessment of old workings, clearing requirements, and potential infrastructure placement.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	A minimum Pre-Feasibility level study is completed prior to converting an ore zone into ore Reserve.
	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.	Ore Reserves have been calculated by generating detailed mining shapes for the proposed open pit. A series of nested optimised pit shells were generated using Whittle software, an analysis of the shells was completed to select one which was then used to complete a detailed pit design to closely resemble the selected whittle shell. The Whittle optimisation used parameters generated from NSR technical personnel and technical consultants. A detailed mine schedule and cost model has been generated using an excel spreadsheet model. Appropriate ore dilution and recoveries have been applied within the excel spreadsheet model.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	The pit cut-off grade has been calculated based on the key input components (processing, recovery and administration) Forward looking forecast costs and physicals form the basis of the cut-off grade calculations. The AUD gold price as per corporate guidance. Mill recovery factors are based on historical data and metallurgical test work. Variable treatment costs to open pit mining for processing is a fundamental premise in the evaluation of open pit projects. Variable cut-off grade is used in the evaluation of open pit projects.
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).	Mineral Resource is converted to Ore Reserve after completing a detailed mine design complete with a detailed financial assessment. The Mineral Resource block model is used. Ore Reserves have been calculated by generating detailed mining shapes for the proposed open pit. A series of nested optimised pit shells were generated using Whittle software, an analysis of the shells was completed to select one which was then used to complete a detailed pit design to closely resemble the selected whittle shell. The Whittle optimisation used parameters generated from NSR technical personnel and technical consultants.
	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 selected mining method for the Paradigm deposit is of a bench mining open pit method. The proposed open pit would be mined using conventional open pit mining methods (drill, blast, load and haul) by a mining contractor utilising 120 t class excavators and 90t trucks. This method is used widely in mines across Western Australia and is deemed appropriate given the nature of the ore body.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	Independent Geotechnical Consultants Dempers & Seymour Pty Ltd completed a geotechnical study for the Paradigm project. Recommended wall angles were applied to the Whittle optimisation and subsequent detailed pit designs.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	
	The mining dilution factors used.	A mining dilution factor of 20% of zero grade has been applied for the reporting of Reserve physicals.
	The mining recovery factors used.	A mining recovery of 95% has been applied.
	Any minimum mining widths used.	The SMU dimensions for the Reserve Estimate are 2.0 m Wide x 2.5 m High x 5.0 m Long. A minimum mining width down to 20 m for final pit extraction from the base of pit has been used.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Inferred material has not been included within this Reserve estimate (treated as waste) but has been considered in LOM planning. It is assumed that Inferred material will be converted to Reserve via grade control drilling which has been provided for and will be carried out ahead of mining.

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Criteria	JORC Code explanation	Commentary
	The infrastructure requirements of the selected mining methods.	Infrastructure required for the proposed Paradigm Project has been accounted for and included in all work leading to the generation of the Ore Reserve estimate. Ore from the Paradigm Project will be processed through the Kanowna Belle Gold Mine Processing Plant at the Kanowna Belle operation; hence no processing infrastructure is required. The Paradigm Project is connected by internal private haul roads to Kanowna Belle. Required infrastructure will be established at Paradigm and will include; Offices, workshops and associated facilities; Communications; Dewatering pipeline; Water will be pumped to a water storage pond and used for dust suppression. Any excess water will be pumped and discharged into Carbine Open Pit located 2100m to the west. Waste Dump; and ROM Pad
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	The Kanowna Belle plant is made up of crushing, grinding, gravity gold recovery, flotation, roasting, CIL, elution and gold recovery circuits. The milling facilities are designed to process approximately 1.8 million tonnes per annum. The plant has the capability to treat both refractory and free milling ores, through either a flotation circuit and associated concentrate roaster circuit (including carbon-in-leach (CIL) gold recovery) or bypassing the flotation circuit and going directly to a CIL circuit designed to treat flotation tails. The plant campaigns both refractory and free milling ores every month. Ore Reserves are calculated using processing plant recovery factors that are based on test work and historical performance.
	Whether the metallurgical process is well-tested technology or novel in nature.	Well tested, standard CIL extraction process utilising the existing KB processing facility.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Based on metallurgical test work carried out and milling experience gained through processing similar ore material through the KB processing facility. The metallurgical recoveries for the project were set at 93% for oxide, 93% for transitional, 93% for fresh rock.
	Any assumptions or allowances made for deleterious elements.	Metallurgical test work carried out indicates no deleterious elements. No assumption made.
	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.	Based on metallurgical test work carried out and milling experience gained through processing similar material through the KB processing facility.
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Not applicable.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	All ore from the Paradigm Project will be trucked to the Kanowna Belle Processing Plant for processing. The Kanowna Belle Mine is operated subject to the requirements of the Western Australian Mining Act 1978 and the Mines (Safety) Act, regulated by the Department of Mines, Industry Regulation and Safety. The Mining Leases covering the Kanowna Belle operation stipulate environmental conditions for operation, rehabilitation and reporting. A “Licence to Operate” is held by the operation which is issued under the requirements of the “Environmental Protection Act 1986”. Kanowna Belle is a prescribed premise requiring Department of Water and Environmental Regulation (DWER) licences to operate. It covers the following activities: • Crushing plant. • CIP process plant. • Sulphide concentrate roaster. • Waldon’s In Pit Tails Facility • Tailings dam cells 1 and 2. • Calcine tails dam. • Wastewater treatment plant. • Arsenic waste stabilisation plant and disposal into underground workings.

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Criteria	JORC Code explanation	Commentary
		• Open cut and underground mines. • Paste backfill plant. • Batch plant. The key environmental areas covered in the licence are: • Air pollution and control conditions. • Water pollution control conditions. • Solid waste conditions. The Paradigm Project has been granted a dewatering licence from DWER for mining tenement M16/548. Licence number L9099/2017/1. Paradigm has been issued groundwater licence GWL 104053(8) for 1,500,000kl. Dempers and Seymour Geotechnical Consultants completed a comprehensive geotechnical study for recommended wall angles and regulatory approval. There are no native title issues. Heritage surveys have been completed for the Paradigm Project. There are no heritage sites identified that impact on the pit or associated infrastructure. The heritage surveys conducted were to full clearance for mining. Flora & Fauna and hydrogeological studies have been completed. Waste rock geochemical studies have been completed. Soil characteristics studies have been completed. The Mining Proposal and Mine Closure Plan (reg ID 77054) for the Paradigm project has been approved by DMIRS.
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 Paradigm Project is located 67km north west of Kanowna Belle. Paradigm is connected to the Kanowna Belle Processing Plant via internal private haul roads. All haul roads are on secured Northern Star tenure. Infrastructure to support mining will be established at Paradigm. Access to Paradigm and the Kanowna Belle operation is provided by well-maintained public and private roads. Employees reside in Kalgoorlie and commute to site daily. Potable water for the Kanowna Belle operations is pumped from Kalgoorlie to a storage facility on site. Non-potable water requirements are sourced from bore fields up to 10 km away from the mine site. Makeup water for the Kanowna Belle process plant is supplied by pipeline from a bore field located in the Gidgi paleochannel approximately 15 km from the plant site with some water is sourced from abandoned pits. Electricity is provided by the state electricity grid. A 15 km long 33 kV line from Kalgoorlie provides all electricity requirements of the operations. Sources of fuel, such as diesel, gasoline, propane, etc., are readily available at competitive pricing from local suppliers, as there are multiple operating plants in the Kalgoorlie area.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Mining costs based on mining contract rates supplied by a reputable WA based mining contractor. Mining costs were built up from first principals on mine designs supplied by NSR. Capital costs were not included in the optimised parameter inputs. Capital costs based on quotes supplied and have been included in the Paradigm economic cost model.
	The methodology used to estimate operating costs.	A capital and operating cost model has been developed in Excel and has been used to complete a life of mine cash flow estimate. Mining costs supplied by a reputable WA based mining contractor who built up costs from first principles from mine designs supplied by NSR.
	Allowances made for the content of deleterious elements.	No allowances made, none expected.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Single commodity pricing for gold only, using a long-term gold price of AUD $1,500 per ounce as per corporate guidance.
	The source of exchange rates used in the study.	Not applicable.
	Derivation of transportation charges.	Transportation costs for ore haulage from Paradigm to Kanowna Belle are based on current NSR contractor schedule of rates. Transportation costs also include an allowance for adequate haul road maintenance and dust suppression.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Historic performance.

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Criteria	JORC Code explanation	Commentary
	The allowances made for royalties payable, both Government and private.	WA State Government royalty of 2.5%.
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.	All financial analysis and gold price have been expressed in Australian dollars and no direct exchange rates have been applied. Revenue factors within the whittle optimisation process were used. A revenue factor shell was selected and used to complete a detailed pit design. A gold price of AUD $1,500 per ounce has been used in the optimisation of the Paradigm Project.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	Corporate guidance.
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.	Gold doré from the mine is to be sold at the Perth mint.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not applicable.
	Price and volume forecasts and the basis for these forecasts.	Corporate guidance.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not applicable.
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.	The Ore Reserve estimate is based on a financial model for that has been prepared at a "pre-feasibility study" level of accuracy economic modelling. All inputs from mining operations, processing, transportation and sustaining capital as well as contingencies have been scheduled and evaluated to generate a full life of mine cost model. Economic inputs have been sourced from suppliers or generated from database information relating to the relevant area of discipline. A discount rate of 6.2% has been applied. The NPV of the project is positive at the assumed commodity prices.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities were conducted on metal price fluctuations of A$1,500 ± $300 per ounce.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders.
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 Issues.
	The status of material legal agreements and marketing arrangements.	No issues.
	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.	No issues.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	Classifications of Measured, Indicated and Inferred have been assigned based on data integrity, continuity of mineralisation and geology, drill density and the quality of the estimation (kriging efficiency).
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results accurately reflect the Competent Persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Nil.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Reserve has been internally reviewed in line with Northern Star Resources governance standard for Reserves and Resources. There have been no external reviews of this Ore Reserve estimate.

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Criteria	JORC Code explanation	Commentary
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	The design, schedule and financial model on which the Ore Reserve is based has been completed to a “pre-feasibility study” standard, with a corresponding level of confidence.
	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.	Estimates are global but will be reasonable accurate on a local scale.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Not applicable.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Not applicable.

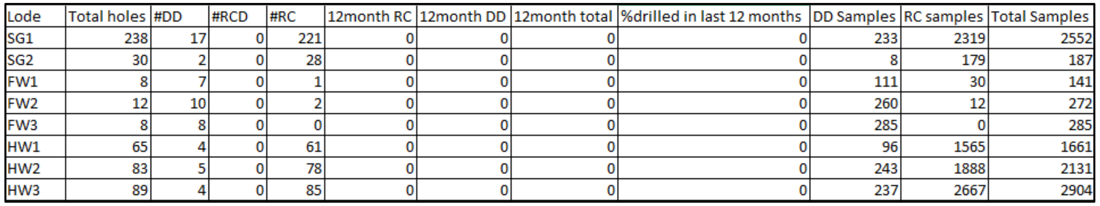
APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report

Carbine: Resources and Reserves – 30 June 2019

Section 1 Sampling Techniques and Data

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="3">Sampling techniques</td><td>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.</td><td>Sampling was completed using a combination of Reverse Circulation (RC), Rotary Air Blast (RAB) and Diamond (DD) drilling. RAB drilling was excluded in resource estimation work. The database is predominantly historic (pre NSR 2014) drilling and had been validated where possible.
The database compiled by NSR for resource estimation contains the following drill quantities per ore lode and screen captures at the end of the table display the data density in plan view:

<table>
<tr><th>Lode</th><th>Total holes</th><th>#DD</th><th>#RCD</th><th>#RC</th><th>12month RC</th><th>12month DD</th><th>12month total</th><th>%drilled in last 12 months</th><th>DD Samples</th><th>RC samples</th><th>Total Samples</th></tr>
<tr><td>SG1</td><td>238</td><td>17</td><td>0</td><td>221</td><td>0</td><td>0</td><td>0</td><td>0</td><td>233</td><td>2319</td><td>2552</td></tr>
<tr><td>SG2</td><td>30</td><td>2</td><td>0</td><td>28</td><td>0</td><td>0</td><td>0</td><td>0</td><td>8</td><td>179</td><td>187</td></tr>
<tr><td>FW1</td><td>8</td><td>7</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>111</td><td>30</td><td>141</td></tr>
<tr><td>FW2</td><td>12</td><td>10</td><td>0</td><td>2</td><td>0</td><td>0</td><td>0</td><td>0</td><td>260</td><td>12</td><td>272</td></tr>
<tr><td>FW3</td><td>8</td><td>8</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>285</td><td>0</td><td>285</td></tr>
<tr><td>HW1</td><td>65</td><td>4</td><td>0</td><td>61</td><td>0</td><td>0</td><td>0</td><td>0</td><td>96</td><td>1565</td><td>1661</td></tr>
<tr><td>HW2</td><td>83</td><td>5</td><td>0</td><td>78</td><td>0</td><td>0</td><td>0</td><td>0</td><td>243</td><td>1888</td><td>2131</td></tr>
<tr><td>HW3</td><td>89</td><td>4</td><td>0</td><td>85</td><td>0</td><td>0</td><td>0</td><td>0</td><td>237</td><td>2667</td><td>2904</td></tr>
</table></td></tr>
<tr><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>RC samples were split using a rig-mounted cone splitter on 1m intervals to obtain a sample for assay.
RC drill holes completed pre-2014 were split using a rig-mounted cone splitter in 1m intervals. Samples were composited to 2m or 4m intervals for assay. Elevated Au values were re-split into 1m intervals.
Diamond core was placed in core trays for logging and sampling. Half core samples were nominated by the geologist from diamond core with a minimum sample width of either 20 cm (HQ) or 30 cm (NQ2).</td></tr>
<tr><td>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 30g 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.</td><td>RC sampling was split using a rig mounted cone splitter to deliver a sample of approximately 3 kg
DD drill core was cut in half using an automated core saw, where the mass of material collected will vary on the hole diameter and sampling interval
All samples were delivered to a commercial laboratory where they were dried, crushed to 95% passing 3 mm if required, at this point large samples may be split using a rotary splitter, pulverisation to 95% passing 75 µm, a 50 g charge was selected for fire assay.</td></tr>
<tr><td>Drilling techniques</td><td>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.).</td><td>Both RC and Diamond Drilling techniques were used at the Carbine project.
Diamond drill holes completed pre-2014 were predominantly NQ2 (50.5 mm). All resource definition holes completed post 2014 up to 2018 were drilled using HQ (63.5 mm) diameter core.
Core was orientated using the Reflex ACT Core orientation system.
RC Drilling was completed using a 5.5" drill bit.
In limited cases RC pre-collars were drilled followed by diamond tails. Pre-collar depth was to 160 m or less if approaching known mineralisation.</td></tr>
<tr><td rowspan="3">Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>Moisture content and sample recovery is recorded for each RC sample. Sample recovery is recorded for DD sampling.</td></tr>
<tr><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>RC drilling contractors adjust their drilling approach to specific conditions to maximize sample recovery. No recovery issues were identified during 2014 - 2018 RC drilling. Recovery was poor at the very beginning of each hole, as is normal for this type of drilling in overburden.
For diamond drilling the contractors adjust their rate of drilling and method if recovery issues arise. All recovery is recorded by the drillers on core blocks. This is checked and compared to the measurements of the core by the geological team. Any issues are communicated back to the drilling contractor.</td></tr>
<tr><td>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.</td><td>No relationship or bias has identified between grade and sample recovery. Average recovery for DD from 2014 – 2018 is 95.3% and average recovery for RC from 2014 to present is 96%. Sample loss in diamond core occurred predominantly in the saprolite profile.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
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 is logged for regolith, lithology, veining, alteration, mineralisation and structure. Structural measurements of specific features are also taken through oriented zones. RC sample chips are logged in 1m intervals for the entire length of each hole. Regolith, lithology, alteration, veining and mineralisation are all recorded. All logging codes for regolith, lithology, veining, alteration, mineralisation and structure is entered into the AcQuire database using suitable pre-set dropdown codes to remove the likelihood of human error.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All logging is primarily qualitative. A wet and dry photograph is taken of every core tray.
	The total length and percentage of the relevant intersections logged.	In all instances, the entire drill hole is logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core is cut using an automated core saw. In most cases, half the core is taken for sampling with the remaining half being stored for later reference. Full core sampling is taken where data density of half core stored is sufficient for auditing purposes.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	All RC samples are split using a rig-mounted cone splitter to collect a 1 m sample weighing 3-4 kg. All samples were intended and assumed to be dry and moisture content was recorded for every sample.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Preparation of NSR samples was conducted primarily at Genalysis Kalgoorlie preparation facilities, commencing with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples are jaw crushed to a nominal -6 mm particle size. If the sample is greater than 3 kg a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3 kg (typically 1.5 kg) at a nominal <3 mm particle size. The entire crushed sample (if less than 3 kg) or sub-sample is then pulverized to 90% passing 75 µm, using a Labtechnics LM5 bowl pulveriser. 300 g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets. Occasional samples were sent to MinAnalytical for Screen Fire Assay A gold deportment study has been recommended for the Carbine Ore body.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures are utilised to guide the selection of sample material in the field. Standard procedures are used for all processes within the laboratory. Grind checks are performed at both the crushing stage (3 mm) and pulverising stage (75 µm), requiring 90% of material to pass through the relevant size.
	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.	Field duplicates were taken for RC samples on a ratio of 1 in 20. Umpire sampling programs are carried out on an ad-hoc basis. A duplicate repeatability issue has been identified and a deportment study has been recommended.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	No recent test work had been conducted for the Carbine project Area.
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.	A 50 gm Fire assay charge is used with a lead flux in the furnace. The prill is totally digested by HCl and HNO_3 acids before Atomic Absorption Spectroscopy (AAS) determination for gold analysis.
	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.	No geophysical tools were used to determine any element concentrations.
	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 materials (CRMs) are inserted into the sample sequence at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations are re-assayed with a new CRM. Blanks are inserted into the sample sequence at a nominal rate of 1 per 20 samples. The insertion points are selected at random, except where high grade mineralisation is expected. In these cases, a Blank is inserted after the high-grade sample to test for contamination. Results greater than 0.2 g/t if received are investigated, and re-assayed if appropriate. New pulps are prepared if anomalous results cannot be resolved. Barren flushes are regularly inserted after anticipated high gold grades at the pulverising stage. Field Duplicates are taken at a ratio of 1 per 20 holes and submitted for analysis based on a range of primary assay results skewed towards anomalous gold grades. No Field duplicates are submitted for diamond core. Pulp duplicates are taken at a ratio of 1 per 20 samples. No bias has been established through the use of these procedures.

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Criteria	JORC Code explanation	Commentary
		2 Independent laboratory checks of MinAnalytical and Genalysis have been completed in the last year. Laboratory performance was monitored using the results from the QA samples mentioned above. This was supplemented by the internal QA samples used by the laboratories, which included pulp duplicates and CRMs. The QA studies indicate that accuracy is within industry accepted limits, but precision should be investigated further via a deportment study.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections are verified by another Northern Star geologist during the drill hole validation process, and later by a Competent person to be signed off.
	The use of twinned holes.	Twinned holes have not been drilled to test the historic data validity to date.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging is directly entered into an Acquire database. Assay files are received in csv format and loaded directly into the database by the project's responsible geologist with an Acquire importer object. Hardcopy and un-editable electronic copies of these are stored.
	Discuss any adjustment to assay data.	No adjustments are made to this assay data.
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.	A planned hole is pegged using a Differential GPS by the field assistants. The final collar is picked up after hole completion by a trained field assistant with a Differential GPS in the MGA 94_51 grid. During drilling single-shot surveys are conducted every 30 m to ensure the hole remains close to design. This is performed using the Reflex Ez-Trac system which measures the gravitational dip and magnetic azimuth results are uploaded directly from the Reflex software export into the Acquire database. At the completion of diamond drilling in 2018, the Reflex Sprint IQ system continuous survey instrument was completed and reported in 3 m intervals. ABIM Solutions completed North Seeking Gyroscope Surveys reported in 5m intervals in 2016. No continuous survey records were found for 2014 drilling.
	Specification of the grid system used.	Collar coordinates are recorded in MGA94 Zone 51.
	Quality and adequacy of topographic control.	The Differential GPS returns reliable elevation data which has been confirmed against a high-resolution Digital Terrain Model survey performed by Aerometrex in 2019.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing across the area varies from approximately 20 m to 100 m spacing.
	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.	Historic resource definition drill spacing was typically 20 m x 20 m through the Carbine and Phantom Pits. 53 drill holes have been completed by NSR across the Carbine area from 2014-2018, covering 2.2km of strike. The spatial distribution of recent drilling could not be used to validate all the historic drilling. As a result, the majority of the estimate is Unclassified, with some areas containing NSR drilling resulting in an inferred classification. Surrounding exploration drilling is sparse (500m – 1000m apart).
	Whether sample compositing has been applied.	4m or 2m RC composites have been used for initial targeting in some circumstances pre-2000. 1 m RC splits were collected and sent to the laboratory dependent on composite results. The dataset contains 4m composites that carry grade. It is unknown if 1m re-splits were assayed at the time, and the re-split assay data lost as a result of database migrations through different Companies. From 2015, NSR sampled entire holes using 1m RC splits in the Carbine project area.
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 orientation of the historically mined ore bodies (Carbine and Phantom via both open pit and historic underground mining at Carbine) is well known and suggests the drilling direction undertaken by NSR in 2014 and 2016 drilling was perpendicular to the orientation of mineralisation for the Carbine Main Lode.
	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.	No sampling bias is considered to have been introduced by the drilling orientation. Drill holes which are considered too oblique have been flagged as unsuitable for resource estimation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission samples are stored by Northern Star Resources in a secure yard. Once submitted to the laboratories they are stored in a secure fenced compound, tracked through their chain of custody and via audit trails.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No audits have been undertaken of the data and sampling practices at this stage.

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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.	All drilling in this report are located within Mining Lease M16/548 which is owned by Northern Star Pty Ltd, a wholly owned subsidiary of Northern Star Resources. There are no private royalty agreements applicable to this tenement.
	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.	No known impediments exist, and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The Carbine - Paradigm area has been explored since the late 1800's. Numerous companies, including BHP, Newcrest, Centaur Mining, Goldfields Exploration, Placer Dome and Barrick have been active in the area.
Geology	Deposit type, geological setting and style of mineralisation.	The Carbine area is considered the northern extension of the regionally significant Zuleika Shear Zone. The tenements are in the Norseman-Wiluna Archaean greenstone belt in the Eastern Goldfields province of the Yilgarn Craton, Western Australia. Gold mineralisation in the Zuleika Shear Zone and adjacent greenstone sequences occurs in all rock types, although historical and recent production is dominated by two predominant styles: • Brittle D2 faults with laminated (multiple crack-seal) quartz veining containing gold and trace base metal sulphides (galena, sphalerite, chalcopyrite, scheelite), • Brittle quartz vein stockworks developed within granophyric gabbro within the Powder Sill At the Carbine deposit, there are multiple mineralisation events associated with the Carbine Thrust, which are poorly understood: • Gold is hosted in quartz veins with moderate sericite-albite alteration and disseminated sulphides • Gold is hosted in thin quartz veinlets with disseminated arsenopyrite in sediments • Gold is hosted in quartz vein stockworks in sediments Gold mineralisation observed is predominately coarse in nature, which may contribute to the identified duplicate repeatability issue. Gold mineralisation may occur in multiple orientations. Sparse diamond drilling throughout the project area limits the amount of structural data available for interpretation. A geology model of the Carbine area was created in 2019 using multi-element, logging and limited structural data. This included defining key lithological boundaries and a large scale local deformation. This has aided the interpretation of the Carbine Main Lode.
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: 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.	A summary of the holes made available for resource estimation is included above. The collar locations are presented in plots contained in the NSR 2019 resource report. Drill holes vary in survey dip from -40 to -90, with hole depths ranging from 6 m to 600 m, and having an average depth of 110 m. The assay data acquired from these holes are described in the NSR 2019 resource report. All of the drill hole data were used directly or indirectly for the preparation of the resource estimates described in the resource report. The Carbine resource is based predominantly on historic validated drilling with the addition of recent drilling to validate, infill and extend. The Carbine resource contains 89% historic drilling pre-2000's (1992-1999), 3% historic drilling (2000-2012) and 7% recent NSR drilling (2014-2018).
	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.	The exclusion of information is not material.
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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 1 m of internal dilution (considered < 0.5 g/t) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 1.0 g/t are considered significant, however, where low grades are intersected in areas of known mineralisation these will be reported. No top-cutting is applied when reporting intersection results.
	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.	Where an intersection incorporates short lengths of high grade results these intersections will be reported in addition to the aggregate value. These will typically take the form of ##.#m @ ##.##g/t including ##.#m @ ##. ##g/t.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used for the reporting of these exploration results.

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Criteria	JORC Code explanation	Commentary
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	True widths have been calculated for intersections of the known ore zones, based on existing knowledge of the nature of these structures.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Both the downhole width and true width have been clearly specified when used.
	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').	It is known and has been reported as such.
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.	Appropriate plans and section have been included in the body of this report. The drill hole plans in the report illustrates the distribution of the drilling over the Mineral Resource areas.
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.	Both high and low grades have been reported accurately, clearly identified with the drill hole attributes and 'From' and 'To' depths.
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.	No other material exploration data has been collected for this area.
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).	Further drilling is planned to target extensions and at depth. A twinning program is proposed to de-risk the project and increase confidence in the historic drilling.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

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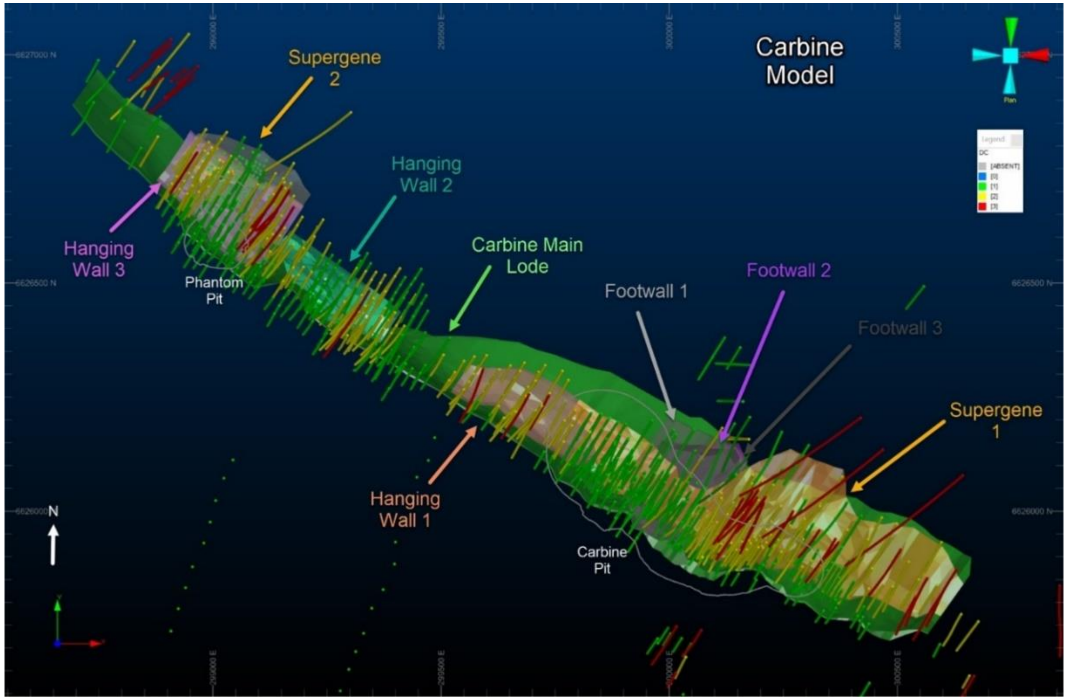

Figure 4: Plan view of Carbine Ore Domains and drill holes (by Data class) used in the resource estimation

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Northern Star personnel have validated the database during the interpretation of the mineralisation, with any drill holes containing dubious data excluded from the MRE.
	Data validation procedures used.	Data validation procedures involve several steps. First a check of the individual collar, survey, geology and assay data was performed by a geologist, then a project geologist validated all data based on suitability for use in estimation, assigning either a “Res_Flag” Yes or No and a data class in AcQuire. This resource used a data class system to indicate the confidence in the historic data, rather than a straight “Res_Flag” Yes or No. • Data class 3 drill holes passed audits of original data (recent drilling). • Data class 2 holes passed spatial validation, were within 100m of recent drilling, and could not be completely verified by original data. Data class 1 holes passed spatial validation, were >100m away from recent drilling, and could not be verified by original data. • Data class 1 drill holes (usually “Res_Flag” No) were included due to the amount of historic drilling with no recent drilling proximal to upgrade the data class. Without these holes there would be insufficient data to estimate the Carbine project.

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Criteria	JORC Code explanation	Commentary
		- Data class 0 holes failed spatial validation, could not be verified by original data, or contained 4m composite assays that were removed due to excessive dilution and smearing of grade. Holes assigned "Res-Flag" No, Data class 0 have been excluded from the data using exclude tables. All historical RC, RCD and DD data has been assigned a Data class and Res_Flag in AcQuire in the project area.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The CP has not visited this site.
	If no site visits have been undertaken indicate why this is the case.	Carbine has been low priority.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The geological interpretation included a first pass lithological model used as a guide for the mineralisation model. Due to the historic logging being highly variable between drilling generations within an oxidized pit, the exact location of the sediment-mafic contact location is uncertain (+/- 20m). The ultramafic-sediment contact marking the Carbine Thrust has been identified more consistently, resulting in confidence in the modelled contact, however uncertainty around what exactly the mineralisation controls are is still high. This was address in the type of estimation which was completed in the Carbine Main Lode, and the Resource Classifications applied. There are several known structural offsets in the ore body, however, detailed information on the localised impact of the structural controls is not currently available. The orientation of Fault 1 is ENE, resulting in an approximately 50m dextral offset observed in the geology. The impact on a local scale of the orebody cannot be identified in the historical RC Drilling. The geological model was developed by resource development geologists and subsequently led to interpretation of ore domains. The Carbine Main Lode is located proximal to the Carbine Thrust and exhibits the similar folding geometry observed in the ultramafic-sediment contact. Ore domains were statistically tested before completion, to determine their suitability for estimation. The geology model was used as a guide for sub domaining following analysis as well, which has resulted in moderate confidence in the geological interpretation used for Carbine. This has been reflected in the Resource Classification.
	Nature of the data used and of any assumptions made.	Open pit mapping along with limited diamond drill core lithology, structure, alteration and mineralisation logs have been used to generate the mineralisation model. The primary assumption is that the mineralisation is hosted within structurally controlled stockwork quartz veins with multiple mineralisation styles (See Section 2 Geology commentary) observed in the Carbine main lode, which is considered robust. This assumption was tested extensively using non-linear estimation and proven to be robust. The Hanging Wall lodes have been modelled as a parallel structure to the Carbine Main Lode and is hosted predominantly in the sediments. This assumption was tested extensively using non-linear and linear estimations and proven to be moderately robust. The Foot Wall lodes have been interpreted as shallow dipping stacked lodes, from extremely limited historic deep diamond drilling data, which indicated multiple vein orientations. This assumption was tested using linear estimation and proven to be weak. The footwall lodes are intended to be used primarily as a targeting tool and are hosted primarily in the sediments. They are named footwall due to relative position of the Main Carbine Lode.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	The Carbine geology model interpretation was simplified from the 2015 resource model. 15 mineralised shapes were included in the previous model. The previous supergene mineralisation of the Carbine Main Lode was pushed 2,000m to the northwest and 250m to the southwest of the current Carbine Main Lode. This reduction in wireframe volume is due to the drill spacing in the project area. Data validation highlighted the lack of diamond drilling and high confidence data in the project. Limited structural information was available for interpretation, so wider zones of mineralisation were interpreted. This has resulted in the inclusion of absent assay data from drill holes within the wireframes, but these values have been removed from the models.
	The use of geology in guiding and controlling Mineral Resource estimation.	The updated geology model was used as a guide for the ore domains, as well as sub domaining based on grade; this includes lithology contacts and fault structures.
	The factors affecting continuity both of grade and geology.	The Carbine Thrust is continuous over the length of the deposit, based on previous mining and drilling, and has currently still open to the north west and the south east. This structure is interpreted to be the fluid pathway feeding the Carbine project area. Sub parallel structures are thought to be mineralised due to dilational areas being created in folded ultramafic footwall. These areas coincide with high grade shoots. Grade tenor tends to decrease in areas were the ultramafic footwall steepens.
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 Carbine Deposit orientation is NNW. There may be other local orientations present which were not identified due to a lack of structural data and diamond drilling in the project area. The Carbine Main Lode appears to extend for approximately 2,200m along strike, 300m down-dip with a width ranging from 1m to 4 0m. The Supergene contains one ore lode which extends above the Carbine Main Lode within the transition and oxide zones. Supergene 1 covers the Carbine Main Lode around the Carbine Pit, extending approximately 925m along strike, 125m down dip and ranging in thickness from 5m to 50m. Supergene 2 covers the Phantom Pit area, extending approximately 275m along strike, 125m down dip and ranging in thickness from 5m to 40m. The Hanging Wall lodes are parallel to the Carbine Main Lode.

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Criteria	JORC Code explanation	Commentary
		Hanging Wall 1 is hosted entirely in the sediment unit. It contains at least 2 sub-parallel lodes, extending approximately 375m along strike, 125m down dip and ranging in thickness from 10m to 30m. Hanging Wall 2 is modelled in the sediment and into the ultramafic footwall unit. It contains at least 2 sub-parallel lodes, extending approximately 300m along strike, 175m down dip and ranging in thickness from 30m to 60m. Hanging Wall 3 is modelled in the sediment and into the ultramafic footwall unit. It contains to contain at least 3 sub-parallel lodes, extending approximately 300m along strike, 225m down dip and ranging in thickness from 20m to 70m. The Footwall lodes are interpreted as shallow dipping (~45^{o}) stacked parallel structures underneath the Carbine Pit. These may be conjugate structures between the Carbine Thrust and the Ol'Rowley Thrust (parallel thrust to Carbine). Footwall 1 is hosted entirely in the sediment unit. It contains at least 2 sub-parallel lodes, extending approximately 200m along strike, 250m down dip and ranging in thickness from 5m to 30m. Footwall 2 is modelled in the sediment and into the ultramafic footwall unit. It contains at least 2 sub-parallel lodes, extending approximately 200m along strike, 300m down dip and ranging in thickness from 10m to 40m. Footwall 3 is modelled in the sediment and into the ultramafic footwall unit. It contains at least 3 sub-parallel lodes, extending approximately 200m along strike, 275m down dip and ranging in thickness from 30m to 70m.
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 of gold has been completed using Ordinary Kriging (OK) unless otherwise stated, and the Carbine Main Lode (CML) used Categorical Indicator Kriging. All estimation was completed using Datamine RM software. CML used a three grade domain indicator estimation which created a waste, low and high grade subdomains. Three different subdomains were also created based on data density in order to use different blocks sizes within the grade domains. Semi soft boundaries were used between the data density subdomains. The most populated domain (1) used both hard and soft top cuts across the grade subdomains (except for a hard only top cut in the Waste subdomain). The second most populated domain (2) used hard top cuts in the waste, soft and hard in the low grade and soft top cut in the high-grade subdomain. The least populated domain (3) used only hard top cuts in the waste and low-grade subdomain. Dynamic Anisotropy was used for estimation, following review of the variography. Three passes were run with a minimum of 5 samples and max of 10 in the first and second pass, and min 1 and max 20 in the third pass. The ranges were guided by the variography. In domain 1 the low-grade subdomain used Inverse Distance Squared and the high-grade subdomain used Inverse Distance Cubed. In domain 2 and 3 the high-grade subdomains used Inverse Distance Cubed. Of the three FW lodes, lodes 1 and 2 used both hard and soft top cuts while lode 3 used only soft top cuts. Variography was only possible for FW lodes 1 and 2. Search rotations and ranges are based on the variography for lodes 1 and 2; an isotropic search was used for lode 3. A minimum of 4-6 samples and max of 10 were used in the first pass, three passes were used in total for all three lodes. A declustering technique was used for all three lodes (min 3 samples per drill hole). FW2 and 3 both used Inverse Distance Squared estimation. Of the two SG lodes, lode 1 used both hard and soft top cuts while lode 2 used only soft top cuts. Variography was possible for both lodes and search rotations and ranges are based on the variography. A minimum of 4 or 5 samples and max of 10 were used in the first pass, three passes were used in total for both lodes. A declustering technique was used for both lodes (min 3 samples per drill hole). Of the three HW lodes, lodes 1 and 2 used both hard and soft top cuts while lode 3 used only soft top cuts. Variography was possible for all three lodes and search rotations and ranges are based on the variography. A minimum of 4-5 samples and max of 10 were used in the first pass, three passes were used in total for all three lodes. A declustering technique was used for all three lodes (min 2 samples per drill hole for HW1, 3 for HW2 and 4 for HW3).
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Inverse Distance Squared, Cubed and Nearest Neighbour estimations were completed as check estimations for all ore lodes.
	The assumptions made regarding recovery of by-products.	No assumptions have been made regarding recovery of any by-products.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements have been considered and therefore estimated for this deposit.

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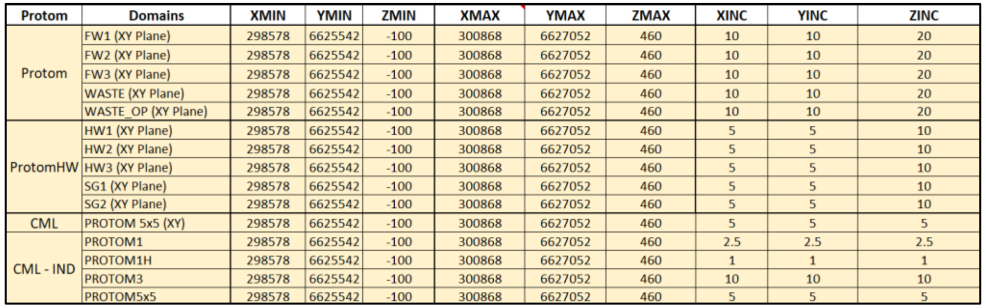
<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td></td><td>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</td><td>Data spacing varies considerably within the deposit, ranging from close spaced 10 m (along strike) to 15 m (down dip) spacing through to 100 m (along strike) to 100 m (down dip) spacing and greater. Gold grades are estimated at the parent block scale and multiple volume models were created to reflect the data spacing (see table below).
<table>
<tr><th>Protom</th><th>Domains</th><th>XMIN</th><th>YMIN</th><th>ZMIN</th><th>XMAX</th><th>YMAX</th><th>ZMAX</th><th>XINC</th><th>YINC</th><th>ZINC</th></tr>
<tr><td>Protom</td><td>FW1 (XY Plane)</td><td>298578</td><td>6625542</td><td>-100</td><td>300868</td><td>6627052</td><td>460</td><td>10</td><td>10</td><td>20</td></tr>
<tr><td></td><td>FW2 (XY Plane)</td><td>298578</td><td>6625542</td><td>-100</td><td>300868</td><td>6627052</td><td>460</td><td>10</td><td>10</td><td>20</td></tr>
<tr><td></td><td>FW3 (XY Plane)</td><td>298578</td><td>6625542</td><td>-100</td><td>300868</td><td>6627052</td><td>460</td><td>10</td><td>10</td><td>20</td></tr>
<tr><td></td><td>WASTE (XY Plane)</td><td>298578</td><td>6625542</td><td>-100</td><td>300868</td><td>6627052</td><td>460</td><td>10</td><td>10</td><td>20</td></tr>
<tr><td></td><td>WASTE_OP (XY Plane)</td><td>298578</td><td>6625542</td><td>-100</td><td>300868</td><td>6627052</td><td>460</td><td>10</td><td>10</td><td>20</td></tr>
<tr><td>ProtomHW</td><td>HW1 (XY Plane)</td><td>298578</td><td>6625542</td><td>-100</td><td>300868</td><td>6627052</td><td>460</td><td>5</td><td>5</td><td>10</td></tr>
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<tr><td></td><td>SG1 (XY Plane)</td><td>298578</td><td>6625542</td><td>-100</td><td>300868</td><td>6627052</td><td>460</td><td>5</td><td>5</td><td>10</td></tr>
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<tr><td>CML</td><td>PROTOM 5x5 (XY)</td><td>298578</td><td>6625542</td><td>-100</td><td>300868</td><td>6627052</td><td>460</td><td>5</td><td>5</td><td>5</td></tr>
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<tr><td></td><td>PROTOM3</td><td>298578</td><td>6625542</td><td>-100</td><td>300868</td><td>6627052</td><td>460</td><td>10</td><td>10</td><td>10</td></tr>
<tr><td></td><td>PROTOM5x5</td><td>298578</td><td>6625542</td><td>-100</td><td>300868</td><td>6627052</td><td>460</td><td>5</td><td>5</td><td>5</td></tr>
</table>
Search ellipse dimensions were derived from the variogram model ranges, or isotropic ranges based on data density where insufficient data was present for variographic analysis.</td></tr>
<tr><td></td><td>Any assumptions behind modelling of selective mining units.</td><td>No selective mining units are assumed in this estimate.</td></tr>
<tr><td></td><td>Any assumptions about correlation between variables.</td><td>No other elements other than gold have been estimated.</td></tr>
<tr><td></td><td>Description of how the geological interpretation was used to control the resource estimates.</td><td>Ore wireframes were created as solids in Maptek Vulcan v9.1 software. The geology model was used as a guide for the creation of the ore lodes:
• Deformation was used as guide for the location of the Carbine Main Lode
• All lodes except the Supergene used the presence of veining and grade as an indicator of an ore lode. The Supergene used predominantly grade located above the top of fresh boundary.
• The geology model as used as a guide for sub domaining following analysis as well, which has resulted in high confidence in the geological interpretation used for Paradigm.</td></tr>
<tr><td></td><td>Discussion of basis for using or not using grade cutting or capping.</td><td>The influence of extreme sample distribution outliers in the composited data has been reduced by top-cutting where required.
Top-cut analysis was carried out on the composite gold values, by ascertaining where a break in the grade population occurred in the upper percentiles of each ore lode or domain. Where the high grades were deemed to be significantly anomalous for that grade population, a top cut was applied using the method outlined below.
The top cut values are applied in several steps, using a technique called influence limitation top cupping. A top cut (AU) and non-top cut (*_NC) variable is created, as well as a spatial variable (*_BC) which only has values where the top cut values appear. For example, the following variables were created and estimated:
• AU (top cut gold)
• AU_NC (non- top-cut gold)
• AU_BC (spatial variable to determine where non-top cut estimate occurred)
The top-cut and non-top cut values are estimated using search ranges based on the variogram, and the *_BC values estimated using very small ranges (e.g. 5 x 5 x 5 m). Where the *_BC values produce estimated blocks within these restricted ranges, the *_NC estimated values replace the original top cut estimated values (AU).
This process allows blocks close to high grade samples to be estimated with the full uncut dataset but blocks outside this restricted range are estimated using the top cut dataset. This limits the spread of very high grades but retains the high local value in these blocks, which more closely reflects the style of mineralisation.
Supergene 1, Hanging Wall 1 & 2, Footwall 1 & 2 ore lodes had both a “hard” top cut and influence limitation top cuts applied, due to extreme outliers present, likely due to both limited data in each domain and the inherent variability present in the mineralisation.</td></tr>
<tr><td></td><td>The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.</td><td>Model validation has been carried out including visual comparison of the composites and block model, swath plots of the declustered composites and estimated blocks; global statistics and check for negative or absent grades.</td></tr>
</table>

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Criteria	JORC Code explanation	Commentary
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	The tonnes have been estimated on a dry basis.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	The mineral resource estimate has been reported at a 0.74 g/t cut off for the open pit resource and 2 g/t cut off within 2.5m minimum mining width (no additional dilution applied) MSO's for the underground resource; both used a $AU1750/oz gold price.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	No minimum mining assumptions have been made during the resource wireframing or estimation process.
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.	No metallurgical or recovery assumptions have been made during the mineral resource estimate.
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 green fields 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.	No environmental assumptions have been made during the mineral resource estimate.
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 was applied following statistical analysis of the measurements from the validated diamond drilling data. In the supergene domain, which was interpreted above the top of fresh boundary, there were no bulk density measurements taken. As a result, the bulk density from oxide and transition were assigned a default value of 2.1 and 2.4 respectively. Because the total mean bulk density values were skewed by the majority of fresh measurements, the few values from the were used as a default where lithologies did not have any measurements. i.e. the default of 2.55 was used rather than 2.7. In the fresh domains (all other ore lode), the major lithologies were determined and the equivalent mean bulk densities values applied (Mafic, Sediment and ultramafic). Where a lithology was rare, the default mean bulk density of 2.8 was applied. The bulk density was then estimated using the equivalent gold estimation parameters or that domain and validated visually and statistically.
	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.	Bulk density measurements were taken using the Archimedes technique onsite; 132 measurements were taken.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	There have been assumptions made based on the consistency of bulk density values within lithologies logged at Carbine.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The resource classification has been applied to the mineral resource estimate based on the drilling data spacing, grade and geological continuity, data integrity, and kriging confidence (slope of regression).
	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, quality, quantity and distribution of the data).	The classification considers the relative contributions of geological and data quality and confidence, as well as grade confidence and continuity.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The classification reflects the view of the Competent Person.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	An audit has not been completed.

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Criteria	JORC Code explanation	Commentary
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 relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC code
	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.	The statement relates to global estimates of tonnes and grade.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Historic production records are incomplete, so no comparison or reconciliation has been made.

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JORC Code, 2012 Edition – Table 1 Report

Paulsens Surface (Belvedere, Merlin) - 30 June 2019

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.	This deposit is sampled by Diamond Drilling (DD) and Reverse Circulation (RC) drilling. Diamond core sample intervals are defined by the geologist to honour geological boundaries. RC initially sampled to 4m comps, any samples reporting > 0.1gpt were re-split and re-assayed as 1m composites.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Core is aligned and measured by tape, comparing back to down hole core blocks consistent with industry practice. RC drilling completed by previous operators, assumed to be to industry standard at the time (1998). Northern Star Resources (NSR) sampling methodologies are to current industry standard.
	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 30g 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.	DD completed to industry standard using varying sample lengths (0.3 to 1.2m) based on geological intervals, which are then crushed and pulverised to produce a ~200g pulp sub sample to use in the assay process. NSR and Intrepid Mines Ltd diamond core samples are fire assayed (50gm charge). Fine grained free gold is encountered occasionally. Pre NSR, Taipan Resources NL RC sampling assumed to be industry standard at that time. NSR RC sampling using mounted static cone splitter used for dry samples to yield a primary sample of approximately 4kg.
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.).	Surface RC drilling of 73 holes used ~5.25" face sampling bit. Surface DD core, 8 holes using NQ2. The surface core was orientated using the ORI-shot device.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	RC – Approximate recoveries are sometimes recorded as percentage ranges based on a visual weight estimate of the sample. DD – Recoveries are recorded as a percentage calculated from measured core versus drilled intervals. Overall recoveries are good.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	RC and diamond drilling by previous operators to industry standard at that time.
	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.	There has been no work completed on the relationship between recovery and grade.
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.	RC chips and surface DD core logged by company geologists to industry standard. All relevant items such as interval, lithologies, structure, texture. Grains size, alterations, oxidation mineralisation, quartz percentages and sulphide types and percentages are recorded in the geological logs. RC logging completed by previous operators to industry standard.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging is qualitative, all core photographed, and visual estimates are made of sulphide, quartz alteration percentages.
	The total length and percentage of the relevant intersections logged.	100% of the drill core and RC drilling chips were logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Core sample intervals are generally to 0.3-1.2m in length, honouring lithological boundaries to intervals less than 1m as deemed appropriate. NQ2 core is half core sampled cut with Almonté diamond core saw. The right half is sampled, to sample intervals defined by the Logging Geologist along geological boundaries. The left half of core is archived. All samples are oven-dried overnight (105^{0}C), jaw crushed to <10mm. The total sample is pulverised in an LM5 to 90% passing 75µm and bagged. The analytical sample is further reduced to a 50gm charge weight using a spatula, and the pulp packet is stored awaiting collection by NSR.

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Criteria	JORC Code explanation	Commentary
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	NSR RC initially sampled to 4m comps, any samples reporting > 0.1gpt were re-split and re-assayed as 1m composites. Rig mounted static cone splitter used for dry samples to yield a primary sample of approximately 4kg. Off-split retained. Duplicate samples are taken at an incidence of 1 in 25 samples. Pre- NSR assumed to be industry standard.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	There was no data available on Taipan sample preparation practices. It is assumed to be industry standard along with NSR processes which are Industry standard.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	NSR standard QAQC procedures and previous owners in the case of Taipan are assumed as Industry standard.
	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.	The field QAQC protocols include; duplicate samples at a rate of 1 in 25, coarse blanks inserted at a rate of 3%, commercial standards submitted at a rate of 4%. Industry standard QAQC procedures are assumed to have been employed by Taipan.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Sample sizes are considered appropriate.
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.	DD - Core is half cut. Repeat analysis of pulp samples (for all sample types – diamond, RC, rock and soil) occurs at an incidence of 2 in 50 samples. Total gold is determined by fire assay using the lead collection technique (50 gm sample charge weight) and AAS finish. Various multi-element suites are analysed using a four-acid digest with an ICP-OES finish. Taipan Resources NL assay techniques were assumed to be industry standard.
	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.	No geophysical tools are used or reporting of analyses.
	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.	The laboratory QAQC protocols include a repeat of pulps at a rate of 3%, sizing at a rate of 1 per batch. The labs internal QAQC is loaded into NST database. In addition to the above, about 5% of samples are sent to an umpire laboratory. Failed standards trigger re-assaying a second 50g pulp sample of all samples in the fire above 0.1ppm. Both the accuracy component (CRM's and umpire checks) and the precision component (duplicates and repeats) are deemed acceptable. Although no formal heterogeneity study has been carried out or nomograph plotted, informal analysis suggests that the sampling protocol currently in use is appropriate to the mineralisation encountered and should provide representative results. Industry standard QAQC procedures are assumed to have been employed by pre NSR operators
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	Significant intersections are verified by NSR senior staff as required.
	The use of twinned holes.	There is no purpose drilled twin holes however holes BVRC018 and BVRC027 are 4m apart and reported 6m @ 2.6gpt and 5m @ 2.4gpt respectively.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	NSR data thoroughly vetted by database administrators. Data is stored in GBIS database has several inbuilt validations. Taipan holes of the 2006 database collated and extensively verified by Maxwell Geoservices previously.
	Discuss any adjustment to assay data.	No adjustments are made to any assay data.
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.	NST collar positions were surveyed using DGPS. Taipan Resources NL collars were surveyed at the end of a drill program. Old mine workings have been picked up on surface, but actual extent and depth has been estimated using 1930's survey plan. Topographic control uses Avista photo data supplemented with local DGPS pickups.
	Specification of the grid system used.	MGA 94_50.
	Quality and adequacy of topographic control.	Topographic control is based on the collar surveys and Avista photogrammetric survey.
	Data spacing for reporting of Exploration Results.	Exploration results are based on the Drill traces as attached.

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Criteria	JORC Code explanation	Commentary
Data spacing and distribution	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.	Data spacing is approximately 20m by 20m. Except one area where deviating holes have left a larger gap of 20m by 40m. Data spacing is adequate for the Resource estimation.
	Whether sample compositing has been applied.	Drill core is sampled to geology; sample compositing is not applied until the estimation stage. NSR RC samples initially taken as 4m composites to be replaced by 1 m samples if assays >0.1gpt were reported. Taipan RC samples treated similarly though historical details not fully reviewed.
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.	Intercept angles are predominantly moderate to high angle (70° to 90°) to the interpreted mineralisation resulting in unbiased sampling.
	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.	Unknown, assumed to not be material.
Sample security	The measures taken to ensure sample security.	Chain of custody is managed by NSR. Samples are stored on site and are delivered to assay laboratory in Perth by Contracted Transport Company. Consignment notes in place to track the samples. Whilst in storage they are kept in a locked yard. Pre NSR operator sample security assumed to be adequate.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	There have not been improved reviews of sampling techniques on NSR drilling phases.

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.	Mining Lease M08/222 is wholly owned by Northern Star Resources Limited and is in good standing. Heritage surveys have been conducted and the area was cleared for drilling. Relationship with the traditional owners is well informed and adequate.
	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.	Mining Lease M08/222 is valid currently to 2021. The access road L08/15 is valid until 2020.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Pre NSR data relevant to this Resource was collected by Taipan Resources NL (35 RC holes in 1998). All previous work is accepted as to industry standard at that time.
Geology	Deposit type, geological setting and style of mineralisation.	Mineralisation at this deposit is considered a mesothermal quartz reef (s) associated with quartz carbonate +/ pyrite, arsenopyrite chalcopyrite and galena, on the contact of by a north south trending dolerite dyke and surrounding sediments. A smaller domain is fault hosted and external to the dolerite host.
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: 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.	No exploration results being released this time.

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Criteria	JORC Code explanation	Commentary
	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.	No exploration results being released this time.
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.	No exploration results being released this time.
	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.	Weighted by length when compositing for estimation.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalents are reported.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	No exploration results being released this time.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Geometry of the mineralisation to drill hole intercepts is at a high angle, often nearing perpendicular.
	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').	No exploration results being released this time.
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.	See plan view of drill traces for Belvedere and surrounding areas.
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.	No exploration results being released this time.
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.	Old Belvedere mine, extents Other Exploration results not considered material. Geotechnical holes were drilled in 2015, results from these are used in pit optimisations.
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 drilling to infill and extend.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	See attached plan view.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are entered directly into the logging package OCRIS. Constrained look-up lists, depth and some interval validation are inbuilt and ensure that the data collected is correct at source. Data is imported to a GBIS relational geological database where additional validation checks are carried out, including depth checks, interval validation, out of range data and coding. Where possible, raw data is loaded directly to the database. Pre-Northern Star Resources Limited (NSR) data assumed correct but no validation has been undertaken. For all data, the drilling looked reliable visually and no overlapping intervals were noted.
	Data validation procedures used.	NSR data validated by database administrators by checking 2% of raw data files. Taipan Resources NL data has not been validated apart from resurveying the old collar positions where found. No inconsistencies were found.

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	Site visits have been undertaken several times by the competent person.
	If no site visits have been undertaken indicate why this is the case.	Site visited.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the deposit was carried out using a systematic approach to ensure continuity of the geology by the supervising and logging geologists. Sectional interpretations were digitized in Vulcan software and triangulated to form three dimensional solids. Confidence in the geological interpretation is moderate. Weathering zones and bedrock sub surfaces were also created.
	Nature of the data used and of any assumptions made.	All available valid data was used including drill data, mapping previous interpretations and existing 1930's mine development extents. Where pre-NSR drill data was used, it is assumed to be correct.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	There are currently no different interpretations.
	The use of geology in guiding and controlling Mineral Resource estimation.	Geology is used to constrain the quartz veins to the dolerite host.
	The factors affecting continuity both of grade and geology.	Grade continuity is related to quartz vein extent, within the constrained dolerite dyke host.
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.	Strike length = 150m; Width = 80m with zones 2 to 3m thick; Depth = from surface to ~160m below surface (top ~20m mined in the 1930's and wholly excluded from the Resource).
Estimation and modelling techniques	The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.	ID2 was used to estimate this Resource using Vulcan 9.1 software. Domains are snapped to drilling, and composited to 1m downhole, Composites of less than 0.15m length are merged with the last composite. Four domains were used to reflect the 2 styles of mineralisation.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	A Resource was estimated internally in June 2015.
	The assumptions made regarding recovery of by-products.	No assumptions of by product recovery are made.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Block size is 2.5m x 2.5m x 2.5m. Sub-celled down to 1.25m x 1.25m x 1.25m to best fit estimation domains. Average drill hole spacing is variable ranging from <10m to 40m (average sample spacing~ 25m). Two search ellipse 70m x 25m x 9m (for Main, Hanging wall and footwall zone) and 50m x 50m x 10m (belvedere fault zone) were used. Minimum of 4 samples to estimate, max 2 samples per octant.
	Any assumptions behind modelling of selective mining units.	No assumptions made.
	Any assumptions about correlation between variables.	No assumptions made.
	Description of how the geological interpretation was used to control the Resource estimates.	Mineralisation wireframes are created within the geological shapes based on drill core logs, mapping and grade. Low grades can form part of an ore wire frame.
	Discussion of basis for using or not using grade cutting or capping.	Composites were cut to 20gpt (Main and hanging wall) and 5gpt (Footwall and Belvedere Fault mineralisation) based on log distribution.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Block grades were compared visually to drilling data. Validation is also through swath plots comparing composites to block model grades, along 10m eastings, 10m nothings and 5m elevation's, comparing Inverse distance to nearest neighbour estimations. All compared favourable but there was no reconciliation against previous mining.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis. Moisture content within the ore is expected to be low (~1-2 %) as it is fresh rock with minimal voids reported.

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Criteria	JORC Code explanation	Commentary
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	Reporting cut off = 1.0gpt based on similar gold projects in the Ashburton Goldfields. Modeling lower grade cut off = 0.3gpt nominally, not more than 2m of internal dilution and requires minimum 2 holes.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	It is assumed Belvedere will initially be mined by open cut mining methods, and quick evaluations support the economics. Below the economic pit depth, grades are high enough to potentially be mined by underground methods.
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.	Extensive metallurgical testing including comminution, leaching and adsorption, flocculation, rheology and geochemistry test work was completed by ALS metallurgy in early 2015. Belvedere ore will be amenable to processing in the existing plant though the thickener may need to be optimised for best recovery.
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 green fields 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.	No environmental, permitting, legal, taxation, socio-economic, marketing or other relevant issues are known, that may affect the estimate.
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 used was based on 756 samples from 5 diamond holes. Measurements were taken using the immersion method and related back to dominant rock code.
	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.	Bulk density of the host rock is well covered, but of the mineralisation only lower grade intersections are represented in only 7 samples. Ten samples were used to determine an average SG of weathered rock.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Individual bulk densities are applied to geological units.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on drill spacing to delineate inferred and indicated Resource. There is no Measured category.
	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, quality, quantity and distribution of the data).	Confidence in the relative tonnage and grade is high, NSR data input reliable, Taipan data assumed to be reliable (based on Paulsens experience). Distribution of data and continuity is moderate.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The result appropriately reflects the Competent Person(s)' view of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	This particular Resource has not been externally reviewed or 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.	This mineral Resource estimate is considered as robust and representative. The application of geostatistical methods has helped to increase the confidence of the model and quantify the relative accuracy of the Resource on a global scale. It relies on historical data being of similar standard as recent infill drilling. This applies to approximately half of the holes. The relevant tonnages and grade are variable on a local scale.
	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.	This Resource report relates to the Belvedere area where it is likely to have local variability. The global assessment is more of a reflection of the average tonnes and grade estimate.

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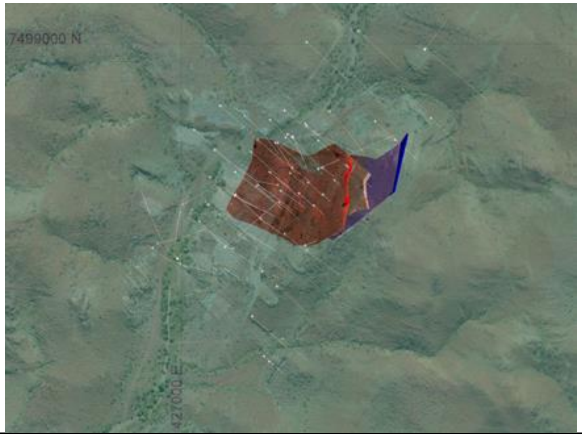
Criteria	JORC Code explanation	Commentary
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	There is no production data available.

PLAN VIEW OF THE BELVEDERE DEPOSIT



APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report

Paulsens Underground (Voyager, Titan, Upper Paulsens & Galileo) - 30 June 2019

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.	This deposit is sampled by Reverse Circulation (RC), Diamond Drilling (DD) and face chip sampling. Sample intervals are defined by the geologist to honour geological boundaries. RC drill results are also used in the Upper Paulsens model.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Core is aligned and measured by tape, comparing back to down hole core blocks consistent with industry practice. RC and most surface core drilling completed by previous operators to industry standard at the time (late 1990's to 2011).
	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 30g 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.	Diamond drilling and face sampling are completed to industry standard using varying sample lengths (0.3 to 1.2m) based on geological intervals, which are then crushed and pulverised to produce a ~200g pulp sub sample to use in the assay process. Pre-June 2013, diamond core samples are fire assayed (30gm charge), current fire assay charge is 40gm. Face samples are assayed by Leachwell. Visible gold is occasionally encountered in core and face sampling. RC sampling to industry standard at the time. There is evidence of mineralisation widths being exaggerated in the lower zone particularly, these areas have now been mined out and do not affect current Resource.
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.).	Upper Paulsens model: Surface RC drilling, 332 holes (face sampling hammer, ~5 1/4" bit size), Surface drill core, 140 holes, (NQ2 sized, standard tube), 962 Underground DD, 3,494 faces used to generate sample composite. Titan model: Surface diamond drill holes 2, 565 Underground drill holes, 560 faces/rises used to generate sample composite. Voyager model: 3240 Underground drill holes and 7935 faces/rises used to generate the sample composite. Galileo model: 502 Underground drill holes and 252 faces/rises used to generate the sample composite. Underground diamond holes are LTK60 or NQ2 size. Surface core is orientated using the EZ ORI-shot device, underground drill core is rarely oriented. Faces are chip sampled aiming to sample every ore development cut but ~10% of ore cuts were missed pre-2015, now all faces are mapped and sampled.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	Diamond drill recoveries are recorded as a percentage calculated from measured core versus drilled intervals. Achieving >95% recovery. Greater than 0.2 metre discrepancies are resolved with the drill supervisor. Surface RC drill recoveries are unknown.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	Standard diamond drilling practice results in high recovery due to competent nature of the ground. RC drilling by previous operators to industry standard at the time.
	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.	There is no known relationship between sample recovery and grade, sample recovery is very high.
Logging	Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.	Core logging is carried out by company geologists, who delineate intervals on geological, structural, alteration and/or mineralogical boundaries, to industry standard. Surface core and RC logging was completed by previous operators to industry standard.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging is qualitative and all core is photographed. All sampled development faces are photographed. Visual estimates are made of sulphide, quartz and alteration percentages.
	The total length and percentage of the relevant intersections logged.	100% of the drill core is logged. 100% of RC drilling is logged.

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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.	LTK 60 is generally whole core sampled, NQ2 core is generally half core sampled. If not whole core sampled, then core is half cut with an Almonté diamond core saw and half core sampled. The right half is sampled, to sample intervals defined by the logging geologist along geological boundaries. The left half is archived. All major mineralised zones are sampled, plus associated visibly barren material, >5m of the hangingwall and footwall. Quartz veins >0.3m encountered outside the know ore zone and ±1m on either side are also sampled. Ideally, sample intervals are to be 1m in length, though range from 0.30m to 1.20m in length. Total weight of each sample generally does not exceed 5kg. All samples are oven-dried overnight (max 1200), jaw crushed to <6mm, and split to <3kg in a static riffle splitter. The coarse reject is then discarded. The remainder is pulverised in an LM5 to >85% passing 75µm (Tyler 200 mesh) and bagged. The analytical sample is further reduced to a 30gm charge weight using a spatula, and the pulp packet is stored awaiting collection by Northern Star Resources Limited (NSR). Post 2013, samples are crushed to 90% passing 3mm before a rotary split to 2.5 kg, all of which is then pulverised to 90% passing 75 microns. For older core, pre- NSR, best practice is assumed.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	Development face samples are chipped directly off the face into a sample bag, aiming for >2.5kg. Sample intervals range between 0.3 – 1.2m in length, modified to honour geological boundaries, and taken perpendicular to the mineralisation if practical. Site lab sample preparation since January 2013 uses a Boyd to crush and split to 3mm. Before that a jaw crusher (6mm aperture) and 50/50 rifle splitter were used.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Sample preparation is deemed adequate.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	For drill core the external labs coarse duplicates are used. One face sub sample per day is sent offsite for fire assay analysis to compare to Leachwell assay results. RC drilling by previous operators to industry standard at that time.
	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.	Field duplicates, i.e. other half of cut core, are not been routinely assayed. For each development face, one field duplicate is taken of the highest grade area, to assess the reproducibility of the assays, and the variability of the samples. Variability is very high due sampling technique and to nuggetty nature of the mineralisation. The variability is accepted, countered by the high density of sampling.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Sample sizes are considered appropriate.
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.	For all drill core samples, gold concentration is determined by fire assay using the lead collection technique with a 30-gram sample charge weight. An AAS finish is used, considered to be total gold. A 40-gram fire assay charge is used post June 2013. Various multi-element suites are analysed using a four-acid digest with an ICP-OES finish. Face samples are analysed using Leachwell process and are not considered total gold. RC drill samples by previous operators assumed fire assay with AAS finished.
	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.	No other sources of data reported.
	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.	The QAQC protocols used include the following for all drill samples: Site sourced coarse blanks are inserted at an incidence of 1 in 40 samples. From April 2013, commercial blanks are used. Commercially prepared certified reference materials are inserted at an incidence of 1 in 40 samples. The CRM used is not identifiable to the laboratory. NSR's blanks and standards data is assessed on import to the database and reported monthly, quarterly and yearly. The primary laboratory QAQC protocols used include the following for all drill samples: Repeat of pulps at a rate of 5%. Screen tests (percentage of pulverised sample passing a 75µm mesh) are undertaken on 1 in 100 samples. The laboratory and Geology department report QAQC data monthly.

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Criteria	JORC Code explanation	Commentary
		Failed standards are followed up by re-assaying a second 30g pulp sample of the failed standard ± 10 samples either side by the same method at the primary laboratory. One standard is inserted with every face sampling submission to assess site lab performance. Both the accuracy component (CRM's and umpire checks) and the precision component (duplicates and repeats) are deemed acceptable. QAQC protocols for surface RC and diamond drilling by previous operators is unknown, assumed to be industry standard.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	Significant intersections are reviewed by the geology manager and senior corporate personnel.
	The use of twinned holes.	Twinned holes are not specifically designed. Occasionally deviating holes could be considered twins, showing similar tenor of mineralisation.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Until June 2014, data was hard keyed or copied into excel spreadsheets for transfer and storage in an access database. Data is now entered in the OCRIS data capture system, where it is then exported to the GBIS Geology database after validating. Hard copies of face and core / assays and surveys are kept on site. All face sheets are scanned and saved electronically as well. Internal checks are made comparing database to raw assays files. Visual checks are part of daily use of the data in Vulcan. Data from previous operators taken from 2006 database compilation by Maxwell Geoservices and further maintained by a succession of Paulsens owners. All data now stored in GBIS and electronically logged and downloaded.
	Discuss any adjustment to assay data.	No adjustments are made to any assay data. First gold assay is utilised for any Resource estimation.
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.	Drill hole collar positions are picked up by survey using a calibrated total station Leica 1203+ instrument. Drill hole, downhole surveys are recorded at 15m and 30m, and then every 30m after, by calibrated Pathfinder downhole cameras. Face samples are located by laser distance measurement device and digitised into Vulcan software. The faces are represented as "pseudo-drill holes" to allow assignation of survey, lithology, assay, and other relevant information. Underground workings are tied into defined surface survey stations. Surface hole collars picked up by the mine surveyors in mine grid. Pre - NSR survey accuracy and quality assumed to be industry standard.
	Specification of the grid system used.	A local grid system (Paulsen Mine Grid) is used. It is rotated 40.61 degrees to the west of MGA94 grid. Local origin is 50,000N and 10,000E Conversion. MGA E = (East_LOC*0.75107808+North_LOC*0.659680194+381504.5)+137.5 MGA N = (East_LOC*-0.65968062+North_LOC*0.751079811+7471806)+153.7 MGA RL = mRL_LOC-1000
	Quality and adequacy of topographic control.	Topographic control is not that relevant to the underground mine. For general use, recent Arvista aerial surveys are flown annually. Resolution is +/- 0.5m.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Exploration result data spacing can be highly variable, up to 100m and down to 10m.
	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.	Measured data spacing is better than 7m x 7m and restricted to areas in immediate proximity to mined development. Data spacing for indicated material is approximately, or better than, 20m x 20m. All other areas where sample data is greater than 20m x 20m, or where intercept angle is low, is classified as inferred.
	Whether sample compositing has been applied.	Core and faces are sampled to geology, sample compositing is not applied until the estimation stage. RC samples initially taken as 4m composites to be replaced by 1 m samples in ores zones above assumed threshold.
Orientation of data in relation to	Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	Intercept angles are mixed; however, all material remains inferred until reconciled by moderate to high angle (45° to 90°) grade control drilling, or mining activities. Hanging-wall drill drives provide excellent intercept orientation to the geological structures used in the estimate.

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Criteria	JORC Code explanation	Commentary
geological structure	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 drill orientation to mineralised structures biases the number of samples per drill hole. It is not thought to make a material difference in the Resource estimation. As the opportunity arises, better angled holes are drilled with higher intersection angles.
Sample security	The measures taken to ensure sample security.	All samples are selected, cut and bagged in tied numbered calico bags, grouped in larger tied plastic bags, and placed in large sample cages with a sample submission sheet. The cages are transported via freight truck to Perth, with consignment note and receipts. Sample pulp splits are returned to NSR via return freight and stored in shelved containers on site. Pre NSR operator sample security assumed to be similar and adequate.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	Recent external review confirmed core and face sampling techniques are to industry standard. Data handling is considered adequate and was further improved recently with a new database. Pre NSR data audits found less QAQC reports, though in line with industry standards at that time.

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.	M08/196 and M08/99 are wholly owned by Northern Star Resources (NSR) and in good standing. Surface expression of the Paulsens Gold Mine is on M08/99, most of underground workings are on neighbouring M08/196. There are no heritage issues with the current operation. Relationship with the traditional owners is good. There is an on-going Production royalty payment to the traditional owners the terms of which are confidential.
	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.	M08/196 and M08/99 are valid for 21 years and are renewable.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Data relevant to these Resources was collected by CRA, Hallmark, Taipan, St Barbara, Nustar and Intrepid Mines Ltd before NSR. All previous work is accepted as to be at industry standard at the time.
Geology	Deposit type, geological setting and style of mineralisation.	Paulsens is a high grade, quartz hosted, mesothermal gold deposit within metasediments.
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length.	Too many (>9000) holes to practically summarise all information for all drill holes and faces used in the Resources. Detailed drill hole data is periodically released on ASX with all relevant information attached and can be found on the Northern Star website.
	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.	Exclusion of information does not detract from this report. For reference, recent releases were dated as follows: 29/2/2016, 4/8/2015, 13/01/2015, 19/02/2014, 05/09/2013, 23/09/2013, 02/08/2013, 29/05/2013, 16/05/2013, 20/01/2013, 12/12/2012, 1/10/2012, 24/8/2012, 04/07/2012, 07/06/12, 29/05/2012, 12/04/2012, 6/03/2012, 25/11/2011, 17/11/2011, 09/11/2011, 13/10/2011, 12/09/11, 30/05/2011, 12/04/2011, 16/03/2011, 06/01/2011, 04/01/2011, 22/12/2010, 10/12/2010, 02/12/2010, 14/10/2010, 04/08/2010.
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.	No exploration results released
	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.	Short intervals are length weighted to create the final intersections.

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Criteria	JORC Code explanation	Commentary
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalents are reported.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Due to complex mineralisation geometry and varying intercept angles the true thickness is manually estimated on a hole by hole basis.
	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').	Downhole length in addition to estimated true width is shown in the report tables.
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.	No exploration results released
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.	No exploration results released
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.	No other relevant data to report.
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).	Paulsens is currently on care and maintenance, awaiting the results of a 3D seismic survey. It is expected that follow up targets will be generated
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Awaiting the results of a 3D seismic survey. It is expected that follow up targets will be generated

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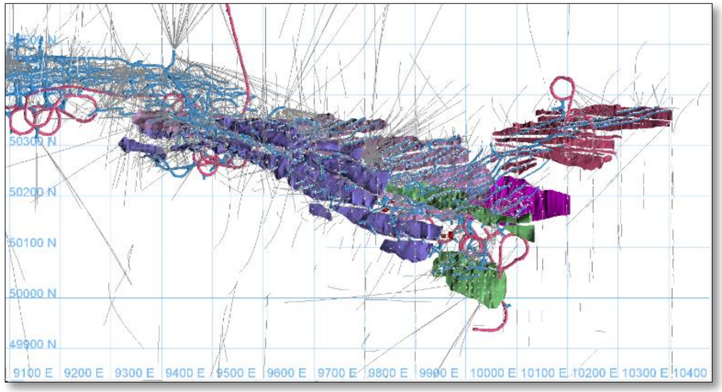
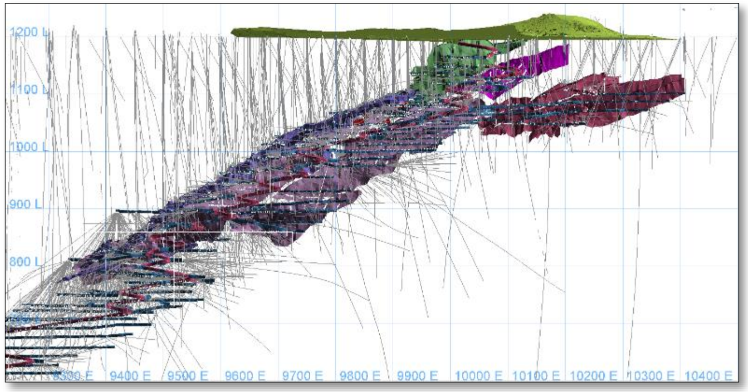
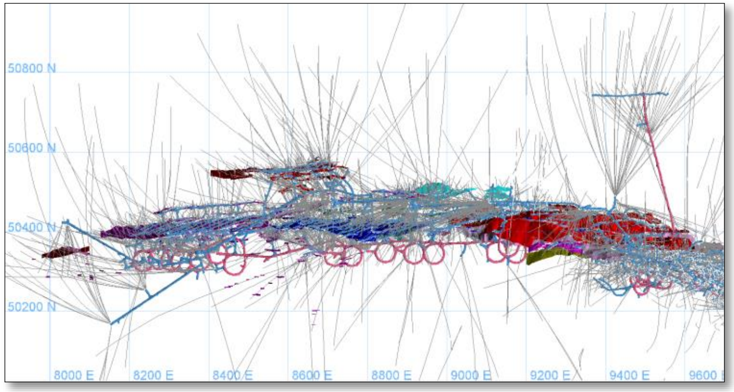
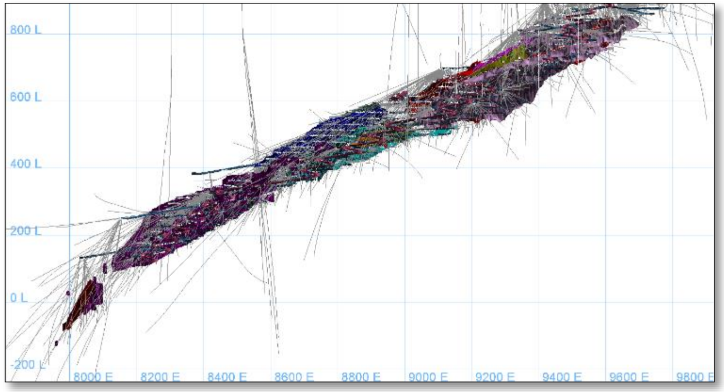
<table>
<tr><th colspan="2">PAULSENS UNDERGROUND - REPRESENTATIVE PLAN & LONG SECTION</th></tr>
<tr><td>Plan View – Paulsens upper Levels
 </td><td>Long Section View – Paulsens upper levels looking north.
 </td></tr>
<tr><td>Plan View – Paulsens Voyager & Titan deposits
 </td><td>Long Section View – Paulsens Voyager & Titan deposits looking north
 </td></tr>
</table>

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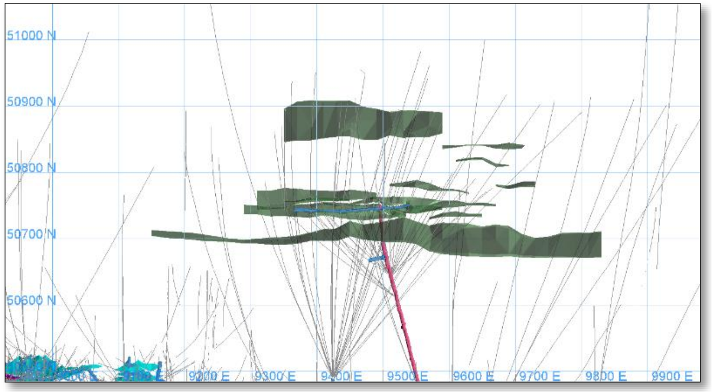
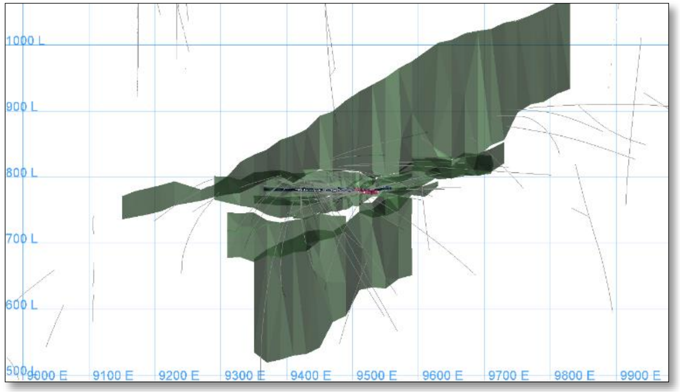
Plan View – Paulsens Galileo deposit	Long Section View – Paulsens Galileo deposit looking North
	

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Sampling and logging data are entered into the OCRIS logging data capture system then transferred to GBIS database. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly to the database from the laboratory. Pre-Northern Star Resources (NSR) data assumed correct, maintained by database administrators.
	Data validation procedures used.	Random checks through use of the data as well as database validations. Checks as part of reporting significant intersections and end of program completion reports are also completed. In addition to this, 5% of the underground drill holes, faces and sludge samples have been validated against the raw data collected. Maxwell Geo Services extensively validated the 2006 data compilation.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The CP has visited this site on numerous occasions between 2004 and 2017. This Resource estimate has been conducted by geologists working in the mine and in direct, daily contact with the ore body data used in this Resource estimate.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the deposit was carried out using a systematic approach to ensure continuity of the geology and estimated mineral Resource. The confidence in the geological interpretation is high with all the information and plus 13 years of operation.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drilling faces, photos, structures.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No substantially different, alternative interpretations have been completed or put forward.
	The use of geology in guiding and controlling Mineral Resource estimation.	The majority of mineralisation is located within a large, variably folded and faulted quartz host, close to, or on, the contacts with the surrounding wall rock sediments between an offset Gabbro intrusive. Drill core logging and face development is used to create 3D constrained wireframes.
	The factors affecting continuity both of grade and geology.	Grade continuity is related to the quartz and sulphide events within the boundaries of the gabbro extent. Mineralised veins are also within the gabbro.

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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.	Upper Paulsens: • Strike length = 1,100m down plunge at 30-35deg to the west; • Width = ~80m (though high-grade component ~ 5m wide); • Depth = from ~130m below surface to ~550m below surface; Voyager: • Strike length = 1,850m down plunge, 25-30 deg to grid west; • Width = ~190m; • Depth = from ~550m below surface to ~1,100m below surface; Titan: • Strike length = 350m down plunge, 25 degrees to grid west; • Width = 50m; • Depth = from 750 to 925m below surface; Galileo: • Strike length = 360m down plunge,10 degrees to grid west; • Width = 50m; • Depth = from 380 to 520m below surface;
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.	Inverse distance squared (ID2) was used to estimate this Resource, using Vulcan 8. Mineralisation domains (in four models) were used to constrain the various lodes, defined by orientation, geological continuity, and grade population. Each domain is validated against the lithology, and then snapped to the drill-hole and face data to constrain the mineralised envelope as a 3D wireframe. Compositing of drill-hole samples was completed against these wireframed domains at 1m (downhole) interval.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Recent reconciliations of the area have been in line with Resource expectations.
	The assumptions made regarding recovery of by-products.	No assumptions are made, but silver is a by-product that makes up part of the refinery revenue. This is not in the model and only gold is defined for estimation.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Block size is 5m x 4m x 5m, sub-blocked to 1m x 0.25m x 1m to suit the narrow east-west orientation of the majority of the domains. Average sample spacing is 3.5m in the case of face samples. Search ellipsoids are 25 * 12 * 6m to 50 * 20 * 10 m, varying the minimum number of samples required on successive passes as well as utilizing an octant search to decluster.
	Any assumptions behind modelling of selective mining units.	No assumptions made.
	Any assumptions about correlation between variables.	No assumptions made.
	Description of how the geological interpretation was used to control the Resource estimates.	Mineralisation wireframes are created within the geological shapes based on drill core logs, mapping and grade. Low grades can form part of an ore wireframe.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were used based on statistical analysis undertaken in Supervisor that ranges from 10 to 200gpt on individual domains. Top cuts are set to incorporate approximately 97.5% of the available sample population for each domain.
	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 is through swath plots comparing composites to block model grades, along 20m eastings and RL, comparing the block model means vs composite means for each domain. Visually, block grades are assessed against drill hole data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis. Moisture content within the ore is low (~1-2 %).

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	Resource reporting based on MSO (Mining Stope Optimiser) using blocks 10m high by 10m wide (variable widths) and a grade of 2.25gpt. Individual MSO Blocks are then visually assessed for "mineability". Remnant stope "skins", small remote blocks and inaccessible pillars are removed.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	Standard sub level retreat mining methods are predominantly used. Historical mining and reconciliation data have been taken into consideration but without affecting wire frame interpretation. The total model has been coded to identify previously mined areas and only reports remnant mineralisation.
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 ore is free milling (Life of Mine over 14 years 91.5% recovery), average hardness (BWI15-16), and with no significant refractory component. There are few deleterious elements, the footwall graphitic shales being a concern in that this can affect recovery through preg-robbing if processed on its own. High percentages of pyrrhotite and chalcopyrite have been known to affect recovery. This known effect is managed through blending the ROM feed to the crusher prior to milling.
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 green fields 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.	Paulsens was recently an operating mine, currently on Care and maintenance, and all permits and closure plans in place. As with all unweathered, underground deposits, when mined, natural oxidation and weathering occurs, however, the ore and waste material mined at Paulsens has been reviewed several times by both independent and contracted consultants with the overall comment that there appears to be no major effects on the environment outside of the environmental conditions imposed with the granting of the initial mining license.
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.	Over 4,000 bulk density measurements from diamond drill holes have been taken from 336 mineralised and un-mineralised intervals within the project area. The bulk densities are derived from laboratory pycnometer readings, with some of the domain densities adjusted over time through mine tonnage reconciliations. Immersion method SG calculations are now routinely preformed to validate against the block model bulk density estimates.
	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.	Minimal voids are encountered in the ore zones and underground environment.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Individual bulk densities are applied to geological units and ore zones.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is defined by data spacing of diamond holes, face/wall and rise sampling and reflects the degree of confidence in the areas specified. Measured Resource classification is where the estimate is supported by data less than 5m apart and/or within 5-7m of development. Indicated Resource classification is where the mineralisation has been sufficiently defined by a drill spacing of 12-15m x 12-15m or better, and/or where development has occurred within 12-15m. Inferred Resource is based in addition to the above to a maximum search distance of 50 m from last sample point and high angle drill intercepts. The Upper Paulsens Resource has not been audited externally. Previous estimates of this area utilising the same, or very similar variables, have been reviewed by external parties and internal parties with protocols deemed appropriate. The area has also been externally estimated by Ordinary Kriging (Hellman and Schofield 2007-2010), Inverse distance (ResEval Pty Ltd) 2004-2006, Conditional Simulation and Ordinary Kriging (Golders) 2002.
	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, quality, quantity and distribution of the data).	Classification is primarily based on 14 years of Paulsens mining experience.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	This mineral Resource estimate is considered representative.

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Criteria	JORC Code explanation	Commentary
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	This particular Resource has not been audited externally. Previous estimates of this area utilising the same, or very similar variables, have been reviewed by external parties and internal parties with protocols deemed appropriate.
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.	This Resource is one in an iterative, evolutionary approach, attempting to increase confidence with each estimation. Taking account of all reconciliation, audits, mentor, and increased ore body knowledge the qualitative confidence improves with mining and drilling.
	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.	This Resource report relates to the Upper Paulsens, Voyager, Titan and Galileo areas, and will show local variability. The global assessment is more of a reflection of the average tonnes and grade estimate.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	The current inverse distance estimation methodology appears to perform sufficiently as an estimation technique for the Paulsens mineralisation.

Section 4 Estimation and Reporting of Ore Reserves

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

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.	NST MY 2018 Resource.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are reported inclusive of the Ore Reserve.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The competent person has conducted numerous site visits, as well as consulted on a range of operating elements.
	If no site visits have been undertaken indicate why this is the case.	Site visits undertaken.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	Update of previous Ore Reserve.
	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.	Update of previous Ore Reserve.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	A cut-off grade is generated, and all potential reserve material is evaluated, based on the direct costs of all tasks involved and corporate gold price guidance. Historic actual costs are relied upon in determining cut-off grades and costs.
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).	Indicated Resources were converted to Probable Ore Reserves subject to mine design physicals and an economic evaluation.
	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.	Selected mining method deemed appropriate as it has been used at Paulsens since 2005.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	Assumptions based on actual mining conditions.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	This table one applies to underground miring only.

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Criteria	JORC Code explanation	Commentary
	The mining dilution factors used.	Based on historical mine performance, mining dilution of 18% for stoping and 18% for development is applied based on historical data.
	The mining recovery factors used.	Mining recovery factor of 94% has been applied.
	Any minimum mining widths used.	2.0m.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Designed stopes with greater than 50% inferred blocks are excluded from the reported Reserve.
	The infrastructure requirements of the selected mining methods.	Infrastructure in place and is maintained as part of the care and maintenance strategy.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	The Paulsens gold mill utilises a CIL (Carbon in Leach) circuit for the extraction of gold. Reserves are based on historical data from the operation of the plant and a Processing recovery of 88% is used for Paulsens based on historical results.
	Whether the metallurgical process is well-tested technology or novel in nature.	Milling experience gained since 2005, 12 years' continuous operation.
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Milling experience gained since 2005, 12 years' continuous operation.
	Any assumptions or allowances made for deleterious elements.	No assumption made.
	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.	Milling experience gained since 2005, 12 years' continuous operation.
	For minerals that are defined by a specification, has the ore Reserve estimation been based on the appropriate mineralogy to meet the specifications?	Gold only being reported.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	Paulsens is currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are either granted or in the process of being granted.
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.	All current site infrastructure is suitable to the proposed mining plan.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.	Actual mine operating costs used.
	The methodology used to estimate operating costs.	Processing, Mining Services, Geology Services and Administration costs have been estimated as a cost per ore tonne based on tracked historical performance. Mining Services fixed cost is based on the monthly lump sum provided in the schedule of rates and then annualised and divided by the budgeted annual processing rate to obtain a cost per ore tonne.
	Allowances made for the content of deleterious elements.	No allowances made for deleterious elements.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products.	Single commodity pricing for gold only, using a long-term gold price of AUD$1,500 per ounce 2.5% WA State Government royalty.
	The source of exchange rates used in the study.	All in $AUD.
	Derivation of transportation charges.	Historic performance.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Refining charge built into the cost model.
	The allowances made for royalties payable, both Government and private.	All royalties are built into the cost model.

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Criteria	JORC Code explanation	Commentary
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.	Revenue was based on a gold price of AUD $1,500 per ounce.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	NSR internal Resource and Reserve guidelines 2018. These are documented in emails and memos.
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.	It is assumed that all gold is sold direct to the market.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Not relevant to gold.
	Price and volume forecasts and the basis for these forecasts.	Not relevant to gold.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Not relevant to gold.
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.	All costs assumptions are made based on historical performance from the mine and current economic forecast seen as representative of current market conditions.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Sensitivities not assessed.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Agreements are in place and are current with all key stakeholders including traditional landowner claimants.
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 issues foreseen.
	The status of material legal agreements and marketing arrangements.	No issues foreseen.
	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.	As a current operation, all government approvals are in place. No impediments are seen in any of these agreements for the continuation of mining activities.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	All Ore Reserves include Proved (if any) and Probable classifications.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results accurately reflect the competent persons view of the deposit.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	None.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	There have been no external reviews of this Ore Reserve estimate. Internally reviewed by site and corporate staff.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the Reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.	Confidence in the model and Ore Reserve Estimate is considered high based on current mine and reconciliation performance.

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Criteria	JORC Code explanation	Commentary
	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.	Estimates are global but will be reasonable accurate on a local scale.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.	Other than dilution and recovery factors, no additional factors have been applied to the 2018 MY estimation.
	It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Reconciliation results from past mining at Paulsens has been considered and factored into the Reserve assumptions where appropriate.

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JORC Code, 2012 Edition – Table 1 Report

Ashburton Mt Olympus Deposit (including Waugh, Zeus, Electric Dingo & Romulus) - 30 June 2019

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.	This deposit is sampled by diamond drilling and RC drilling completed by NSR (Northern Star Resources Limited) and previous operators. NSR – DD. Sampled sections are generally NQ2. Core sample intervals are defined by the geologist to honour geological boundaries ranging from 0.3 to 1.5m in length. NSR - RC - Rig-mounted static cone splitter used with the aperture set to yield a primary sample of approximately 4kg for every metre (representing approximately one eighth of the total sample). Off-split retained. RC and DD sampling by previous operators to industry standard at that time often using 1m samples after initial 4m composites. It is unknown what grade threshold triggers the 1m re-samples.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Core is aligned and measured by tape, comparing back to down hole core blocks consistent with industry practice. RC and surface core drilling completed by previous operators to industry standard at that time (1988 initial discovery, to 2004).
	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 30g 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.	Diamond drilling completed to industry standard using varying sample lengths (0.3 to 1.5m) based on geological intervals, which are then crushed and pulverised to produce a ~200g pulp sub sample to use in the assay process. NSR diamond core samples are fire assayed (50g charge). Visible gold is occasionally encountered in core. RC sampling to industry standard at the time of drilling.
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 – Reverse circulation drilling is carried out using a face sampling hammer and a 5¼ inch diameter bit. NSR surface diamond drilling carried out by using both HQ3 (triple tube) and NQ2 (standard tube) techniques. Sampled sections are generally NQ2. Core is orientated using the ORI-shot device.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	RC – Approximate recoveries are sometimes recorded as percentage ranges based on a visual and weight estimate of the sample. DD – Recoveries are recorded as a percentage calculated from measured core verses drilled intervals.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	NSR diamond drilling practice results in high recovery due to the competent nature of the ground. For RC drilling, efforts are made to ensure good recoveries are achieved by the use of auxiliary compressors and high-pressure booster units supplying compressed air at a high enough pressure to keep water from the hole and the samples dry in most circumstances. Where water is encountered in the pre-collar and wet samples result, more frequent cleaning of the cyclone and splitter is carried out and the hole is thoroughly flushed at the end of each sample. RC and diamond drilling by previous operators to industry standard at that time.
	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.	There is no known relationship between sample recovery and grade, diamond drill sample recovery is very high.
Logging	Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.	Core and chip samples have been logged by qualified Geologist to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies. Percussion holes logging were carried out on a metre by metre basis and at time of drilling. Surface core and RC logging completed by previous operators assumed to be to industry standard.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging is Qualitative and Quantitative and all core is photographed both wet and dry (some older core is pre-digital, photos not all reviewed). Visual estimates of sulphide, quartz alteration as percentages. Selected RC chip trays are archived.
	The total length and percentage of the relevant intersections logged.	100% of the drill core is logged. 100% of RC drilling is logged.

APPENDIX B: TABLE 1

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.	DD – Core is half cut with an Almonté diamond core saw. Sample intervals are defined by a qualified geologist to honour geological boundaries. The left half is archived. All major mineralised zones are sampled, plus associated visibly barren material, >5m of mineralised zones. Ideally, sample intervals are to be 1m in length, though range from 0.3m to 4.0m in length. Total weight of each sample generally does not exceed 5kg. Following drying at 105°C to constant mass, all samples below approximately 4kg are totally pulverised in LM5's to nominally 90% passing a 75µm screen. The very few samples generated above 4kg are crushed to <6mm and riffle split first prior to pulverisation. For RC drilling, duplicate samples are taken from the cone splitter at an incidence of 1 in 25 samples. Repeat analysis of pulp samples (for all sample types – diamond, RC, rock and soil) occurs at an incidence of 2 in 50 samples. No formal heterogeneity study has been carried out or nomograph plotted. An informal analysis suggests that the sampling protocol currently in use are appropriate to the mineralisation encountered and should provide representative results. All samples are oven-dried overnight (max 1200), jaw crushed to <6mm, and split to <3kg in a static riffle splitter. The coarse reject is then discarded. The remainder is pulverised in an LM5 to >85% passing 75µm (Tyler 200 mesh) and bagged. The analytical sample is further reduced to a 30gm charge weight using a spatula, and the pulp packet is stored awaiting collection by NSR. For older pre- NSR samples, best practice is assumed.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC - Rig-mounted static cone splitter used for dry samples. Pre NSR RC sub sampling assumed to be at industry standard at that time.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Following drying at 105°C to constant mass, all samples below approximately 4kg are totally pulverised in LM5's to nominally 90% passing a 75µm screen. The very few samples generated above 4kg are crushed to <6mm and riffle split first prior to pulverisation. No formal heterogeneity study has been carried out or nomograph plotted. An informal analysis suggests that the sampling protocol currently in use are appropriate to the mineralisation encountered and should provide representative results. For older pre- NSR samples, best practice is assumed.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	For RC drilling, duplicate samples are taken from the cone splitter at an incidence of 1 in 25 samples. Repeat analysis of pulp samples (for all sample types – diamond, RC, rock and soil) occurs at an incidence of 2 in 50 samples. For drill core the external labs coarse duplicates are used. RC drilling by previous operators to industry standard at the time. With new database protocol, older QAQC data is being retrieved but was not reviewed at the time of this report.
	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.	Field duplicates, i.e. other half of cut core, have not been routinely assayed. RC drilling by previous operators assumed to be to industry standard at that time.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Sample sizes are considered appropriate.
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.	For all NSR drill core samples, gold concentration is determined by fire assay using the lead collection technique with a 30-gram (or 50g depending on which lab was used) sample charge weight. An AAS finish is used, considered to be total gold. Various multi-element suites are analysed using a four-acid digest with an ICP-OES finish. RC drilling by previous operators to industry standard at the time and not reviewed for this Resource.
	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.	Not applicable to this report.
	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.	The field QAQC protocols used include the following for all drill samples: • Duplicate samples are taken from the cone splitter at an incidence of 1 in 25 samples, • Coarse blanks are inserted at an incidence of 1 in 30 samples, • Commercially prepared certified reference materials (CRM) are inserted at an incidence of 1 in 25 samples. The CRM used is not identifiable to the laboratory,

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
		• NSR's QAQC data is assessed on import to the database and reported monthly and yearly. The laboratory QAQC protocols used include the following for all drill samples: • Repeat analysis of pulp samples occurs at an incidence of 2 in 50 samples, • Screen tests (percentage of pulverised sample passing a 75µm mesh) are undertaken on 1 in 100 samples, • The laboratories own standards are loaded to the NST database, • The laboratory reports its own QAQC data on a quarterly basis. • In addition to the above, about 5% of samples are sent to an umpire laboratory. • Failed standards are followed up by re-assaying a second 50g pulp sample of all samples in the fire above 0.1ppm by the same method at the primary laboratory. Both the accuracy component (CRM's and umpire checks) and the precision component (duplicates and repeats) of the QAQC protocols are thought to demonstrate acceptable levels of accuracy and precision. QAQC protocols for Surface RC and diamond drilling by previous operators unknown, assumed to be industry standard.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	Significant intersections not verified.
	The use of twinned holes.	There are no purpose twinned holes.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	NSR data was hard keyed or copied into excel spreadsheets for transfer and storage in an access database, now replaced by SQL database and more automated data entry. Hard copies of NSR core assays and surveys are kept at head office. Visual checks are part of daily use of the data in Vulcan. Data from previous operators thoroughly vetted and imported to Access initially, now SQL database.
	Discuss any adjustment to assay data.	No adjustments are made to any assay data. First gold assay is utilised for any Resource estimation. Some minor adjustments have been made to overlapping data.
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.	NSR collar positions were surveyed using DGPS and were set-out and picked-up in MGA 1994 Zone 50 grid. This information is digitally transferred to the geology database. Multi shot cameras and gyro units were used for down-hole survey. Previous drilling has been set-out and picked up in both national and local grids using a combination of GPS and survey instruments and are assumed to be to NST standards.
	Specification of the grid system used.	MGA94 grid, zone 50
	Quality and adequacy of topographic control.	Topographic control is from the Fugro 2002 Aerial photo data and site surveyed pit pickups. Accuracy would be to 10cm within the pits.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing on the order of 20m by 10m in the shallow portions of the deposit. Up to 100m on the down plunge extents.
	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 Resource development drilling over the deposit was generally 20m x 20m or better for the indicated Resource and up to 50m x 50m for the inferred Resource. The data spacing and distribution is sufficient to establish geological and/or grade continuity appropriate for the Mineral Resource and classifications to be applied.
	Whether sample compositing has been applied.	Core is sampled to geology; sample compositing is not applied until the estimation stage. RC samples initially taken as 4m composites to be replaced by 1 m samples in mineralised zones though it is unknown at what grade threshold the 1m sub-samples were analysed for. Compositing of the data to 1m was used in the estimate.
Orientation of data in relation to	Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	The orientation of sampling is generally perpendicular to Zoe shear zone mineralisation and slightly oblique to the main sedimentary beds and mineralisation. Steep topography as also affected the orientation of drilling. The orientation achieves unbiased sampling of all possible mineralisation and the extent to which this is known.

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
geological structure	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 drill orientation to mineralised structures biases the number of samples per drill hole. It is not thought to make a material difference in the Resource estimation. As the opportunity arises better angled holes are infill drilled.
Sample security	The measures taken to ensure sample security.	All samples are selected, cut and bagged in tied numbered calico bags, grouped in larger tied plastic bags, and placed in large sample cages with a sample submission sheet. The cages are transported via freight truck to Perth, with consignment note and receipted by external and independent laboratory. All sample submissions are documented, and all assays are returned via email. Sample pulp splits are returned to NSR via return freight and stored in shelved containers at the Paulsens mine site. Pre NSR operator sample security assumed to be similar and adequate.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	There has been no audit of the sampling techniques, however all recent NST sample data has been extensively QAQC reviewed both internally and externally. Pre NSR data audits found to be light on in regard to QAQC though in line with industry standards of the time.

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.	M52/639 is wholly owned by NSR (Northern Star Resources Limited) and in good standing. There are no heritage issues with the current operation. Relationship with the traditional owners is good, though contact has become very limited. Several heritage surveys have been completed and there are no heritage issues with the current planned pit extents.
	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.	M52/639 was granted in 1996, renewed in 2018, now expiring on 27/05/2039.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Data relevant to this Resource was predominantly collected by SIPA who operated the Mt Olympus mine from start up to closure, previous to the NSR purchase. Gold mineralisation was discovered in 1988 by BP minerals. All previous work is accepted and assumed to industry standard at that time.
Geology	Deposit type, geological setting and style of mineralisation.	Mount Olympus is a medium grade, structurally controlled, sediment hosted epigenetic gold deposit. Mineralisation is hosted mainly by thick tensional quartz veins cross cutting bedding parallel shears.
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: 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.	Too many (692) holes to practically summarise all drill information used. (See diagram). The detail is available in the Dec 2012 Resource Report.
	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.	Exclusion of the drill information will not detract from the understanding of the report. Holes are close spaced and tightly constrained to an active mine area.
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.	Exploration results previously released.
	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.	Exploration results previously released.

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalents are reported.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	Exploration results previously released by NSR, do include an estimate of true thickness.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Due to complex mineralisation geometry and varying intercept angles the true thickness is manually estimated on a hole by hole basis.
	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').	Exploration results previously released with downhole depth and estimated true thickness.
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.	See long section in main release and previous ASX releases (18/2/2011, 27/9/11, 2/12/11, 6/3/12, 12/3/12,1/7/12, 26/7/12, 27/8/12, 10/9/12, 7/2/13). Plan view and long section view of Mt Olympus showing drill collars is attached.
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.	When previously reported by NSR, exploration results do include all intersections for the period / area.
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.	Exploration results not being released at this time.
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).	A program of 13,000m (both RC and Diamond) is currently on hold, primarily due to current gold price and focus on other projects. This drilling would aid a pit optimization, test for free milling (oxide) extensions, test deeper plunge extensions and test high grade underground targets. A Metallurgical test study is also currently on hold.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Part of main announcement.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	NSR (Northern Star Resources Limited) sampling and logging data is digitally entered into OCRISS then transferred to an SQL based database. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly to the database from lab, logging and survey derived files. Pre NSR data considered correct, has been maintained by SIPA company database administrators.
	Data validation procedures used.	Pre NSR data has been partially validated by internal database administrators.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The competent person for this Resource report has visited the site in 2012.
	If no site visits have been undertaken indicate why this is the case.	A site visit has been undertaken by the CP. The originator of this resource worked extensively on site between 2012 and 2013.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the deposit was carried out using a systematic approach to ensure continuity of the geology and estimated mineral Resource using Vulcan software. The confidence in the geological interpretation is high with all the information and 5 years of open pit operation.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drilling, oxidation surfaces, and underground style high grade ore zone interpretations.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations have been completed or put forward.
	The use of geology in guiding and controlling Mineral Resource estimation.	Drill core logging and pit development data used to create 3D constrained wireframes.

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Criteria	JORC Code explanation	Commentary
	The factors affecting continuity both of grade and geology.	Continuity of the grade closely follows sedimentary bedding planes, particularly the coarser grained units.
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.	Strike length = 800m (east – west); Width = 200m (North-south); Depth = surface to -90mRl (~500m below surface).
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.	Compositing of drill-hole samples was completed against one mineralised domain at 1m (downhole) intervals. The ordinary kriging interpolation (OK) method was used in the first 2 passes of the estimation. A final nearest neighbor method was used to fill empty blocks. 73% of blocks were estimated in the first 2 passes Maximum distance of extrapolation from data points was statistically determined and varies by domain Vulcan software was used for data compilation, domain wire framing, calculating and coding composite values and reporting. Block model volumes were compared to wireframe volumes to validate sub-blocking.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Reconciled historical production from open pit operations is comparable with new estimate.
	The assumptions made regarding recovery of by-products.	No assumptions are made and only gold is defined for estimation.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The parent block size is 10m (Y) x 10m (X) x 10m (Z), with sub-block to 1.25m x 1.25m x 1.25m. Average sample spacing is 20 by 20 or better for the main part of the Resource, up to 20m by 40m on the peripheries.
	Any assumptions behind modelling of selective mining units.	A 3m minimum mining width for both the surface and underground environment is assumed.
	Any assumptions about correlation between variables.	In the fresh material, there is a correlation between the Au grade and the bulk density measurement (see bulk density section).
	Description of how the geological interpretation was used to control the Resource estimates.	Mineralisation wireframes are created within the geological shapes based on drill core logs, mapping and grade. Low grades can form part of an ore wireframe. Estimations are constrained by the interpretations.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were determined by statistical techniques and vary by domain.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Block grades are assessed against drill hole data visually, by using swath plots and de-clustered means.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis. Moisture content within the ore is expected to be low.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	Reporting cut off = 0.7gpt. Modelling lower grade cut off = 0.5gpt nominally.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	The Resource has been created based on open pit and underground mining methods.
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	The metallurgical conditions and characteristics of the Mount Olympus mineralisation are generally known with free milling material mined by Sipa from within oxide zones. Fresh mineralisation is refractory in nature with its high pyrite content and fine gold at times locked within this matrix. Local areas of graphite rich mineralisation have in certain cases preg-robbing properties.

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
	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.	Initial test work has shown favorable results, more detailed studies are required. No Metallurgical assumptions have been built into the Resource model.
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 green fields 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.	Mt Olympus was a going concern and as such the previous practice have shown to be effective and practical.
Bulk density	Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.	The bulk density for oxide and transition material was assumed due to the low number of measurements within these zones.
	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.	A total of 4440 bulk density measurements from 30 diamond drill holes have been taken from mineralised and un-mineralised intervals within the project area.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Individual bulk densities are applied in accordance with specific geological units and weathering states. In fresh material, a correlation between the bulk density valve and gold assay grade exists and was used to assign bulk density values.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The Resource classification is based primarily on the geological and grade continuity as shown by drilling (open pit Grade control data not considered). If a wireframe has been constructed with geological or grade continuity, all block within the wireframe are assigned as inferred. Assignment of the indicated Resource category was done on each ore zone individually using a number of different criteria including: • continuity of both grade and geology; • drill holes' density; • number of passes to fill the blocks; and • Quality of the estimate (kriging efficiency). The halo (non-wireframed material) is assigned a Resource category of inferred if it is within the inferred wireframe and the block is filled in the first pass.
	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, quality, quantity and distribution of the data).	Input and geological data is assumed accurate backed up by previous successful mining operations.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	This mineral Resource estimate is considered representative with comments noted in the discussion below.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The Mineral Resource has been subjected to a review by Northern Star Resources' senior technical personal. The process and validation of Mineral Resource estimates was undertaken by an independent consultant from Optiro.
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.	This mineral Resource estimate is considered as robust and representative of the Mount Olympus mineralisation. The application of geostatistical methods has helped to increase the confidence of the model and quantify the relative accuracy of the Resource on a global scale.
	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.	This Resource report relates to the Mt Olympus and West Olympus ore zones and are likely to have local variability. The global assessment is more of a reflection of the average tonnes and grade estimate.

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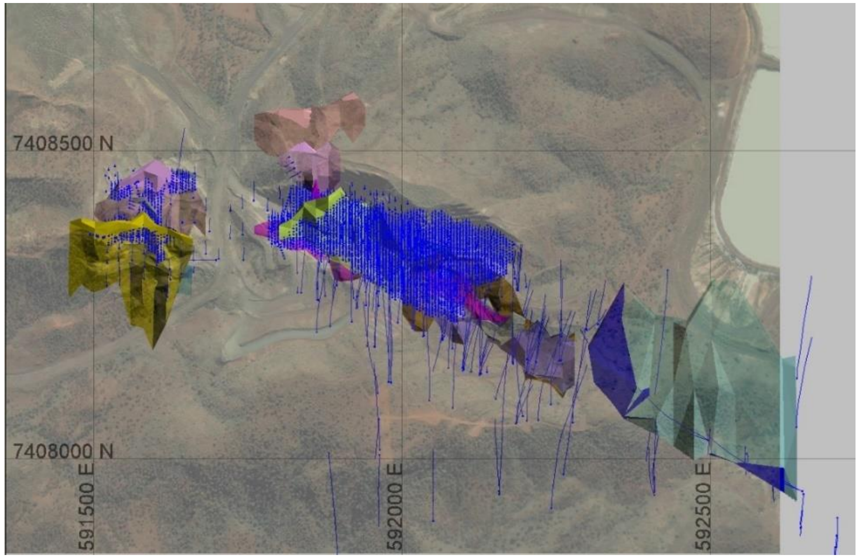
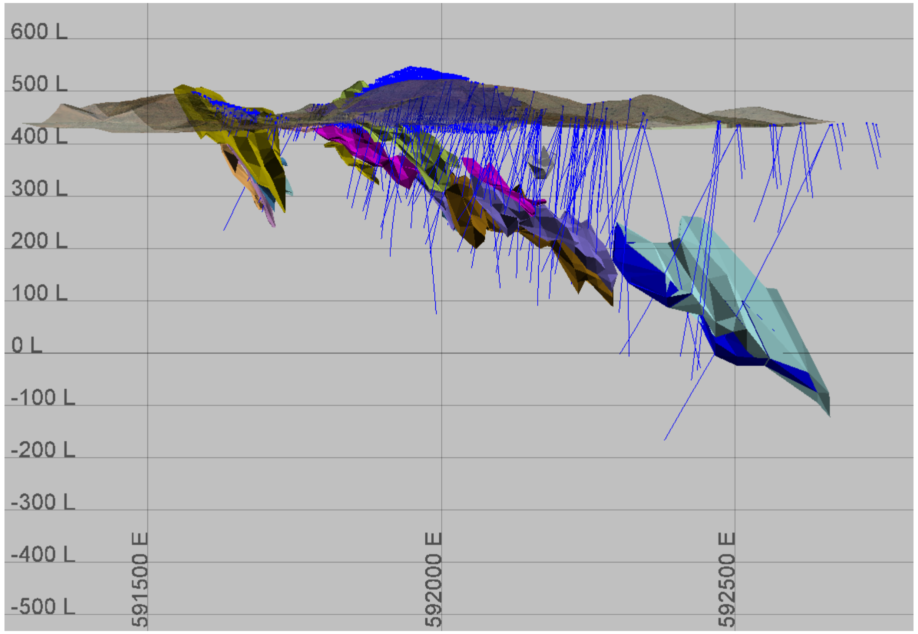
Criteria	JORC Code explanation	Commentary
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Reconciliation comparison between the previously mined Mount Olympus (including West Olympus) and the MTO_Resource_jan2013 block model is favourable with reported reconciled production of 2.5mt @3gpt for 242koz (Mining cut-off grade is variable but assumed to be 0.7gpt when mined for stockpiling). At 0.7gpt lower cut-off and 92% recovery the block model reports 2.8mt @ 3.0gpt for 243,000koz.

ASHBURTON MT OLYMPUS DEPOSIT - REPRESENTATIVE PLAN & LONG SECTION

Plan View – Mt Olympus deposit



Long Section View – Mt Olympus Deposit



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JORC Code, 2012 Edition – Table 1 Report

Ashburton - Peake Deposit - 30 June 2019

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.	This deposit is sampled by diamond drilling (DD) and Reverse Circulation (RC) drilling completed by NSR (Northern Star Resources Limited) and previous operators. NSR – DD - Sampled sections are generally NQ2. Core sample intervals are defined by the geologist to honour geological boundaries ranging from 0.3 to 1.5m in length. NSR - RC - Rig-mounted static cone splitter used with the aperture set to yield a primary sample of approximately 4kg for every metre (representing approximately one eighth of the total sample). Off-split retained. RC and DD sampling by previous operators to industry standard at that time often using 1m samples after initial 4m composites. It is unknown what grade threshold triggers the 1m re-samples.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Core is aligned and measured by tape, comparing back to down hole core blocks consistent with industry practice. RC and surface core drilling completed by previous operators to industry standard at that time (1988 initial discovery, to 2004).
	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 30g 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.	Diamond drilling completed to industry standard using varying sample lengths (0.3 to 1.5m) based on geological intervals, which are then crushed and pulverised to produce a ~200g pulp sub sample to use in the assay process. NSR diamond core samples are fire assayed (50g charge). Visible gold is occasionally encountered in core. RC sampling to industry standard at the time of drilling.
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 – Reverse circulation drilling is carried out using a face sampling hammer and a 5¼ inch diameter bit NSR surface diamond drilling carried out by using both HQ3 (triple tube) and NQ2 (standard tube) techniques. Sampled sections are generally NQ2. Core is orientated using the ORI-shot device.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	RC – Approximate recoveries are sometimes recorded as percentage ranges based on a visual and weight estimate of the sample. DD – Recoveries are recorded as a percentage calculated from measured core verses drilled intervals.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	NSR diamond drilling practice results in high recovery due to the competent nature of the ground. For RC drilling, efforts are made to ensure good recoveries are achieved by the use of auxiliary compressors and high-pressure booster units supplying compressed air at a high enough pressure to keep water from the hole and the samples dry in most circumstances. Where water is encountered in the pre-collar and wet samples result, more frequent cleaning of the cyclone and splitter is carried out and the hole is thoroughly flushed at the end of each sample. RC and diamond drilling by previous operators to industry standard at that time.
	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.	There is no known relationship between sample recovery and grade, diamond drill sample recovery is very high.
Logging	Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.	Core and chip samples have been logged by qualified Geologist to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies Percussion holes logging were carried out on a metre by metre basis and at time of drilling. Surface core and RC logging completed by previous operators assumed to be to industry standard.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging is Qualitative and Quantitative and all core is photographed both wet and dry (some older core is pre-digital, photos not all reviewed). Visual estimates of sulphide, quartz alteration as percentages Selected RC chip trays are archived.
	The total length and percentage of the relevant intersections logged.	100% of the drill core is logged. 100% of RC drilling is logged.

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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.	DD – Core is half cut with an Almonté diamond core saw. Sample intervals are defined by a qualified geologist to honour geological boundaries. The left half is archived. All major mineralised zones are sampled, plus associated visibly barren material, >5m of mineralised zones. Ideally, sample intervals are to be 1m in length, though range from 0.3m to 4.0m in length. Total weight of each sample generally does not exceed 5kg. Following drying at 105°C to constant mass, all samples below approximately 4kg are totally pulverised in LM5's to nominally 90% passing a 75µm screen. The very few samples generated above 4kg are crushed to <6mm and riffle split first prior to pulverisation. For RC drilling, duplicate samples are taken from the cone splitter at an incidence of 1 in 25 samples. Repeat analysis of pulp samples (for all sample types – diamond, RC, rock and soil) occurs at an incidence of 2 in 50 samples. No formal heterogeneity study has been carried out or nomograph plotted. An informal analysis suggests that the sampling protocol currently in use are appropriate to the mineralisation encountered and should provide representative results. All samples are oven-dried overnight (max 1200), jaw crushed to <6mm, and split to <3kg in a static riffle splitter. The coarse reject is then discarded. The remainder is pulverised in an LM5 to >85% passing 75µm (Tyler 200 mesh) and bagged. The analytical sample is further reduced to a 30gm charge weight using a spatula, and the pulp packet is stored awaiting collection by NSR. For older pre- NSR samples, best practice is assumed.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC - Rig-mounted static cone splitter used for dry samples. Pre NSR RC sub sampling assumed to be at industry standard at that time.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Following drying at 105°C to constant mass, all samples below approximately 4kg are totally pulverised in LM5's to nominally 90% passing a 75µm screen. The very few samples generated above 4kg are crushed to <6mm and riffle split first prior to pulverisation. No formal heterogeneity study has been carried out or nomograph plotted. An informal analysis suggests that the sampling protocol currently in use are appropriate to the mineralisation encountered and should provide representative results. For older pre- NSR samples, best practice is assumed.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	For RC drilling, duplicate samples are taken from the cone splitter at an incidence of 1 in 25 samples. Repeat analysis of pulp samples (for all sample types – diamond, RC, rock and soil) occurs at an incidence of 2 in 50 samples. For drill core the external labs coarse duplicates are used. RC drilling by previous operators to industry standard at the time. With new database protocol, older QAQC data is being retrieved but was not reviewed at the time of this report.
	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.	Field duplicates, i.e. other half of cut core, have not been routinely assayed. RC drilling by previous operators assumed to be to industry standard at that time.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Sample sizes are considered appropriate.
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.	For all NSR drill core samples, gold concentration is determined by fire assay using the lead collection technique with a 30-gram (or 50g depending on which lab was used) sample charge weight. An AAS finish is used, considered to be total gold. Various multi-element suites are analysed using a four-acid digest with an ICP-OES finish. RC drilling by previous operators to industry standard at the time and not reviewed for this Resource.
	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.	Not applicable to this report.
	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.	The QAQC protocols used include the following for all NSR drill samples: The field QAQC protocols used include the following for all drill samples: • Duplicate samples are taken from the cone splitter at an incidence of 1 in 25 samples, • Coarse blanks are inserted at an incidence of 1 in 30 samples,

APPENDIX B: TABLE 1

Criteria	JORC Code explanation	Commentary
		• Commercially prepared certified reference materials (CRM) are inserted at an incidence of 1 in 25 samples. The CRM used is not identifiable to the laboratory, • NSR's QAQC data is assessed on import to the database and reported monthly and yearly. The laboratory QAQC protocols used include the following for all drill samples: • Repeat analysis of pulp samples occurs at an incidence of 2 in 50 samples, • Screen tests (percentage of pulverised sample passing a 75µm mesh) are undertaken on 1 in 100 samples, • The laboratories own standards are loaded to the NST database, • The laboratory reports its own QAQC data on a quarterly basis. • In addition to the above, about 5% of samples are sent to an umpire laboratory. • Failed standards are followed up by re-assaying a second 50g pulp sample of all samples in the fire above 0.1ppm by the same method at the primary laboratory. Both the accuracy component (CRM's and umpire checks) and the precision component (duplicates and repeats) of the QAQC protocols are thought to demonstrate acceptable levels of accuracy and precision. QAQC protocols for Surface RC and diamond drilling by previous operators unknown, assumed to be industry standard.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	Significant intersections not verified.
	The use of twinned holes.	There are no purpose twinned holes.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	NSR data was hard keyed or copied into excel spreadsheets for transfer and storage in an access database, now replaced by SQL database and more automated data entry. Hard copies of NSR core assays and surveys are kept at head office. Visual checks are part of daily use of the data in Vulcan. Data from previous operators thoroughly vetted and imported to Access initially, now SQL database.
	Discuss any adjustment to assay data.	No adjustments are made to any assay data. First gold assay is utilised for any Resource estimation. Some minor adjustments have been made to overlapping data.
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.	NSR collar positions were surveyed using DGPS and were set-out and picked-up in MGA 1994 Zone 50 grid. This information is digitally transferred to the geology database. Multi shot cameras and gyro units were used for down-hole survey. Previous drilling has been set-out and picked up in both national and local grids using a combination of GPS and Survey instruments and are assumed to be to NST standards.
	Specification of the grid system used.	MGA94 grid, zone 50.
	Quality and adequacy of topographic control.	Topographic control is from the Fugro 2002 Aerial photo data and site surveyed pit pickups. Accuracy would be to 10cm within the pits.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing on the order of 20m by 20m in the shallow portions of the deposit. Up to 200m by 200m on the down plunge extents.
	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 spacing and distribution is sufficient to establish geological and/or grade continuity appropriate for the Mineral Resource and classifications to be applied.
	Whether sample compositing has been applied.	Core is sampled to geology; sample compositing is not applied until the estimation stage. RC samples initially taken as 4m composites to be replaced by 1 m samples in mineralised zones though it is unknown at what grade threshold the 1m sub-samples were analysed for. Compositing of the data to 1m was used in the estimate.
Orientation of data in relation to	Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	The orientation of sampling is generally perpendicular to mineralisation. Steep topography may also have affected the orientation of drilling. The orientation achieves unbiased sampling of all possible mineralisation and the extent to which this is known.

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Criteria	JORC Code explanation	Commentary
geological structure	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 drill orientation to mineralised structures biases the number of samples per drill hole. It is not thought to make a material difference in the Resource estimation. As the opportunity arises better angled holes are infill drilled.
Sample security	The measures taken to ensure sample security.	All samples are selected, cut and bagged in tied numbered calico bags, grouped in larger tied plastic bags, and placed in large sample cages with a sample submission sheet. The cages are transported via freight truck to Perth, with consignment note and receipted by external and independent laboratory All sample submissions are documented, and all assays are returned via email. Sample pulp splits are returned to NSR via return freight and stored in shelved containers at the Paulsens mine site Pre NSR operator sample security assumed to be similar and adequate.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	There has been no audit of the sampling techniques, however all recent NST sample data has been extensively QAQC reviewed both internally and externally. Pre NSR data audits found to be light on in regard to QAQC though in line with industry standards of the time

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.	M52/734 is wholly owned by NSR (Northern Star Resources Limited) and in good standing. There are no heritage issues with the current operation. Relationship with the traditional owners is good, though contact has become very limited. A new heritage survey will be required for further deep drilling and pit expansions.
	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.	M52/734 granted 9/5/2001 for 21 years.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Data relevant to this Resource was collected by Sipa who operated the Peake mine from start up to closure, previous to the NSR purchase. All previous work is accepted and assumed to industry standard at that time.
Geology	Deposit type, geological setting and style of mineralisation.	Peake is a medium grade, structurally controlled, sediment hosted epigenetic gold deposit. Mineralisation is hosted mainly within in a vertical, bedding parallel shear zone.
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: 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.	Too many (408) holes to practically summarise all drill information used. (See diagram). The detail is available in the Dec 2012 Resource Report.
	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.	Exclusion of the drill information will not detract from the understanding of the report. Holes are close spaced and tightly constrained to an active mine area.
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.	Exploration results previously released.
	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.	Exploration results previously released.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalents are reported.
	These relationships are particularly important in the reporting of Exploration Results:	Exploration results previously released by NSR, do include an estimate of true thickness.

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Criteria	JORC Code explanation	Commentary
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 hole angle to orientation of mineralisation is perpendicular to 45 degrees at most.
	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').	Exploration results previously released with downhole depth and estimated true thickness.
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.	See previous ASX releases (18/2/2011, 27/9/11, 2/12/11, 6/3/12, 12/3/12,1/7/12, 26/7/12, 27/8/12, 10/9/12, 7/2/13). Plan view and long section view of Peake area collars and all drill traces used is attached.
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.	When previously reported by NSR, exploration results do include all intersections for the period / area.
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.	Exploration results not being released at this time.
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).	A program of 11,000m (both RC and Diamond) is currently on hold, primarily due to current gold price and focus on other projects. This drilling would aid a pit optimization, test for free milling (oxide) extensions and test deeper plunge extensions A Metallurgical test study is also currently on hold.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Part of main announcement.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	NSR (Northern Star Resources Limited) sampling and logging data is digitally entered into OCRISS then transferred to an SQL based database. There are checks in place to avoid duplicate holes and sample numbers. Where possible, raw data is loaded directly to the database from lab, logging and survey derived files. Pre NSR data considered correct, has been maintained by Sipa company database administrators.
	Data validation procedures used.	Pre NSR data has been partially validated by internal database administrators.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The competent person for this Resource report has visited the site in 2012.
	If no site visits have been undertaken indicate why this is the case.	A site visit has been undertaken by the CP. The originator of this resource worked extensively on site between 2012 and 2013.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the deposit was carried out using a systematic approach to ensure continuity of the geology and estimated mineral Resource using Vulcan software. The confidence in the geological interpretation is high with all the information and several years of open pit operation.
	Nature of the data used and of any assumptions made.	All available geological data was used in the interpretation including mapping, drilling, oxidation surfaces, and underground style high grade ore zone interpretations.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations have been completed or put forward.
	The use of geology in guiding and controlling Mineral Resource estimation.	Drill core logging and pit development data used to create 3D constrained wireframes.
	The factors affecting continuity both of grade and geology.	Mineralisation is hosted within shallower south dipping siltstones of the Mount McGrath formation. Its true width is approximately 2 to 4 metres and is very continuous along strike. Mineralisation is easily identifiable in the pit as a strongly foliated pale cream siltstone that is carbonate, silica and sericite altered. The siltstone may contain ex-pyrite

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Criteria	JORC Code explanation	Commentary
		as well as primary sulphides at depth. Gold is generally found within stringers and veinlets of quartz within this zone. There is a sharp grade cut-off on the hangingwall side of the structure and it is marked by a change into a more hematite-rich siltstone. The grade boundary is more diffuse on the footwall side of mineralisation.
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.	Strike length = 1850m (east – west); Width = 5-10m (North-south); Depth = surface to 50mRL (~450m below surface).
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.	Compositing of drill-hole samples was completed against one mineralised domain at 1m (downhole) intervals. The ordinary kriging interpolation (OK) method was used in the first 2 passes of the estimation. A final nearest neighbor method was used to fill empty blocks. 99.3% of the blocks were filled in the first 2 passes. Maximum distance of extrapolation from data points was statistically determined and varies by domain Vulcan software was used for data compilation, domain wire framing, calculating and coding composite values and reporting. Block model volumes were compared to wireframe volumes to validate sub-blocking.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Reconciled historical production from open pit operations is comparable with new estimate
	The assumptions made regarding recovery of by-products.	No assumptions are made and only gold is defined for estimation.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The parent block size is 16m (Y) x 8m (X) x 8m (Z), with sub-block to 1m x 0.5m x 0.5m. Drill hole spacing varies from 5m to 200m. Average sample spacing is 40 by 40 or better for the main part of the Resource, up to 40m by 120m on the peripheries.
	Any assumptions behind modelling of selective mining units.	A 3m minimum mining width for both the surface and underground environment is assumed.
	Any assumptions about correlation between variables.	N/A.
	Description of how the geological interpretation was used to control the Resource estimates.	Mineralisation wireframes are created within the geological shapes based on drill core logs, mapping and grade. Low grades can form part of an ore wireframe. Estimations are constrained by the interpretations.
	Discussion of basis for using or not using grade cutting or capping.	Top cuts were determined by statistical techniques and vary by domain.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Three validation processes were used to compare the block model against drill-hole data, including visual, declustered means and Swath plots.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated on a dry basis. Moisture content within the ore is expected to be low.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	Reporting cut off = 0.9gpt. Modelling lower grade cut off = 0.5gpt nominally.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	It is assumed that the surface portion of the Resource will be mined via conventional surface mining techniques (diesel excavator and haul truck). Mining of the underground portion of the Resource has been assumed to be via conventional underground mining techniques.

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Criteria	JORC Code explanation	Commentary
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 conditions and characteristics of the Peake mineralisation are generally known with free milling material mined by Sipa from within oxide zones. Fresh mineralisation is refractory in nature with its high pyrite content and fine gold at times locked within this matrix. Initial test work has shown favorable results, more detailed studies are required. No Metallurgical assumptions have been built into the Resource model
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 green fields 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.	Peake was a going concern and as such the previous practice have shown to be effective and practical.
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.	Specific Gravity (SG) or Bulk Density measurement data were conducted on diamond core samples from the Peake deposit. A total of 898 Specific gravity measurements were taken from 12 NST drill core. The method used was the submersion technique as stated in procedure IMS-EXP_SWP_XXX Specific Gravity Procedure (see Appendix 4). Most the specific gravity measurements were conducted on fresh material. Fresh un-mineralised material was given SG of 2.95 given as a result of NST SG measurement at Peake and MT Olympus (similar geology). The average SG given to fresh mineralised material (inside ore wireframes) was 3.10. This is due to the increase in heavy sulphide minerals (pyrite). For transitional material, a conservative Specific Gravity measurement of 2.75 was used considering SG's from current data, previous Resource models and Mount Olympus which has similar geology. For oxide material, a conservative SG of 2.65 was given. This considers current data and previous Resource models and reconciled data from mining the open pit.
	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.	A total of 899 bulk density measurements from 12 recent diamond drill holes have been taken from mineralised and un-mineralised intervals within the project area.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Individual bulk densities are applied in accordance with specific geological units and weathering states.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	The Resource classification is based primarily on the geological and grade continuity as shown by drilling (open pit Grade control data not considered). If a wireframe has been constructed with geological or grade continuity, all block within the wireframe are assigned as inferred. Assignment of the indicated Resource category was done on each ore zone individually using several different criteria including. • continuity of both grade and geology. • drill holes' density. • number of passes to fill the blocks and • Quality of the estimate (kriging efficiency). The Halo (non-wire framed material) is assigned a Resource category of inferred if it is within the inferred wireframe and the block is filled in the first pass.
	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, quality, quantity and distribution of the data).	Input and geological data is assumed accurate backed up by previous successful mining operations
	Whether the result appropriately reflects the Competent Person's view of the deposit.	This Mineral Resource estimate is considered representative with comments noted in the discussion below.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The Mineral Resource has been subjected to a review by Northern Star Resources' senior technical personal. The process and validation of Mineral Resource estimates was undertaken by an independent consultant from Optiro.

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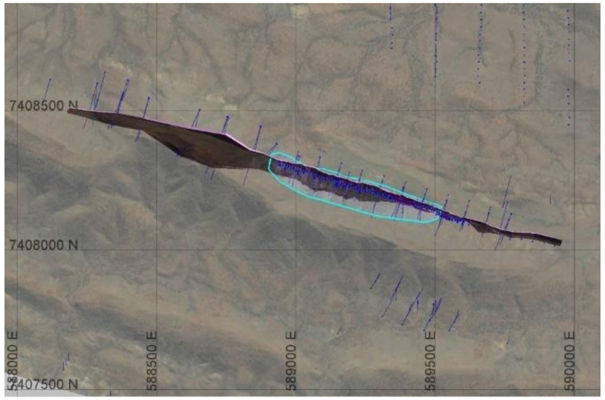
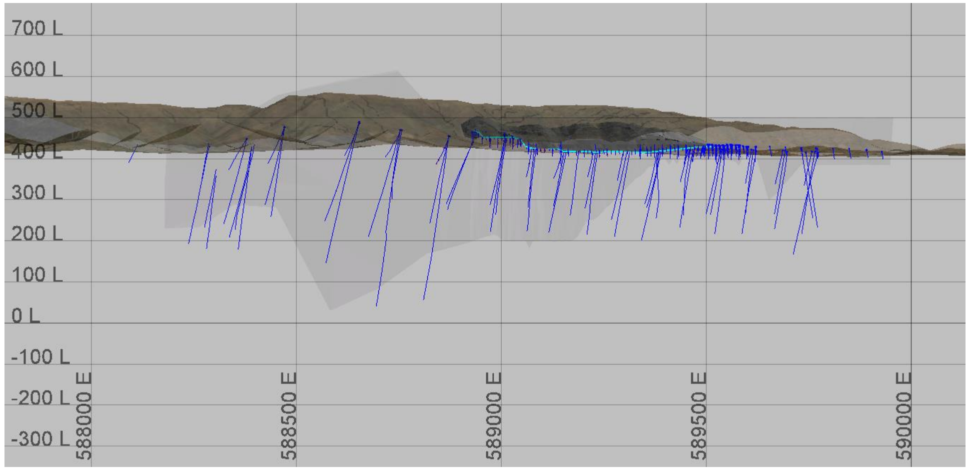
Criteria	JORC Code explanation	Commentary
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of 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.	This mineral Resource estimate is considered as robust and representative of the Peake mineralisation. The application of geostatistical methods has helped to increase the confidence of the model and quantify the relative accuracy of the Resource on a global scale.
	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.	This Resource report relates to the Peake ore zones and are likely to have local variability. The global assessment is more of a reflection of the average tonnes and grade estimate.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Reconciliation comparison between the previously mined Peake and this, Peake_Resource_final Mar_2013 block model is favourable with reported reconciled production of 0.08mt @ 7gpt for 15koz (Mining cut-off grade is variable but assumed to be 0.9gpt). At 0.9gpt lower cut-off and 92% recovery the block model reports 0.08mt @ 6.4gpt for 15.8koz.

PEAKE DEPOSIT - REPRESENTATIVE PLAN & LONG SECTION

Plan View – Peake deposit



Long Section View - 7408250N looking north – Peake with drillhole traces and mineralised domains. Grade contol holes shown, but not used for estimation. Current Peake pit extents shown in light blue.



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JORC Code, 2012 Edition – Table 1 Report

Central Tanami JV – 30 June 2019

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.	Sampling was completed using diamond (DD) core or reverse circulation (RC) drilling. Some drill-holes were pre-collared using RC drilling methods and completed with DD tails while others were drilled DD core from surface.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Diamond drilling used NQ2 sized core (minor HQ3 used). Drill core was oriented, aligned and half-cut using metre intervals and geologically determined intervals (min 0.3 metres) with geologically determined intervals taking precedence.
	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 30g 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.	Samples were dispatched to ALS Perth for preparation by drying, crushing to <6mm for samples <3kg (sample >3kg are crushed to 2mm then rotary split), and pulverising the entire sample to <75µm. Bulk pulp splits (300g) were then taken for fire assay purposes. Fire assay was conducted using a 50g charge and an AAS finish.
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 drilling used a 5.25" face sampling hammer drill bit. Diamond core (including tails) was NQ2 size and oriented where possible (using an in-line core orientation tool).
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	DD core recoveries are recorded as a percentage calculated from measured core versus drilled intervals length.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	The DD contractors adjusted their rate of drilling and method if recovery issues arose. All recovery was recorded by the drillers on core blocks. This was checked and compared to the measurements of the core by the geological team. Any issues were communicated back to the drilling contractor at the time and necessary adjustments made.
	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.	Overall DD recoveries were good. There has been no work completed to determine if any relationship between recovery and grade exists.
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.	DD core is logged by company geologists to industry standards. All relevant features such as lithology, structure, texture, grain-size, alteration, oxidation state, vein style and veining percentage per interval, and mineralisation were recorded in the geological logs.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	All logging was quantitative where possible and qualitative elsewhere. All DD core was photographed.
	The total length and percentage of the relevant intersections logged.	The entire length of each RC and DD hole was logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	DD core was cut in half using an Almonté diamond core saw. Half core was sampled on intervals between 0.3 - 1.1m in length honouring lithological boundaries. The right-hand side of the core was bagged as the primary sample for analysis. The remaining half of core was archived and stored for reference.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC samples were collected in plastic bags; primary samples were collected as 4m speared composites. Assay results of composite samples with gold grades over 0.5gpt were re-split from their respective 1m bulk sample using a 3-tier riffle splitter.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Sample preparation was conducted at ALS Perth. Samples were dried at less than 110°C to prevent sulphide breakdown. Samples were jaw crushed to a nominal -6mm particle size. If the sample weight is greater than 3kg, a Boyd crusher with rotary splitter is used to reduce the sample size to less than 3kg at a nominal <2mm particle size. The entire crushed sample (if less than 3kg) or sub-sample is then pulverised to 90% passing 75µm, using a Labtechnics LM5 bowl pulveriser. 300g pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Grind checks are performed at both the crushing stage (2mm) and pulverising stage (75µm), requiring 90% of material to pass through the relevant size.
	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.	The sample preparation is considered appropriate and to industry standard. No field duplicates were submitted for DD core sampling.

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Criteria	JORC Code explanation	Commentary
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Sample sizes are considered appropriate.
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.	A 50g fire assay charge is fired with an introduced lead flux and fired in a typical gas-fired furnace. The resultant "button" was then totally digested by Aqua Regia before using Atomic Absorption Spectroscopy (AAS) determination for gold.
	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.	No geophysical tools were used to determine any element concentrations.
	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 materials (CRMs) were inserted into the sample sequence at a rate of 1 per 20 samples to ensure correct calibration. Any values outside of 3 standard deviations were re-assayed with a new CRM. Certified blanks (Bunbury Basalt) were routinely inserted into the sample sequence at a rate of 1 per 25 samples and again specifically after potential or existing high-grade mineralisation to test for contamination. Failures of blanks above 0.1gpt were followed up and re-assayed. New pulps were prepared if failures continued.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	All significant intersections were verified by a Northern Star Senior geologist on-site during the drill-hole validation process and later by signed off by a Competent Person, as defined by JORC.
	The use of twinned holes.	No twinned holes were drilled for this data set.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Geological logging was directly entered into LogChief logging package, exported into an Access database on-site. Assay files are loaded directly into the Access database by the Senior on-site geologist. Hardcopy and electronic copies of the data was stored for future reference.
	Discuss any adjustment to assay data.	No adjustments were made to the assay data.
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.	Planned holes were pegged using a Differential GPS by company geologists and field assistants. The final hole collars were surveyed (by company geologist and field assistant) by Differential GPS in the MGA 94_52 grid. The accuracy of the DGPS was validated by an external surveyor using an ultra-accurate temporal multi-satellite corrected RTK jigger. Down-hole surveys were performed using a Reflex Ez-Trac or Ranger camera system, recording the down-hole dip and magnetic azimuth. These results were then uploaded into the Access database. At the completion of a hole, a surface referenced gyro survey was performed and upload into the Access database as well as being validated against single shot downhole surveys.
	Specification of the grid system used.	Collar coordinates were recorded in MGA94 Zone 52.
	Quality and adequacy of topographic control.	Topographic control was established through detailed aerial and ground survey control from previous mining operations.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill-hole spacing across the area varies, although minimum 25m spacing was targeted during the design and drilling phases.
	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 drill spacing and geological continuity is sufficient to classify this Resource as Indicated and Inferred.
	Whether sample compositing has been applied.	Samples are composited to 1m as part of the estimation process.
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 orientation of specific targets is typically well understood and the drilling direction is considered near perpendicular to the orientation of mineralisation.
	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.	No sampling bias is considered to have been introduced by the drilling orientation.
Sample security	The measures taken to ensure sample security.	Prior to laboratory submission, samples are stored by Northern Star Resources in a secure yard. Once submitted to the ALS laboratory, they are stored in a secure fenced compound and tracked through the assay process by established chain of custody procedure and via audit trails conducted by independent and company specialists.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	The NST database was reviewed internally and no material issues were identified.

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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.	All holes mentioned in this report are from the Groundrush deposit located within the ML22934 tenement which is owned by Tanami Gold NL (75%) and Northern Star Resources Limited (25%). There are statutory royalties' payable to the Northern Territory Government and a range of payment obligations under existing agreements with the Central Lands Council.
	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.	No known impediments exist and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The Groundrush area has been explored since the mid 1980's. Numerous companies, including Zapopan NL, Otter Gold NL, Normandy Mining Ltd, Newmont (Asia Pacific), and Tanami Gold NL have been active in the area. Previous drilling at this project adds gold grade and geological context to the subsequent Northern Star Resources interpretation of the area as tested by the drill holes covered by this report.
Geology	Deposit type, geological setting and style of mineralisation.	The Groundrush deposit is hosted by rocks of the Killi Formation exposed in a narrow N to NNW trending corridor flanked by lobes of the younger Frankenia Dome granite. Groundrush lies within rocks of a similar age to the host rocks of The Granites and Dead Bullock Soak gold deposits 100km to the south, but older than the Mount Charles Formation, which hosts the Tanami gold deposits 50km south west. Less than 1 km to the north of Groundrush, the Killi Killi beds are truncated by a fault bounded outlier of younger sediment of the Mount Charles Formation. At Groundrush, a package of relatively undeformed, steeply west dipping, sedimentary rocks are intruded by two tabular dolerite units which are broadly conformable with bedding. The main dolerite body exposed in the open pit consists of a coarser grained leucocratic quartz dolerite. Gold mineralisation is mainly hosted in quartz-sulphide veins and stockwork zones within steeply dipping shear zones in the quartz dolerite unit as well as flat dipping quartz-sulphide brittle fracture veins.
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: 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.	Exploration results not being reported.
	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.	Exploration results not being reported.
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.	Exploration results not being reported.
	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.	Mineralised intersections were composited to 1m with smaller intersects distributed throughout intersection. Top cuts were used and ranged from10-150gpt depending on the domain.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used in this Resource.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results:	Exploration results not being reported.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	The exact orientation of the Groundrush mineralised system is generally well understood. Geometry of the mineralisation to drill hole intercepts generally at a high angle, often nearing perpendicular. There is enough historic exploration and production data at Groundrush to infer geological continuity in mineralisation reported.
	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').	The downhole widths have been clearly specified when used.

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Criteria	JORC Code explanation	Commentary
Diagrams	Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	Appropriate plans and section have been included in this release.
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.	Both high and low grades have been reported accurately, clearly identified with the drill-hole attributes and 'From' and 'To' depths. All intercepts for all holes have been reported regardless of grade.
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.	Bulk density were conducted on every fifth hole throughout the waste and mineralised zones.
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).	Drilling is continuing in 2016 to determine the extents of the Groundrush system.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Appropriate diagrams accompany this release.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.	Logging data is entered directly into the logging package Logchief. Constrained look-up lists, depth and some interval validation are inbuilt and ensure that the data collected is correct at source. Data was exported as .csv and imported into a "restricted access" Access database. Sampling and raw assay files were directly imported into a "restricted access" Access database, with internal validations and QAQC protocols used to check integrity. Pre-NSR data assumed correct but no validation has been undertaken. For all data, the drilling looked reliable visually and no overlapping intervals were noted.
	Data validation procedures used.	NST data validated by internal protocols within the access database and by database administrators. Pre-NSR data has been validated by previous owners and is assumed to be correct. One hole was excluded due to unrepresentative intercept angle.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The CP has visited this site and found all as expected
	If no site visits have been undertaken indicate why this is the case.	Site visited
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The interpretation of the deposit was carried out using a systematic approach to ensure continuity of the geology by the supervising and logging geologists. Sectional interpretations were digitized in Vulcan software and triangulated to form three dimensional solids. Confidence in the geological interpretation is moderate to high. Weathering zones and bedrock sub surfaces were also created.
	Nature of the data used and of any assumptions made.	All available valid data was used including drill data, mapping, and previous interpretations. NSR drilled 118 of the 778 holes used in the current Resource. Where pre-NSR drill data was used, it is assumed correct and to industry standards of the time.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	A previous Resource used narrow, high grade interpretations based on the structural data. While those narrow structures do exist, it is evident from the infill grade control, pit mapping and continues drilling that the narrow structures form larger cohesive units. The effect of the broader interpretation approach results in lower grade, higher tonnes and a realistic model to be used for economic studies.
	The use of geology in guiding and controlling Mineral Resource estimation.	Geology is used to constrain the mineralised packages (containing variously orientated quartz veins) within the Groundrush dolerite host.
	The factors affecting continuity both of grade and geology.	Grade continuity is related to mineralised packages extent within Groundrush dolerite host.

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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.	Maximum Strike Length = 1,650m with individual zones 50 to 1,100m long; Maximum Width = 80m with zones 2 to 35m thick; Maximum Depth = from surface to ~680m below surface.
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.	Ordinary Kriging (OK) was used to estimate this Resource using Vulcan 9.1 software. Domains are snapped to drilling and composited to 1m downhole. Small composites were merged throughout intersection. Four statistical domains were used to reflect the different orientations of mineralisation packages. A maximum search range from 18 - 220m (all directions and passes) was used in the mineralised packages.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	The modelling techniques were compared to a Mineral Resource was estimated in 2012 that reported all material greater than 1gpt and previous open pit production records.
	The assumptions made regarding recovery of by-products.	No assumptions of by product recovery are made.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	No deleterious elements estimated in the model.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	Block size is 4m x 12m x 4m, sub-celled down to 0.5m x 1.5m x 0.5m to fit estimation domains. Average drill hole spacing is ~ 25-50m. Four search ellipses were used over four passes with a minimum of 15 samples to estimate per block (1st Pass) with a maximum of 32. Subsequent pasts used fewer numbers of samples (8) and maximum search range was increased (3rd Pass). Waste was assigned a valve of 0.005gpt.
	Any assumptions behind modelling of selective mining units.	No assumptions made.
	Any assumptions about correlation between variables.	No assumptions made.
	Description of how the geological interpretation was used to control the Resource estimates.	Mineralisation wireframes are created within the geological shapes based on drill core logs, mapping and grade. Low grades can form part of an ore wireframe.
	Discussion of basis for using or not using grade cutting or capping.	Composite grades were cut to between 10 – 150gpt based on log distribution on individual domains.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Block grades were compared visually to drilling data. Validation is also through swath plots comparing composites to block model grades, along northings comparing OK to ID2 to nearest neighbour estimations. All compared favourable.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated with natural moisture. Moisture content within the ore is expected to vary through the oxide to fresh. Minimal voids reported within all rock types. Water table at approximately 60m below surface.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	Reporting cut off = 1.0gpt.
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	It is assumed Groundrush will be mined by either open pit and/or underground mining methods, and scoping level evaluations support the economics. Below the economic pit depth, grades are high enough to potentially be mined by underground methods. Assume nearby CTP mill will be refurbished for processing.
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.	No metallurgical holes were drilled as a part of the current drilling program. Metallurgical test work from previous owners and previous production data indicate that the mineralisation is free milling with high (90%+) gold recovery using standard CIL processing.

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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 green fields 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.	No environmental, permitting, legal, taxation, socio-economic, marketing or other relevant issues are known, that may affect the estimate.
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 densities are based on 845 samples from 20 DD holes. Measurements were taken using the immersion method and related back to dominant rock code. This validated previously reported bulk density measurements and assumptions.
	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.	Bulk density of the host rock and mineralisation is well covered and validates previous bulk density work.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Individual bulk densities are applied to geological units.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification is based on drill spacing and passes used to delineate Inferred and Indicated Mineral Resource.
	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, quality, quantity and distribution of the data).	Confidence in the relative tonnage and grade is moderate to high based on interpretation continuity which will be confirmed by future infill drilling. Pre-NSR data was audited previously and is assumed to be reliable.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The result appropriately reflects the Competent Person(s)' view of the deposit.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	This Groundrush Mineral Resource has been internally and externally reviewed. A number of recommendations highlighted during the processes were implemented as required.
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.	This Groundrush Mineral Resource estimate is considered as robust and representative. The application of geostatistical methods has increased the confidence of the model and quantify the relative accuracy of the Resource on a global scale. It relies on historical data being of similar standard as recent infill drilling. The relevant tonnages and grade are variable on a local scale.
	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.	This Resource report relates to the Groundrush Gold Project where it is likely to have local variability. The global assessment is more of a reflection of the average tonnes and grade estimate.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Historic production from the Groundrush pit has been recorded as 4.2Mt @ 4.5gpt for 611koz. Comparison with current Resource shows similar results (4.4Mt @ 4.2gpt for 600koz @ 0.8gpt cut-off). Certainly, on a global scale this compares favourably.

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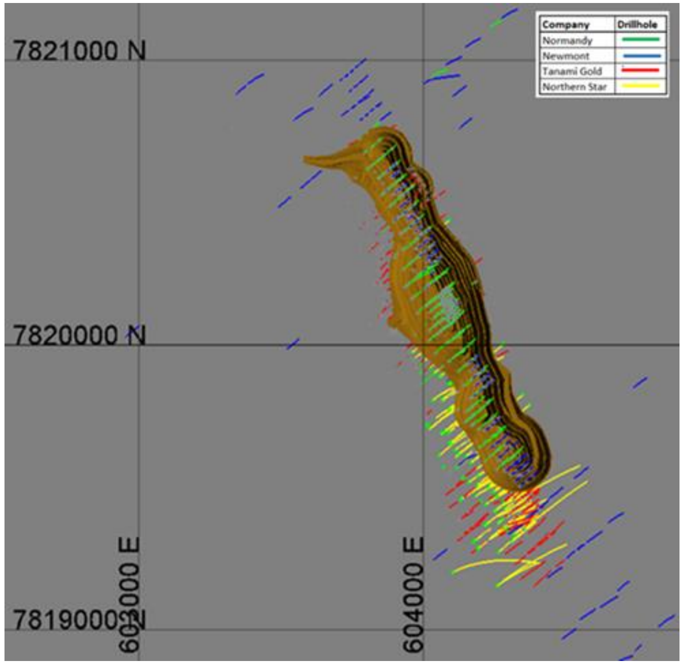
CENTRAL TANAMI - REPRESENTATIVE PLAN & OBLIQUE VIEW (GROUNDRUSH DEPOSIT)

Plan View – Groundrush deposit



Oblique View - Groundrush deposit with drill hole traces. Wireframes denote major mineralised structures and open pit.