NORTHERN STAR
RESOURCES LIMITED

Resources and Reserves, Production and Cost Guidance Update (ex-KCGM)
13 August 2020

PRODUCTION SET TO INCREASE 30% OVER NEXT TWO YEARS AND COSTS TO FALL 10%

FY21 production guidance (ex-KCGM) is 720koz-820koz; Production (ex-KCGM) is forecast to rise to ~900koz in FY22 and ~1Moz in FY23, driving down AISC by 10%; Resources increase by 3.2Moz, underwriting longer mine lives and increased cashflow

HIGHLIGHTS

Resources at June 30, 2020

- Group Resources increased by 3.2Moz to 22.3Moz (after depletion of 912,000oz and acquisition of Bronzewing Project); Resources per share have grown by +120% over the past five years (ex-KCGM)
- Importantly, Measured and Indicated Resources increased 29% to 13.8Moz; This underpins continued replacement of Reserves in coming years
- Increased inventory will underpin further organic production growth, longer mine lives and cashflow
- Resources breakdown:
  - Pogo up 13% to 6.7Moz at 9.8gpt; This is the largest Resource in Pogo's history
  - Jundee up 16% to 5.3Moz, with a further 1.6Moz at Bronzewing to be included as part of the Yandal Operations
  - Kalgoorlie Operations at 6.8Moz
    - Kanowna up 16% to 2.2Moz, 100% Kundana at 1.2Moz, 51% Kundana at 1.0Moz, South Kalgoorlie at 1.9Moz
- In FY20, NST acquired the 1.6Moz Bronzewing Project and agreed to divest the 1.6Moz Mt Olympus Project

Reserves at June 30, 2020

- Group Reserves increased 12%, or 600,000oz, to 6Moz (after depletion of 912,000oz); Reserves per share have grown by 180% over the past five years (despite production of 3.6Moz)
- Reserves are calculated conservatively using an assumed gold price of A$1,750/oz and US$1,350/oz compared with the current spot price of ~A$2,700/oz (US$1,940/oz)*
- Reserves breakdown:
  - Jundee up 25% to 2Moz (despite depletion of 379,500oz), with a further 800,000oz at Bronzewing to be included as part of the now consolidated Yandal Operations
  - Pogo Reserve of 1.5Moz (despite depletion of 200,700oz), grade up 7% to 8gpt, despite only drilling 62% of budgeted drill metres due to COVID-19 restrictions
  - Kalgoorlie reduced 25% to 1.6Moz (after depletion of 330,200oz); New estimate reflects a significant reduction in the Raleigh Reserve and a higher cost base used in the calculations
    - Kanowna at 700koz, 100% Kundana at 300koz, 51% Kundana at 400koz and South Kalgoorlie at 200koz
- Considerable opportunity to further grow Reserves with conversion of the +22Moz Resource base

Guidance

- FY21 production guidance for Australian operations (ex-KCGM) is 540,000-600,000oz at AISC of A$1,425-A$1,525/oz (US$1,025-US$1,096/oz)
  - Jundee Operations 270,000-300,000oz at A$1,200-A$1,275/oz (US$863-US$917/oz)
  - Kalgoorlie Operations 270,000-300,000oz at A$1,650-A$1,750/oz (US$1,186-US$1,258/oz)
- FY21 production guidance for Pogo is 180,000-220,000oz at AISC of US$1,200-US$1,400/oz; Guidance takes into account the impact of COVID-19 on operational restrictions
- FY21 expansionary capital budget of A$99M, comprising:
  - A$50M (US$35M) at Pogo, with most of this applied to increasing processing capacity to 1.3Mtpa
  - A$37M at Jundee, predominantly for surface infrastructure upgrades and bringing on new production areas
  - A$12M at Kalgoorlie Operations for capital works

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RESOURCES AND RESERVES, PRODUCTION AND COST GUIDANCE UPDATE (EX-KCGM)

Exploration and Production Growth

- **A$95M is budgeted for exploration in FY21 as part of the strategy for ongoing growth in production, mine lives and cashflow; Includes; Pogo A$21M, Jundee A$28M, Kalgoorlie $A35M, Regional A$11M**
- **The acquired Bronzewing Project will be merged with Jundee and re-named Yandal Operations; This expanded operation will benefit from operational synergies and significant growth opportunities**
- **Yandal Operations combined Reserve stands at 2.8Moz and Resource at 6.9Moz which has the potential to underpin a production profile of ~400,000ozpa in the next 2-3 years**
- **Northern Star's total production (ex-KCGM) forecast to rise to ~900,000oz in FY22 and ~1Moz in FY23; AISC forecast to fall by 10% to ~<US$1,000/oz due mainly to the increased production base**
- **In FY22, the additional capital required to achieve the 1Mozpa run rate is only A$175M, Non-sustaining capital drops away significantly after then**
- **~1Mozpa (ex-KCGM) can be comfortably maintained for at least seven years as evidenced by the current Reserves/Resources and significant exploration potential within the portfolio**

Northern Star Resources (ASX: NST) is pleased to advise that it is set to generate significant increases in production, cashflow and mine lives over the next two years.

The Company's strong growth outlook stems from its exploration success and accretive acquisitions and will require relatively limited capital expenditure.

The forecast increases in production are expected to deliver lower all-in sustaining costs, further strengthening cashflow generation.

This combination means Northern Star expects to extend its record of generating superior financial returns while at the same time achieving greater scale and longer mine lives exclusively in Tier-1 locations.

Northern Star Executive Chair Bill Beament said the Company was poised to achieve a new level of sustainable production.

"We are entering the next chapter of growth on all levels of our business," Mr Beament said. "The cornerstone of this strong outlook is our exploration success, which has seen Resources increase by 3.2Moz in the past year to 22.3Moz and Reserves rise by 12 per cent to 6Moz (excluding KCGM).

"This outstanding result includes a 25 per cent increase in Reserves at Jundee, taking that total to 2Moz. We also have a further 800,000oz of Reserves at the nearby Bronzewing Project.

"By combining Jundee and Bronzewing into the unified Yandal Operations, we will unlock substantial synergies and growth opportunities, paving the way for this to become a 400,000ozpa production centre in the next two to three years.

"At Pogo, the exploration results being generated despite the impacts of COVID-19 are testimony to the world-class nature of this geological system and provide further evidence of what could be achieved in a normalised environment.

"Despite a limited drilling program, Pogo's Resources still rose 13 per cent to 6.7Moz at 9.8gpt, giving Pogo the largest inventory in its history and positioning the project for further increases in production, mine life and cashflow."

Mr Beament said that with the increased inventory under its belt, Northern Star was now embarking on its next round of growth in production and cashflow.

"Over the next two years, our annual production rate will rise by 30 per cent to 1Moz (excluding KCGM)," he said. "All of this production will be in Tier-1 locations, all the growth will come from existing assets and leverage existing infrastructure and the increased output will drive down all-in sustaining costs.

"In FY22, the additional capital expenditure required to deliver this growth is just A$175 million.

"This is the recipe which has enabled Northern Star to generate some of the highest returns on capital on the ASX over the past 10 years and it will enable us to maintain these superior returns into the future.

RESOURCES AND RESERVES, PRODUCTION AND COST GUIDANCE UPDATE (EX-KCGM)

"This outlook is particularly enticing given that our inventory and exploration potential shows we can maintain a ~1Moz production profile (excluding KCGM) for at least seven years."

Mineral Resource and Reserve Summary

FY2020 Group Mineral Resource Estimate is 190 million tonnes at 3.7gpt Au for 22.3 million ounces.

Resources for the Australian operations were calculated using an assumed gold price of A$2,250/oz. The Resources for the US Pogo operation were calculated using an assumed gold price of US$1,500/oz.

FY2020 Group Mineral Reserve Estimate is 54 million tonnes at 3.5gpt Au for 6.0 million ounces.

Reserves for the Australian operations were calculated using an assumed gold price of A$1,750/oz. Reserves for the US Pogo operation were calculated using an assumed gold price of US$1,350/oz.

These figures, which are estimated at 30 June 2020, represent JORC 2012 combined Resources and Reserves for the assets owned by Northern Star.

MINERAL RESOURCES as at 30 June 2020

	MEASURED			INDICATED			INFERRED			TOTAL RESOURCES		
	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)
NST ATTRIBUTABLE INCLUSIVE OF RESERVE												
NORTHERN STAR TOTAL	16,935	2.9	1,581	102,496	3.7	12,214	67,143	3.9	8,461	186,574	3.7	22,256

ORE RESERVES as at 30 June 2020

	PROVED			PROBABLE			TOTAL 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)
NST ATTRIBUTABLE INCLUSIVE OF RESERVE									
NORTHERN STAR TOTAL	10,889	2.5	869	43,032	3.7	5,135	53,921	3.5	6,004

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

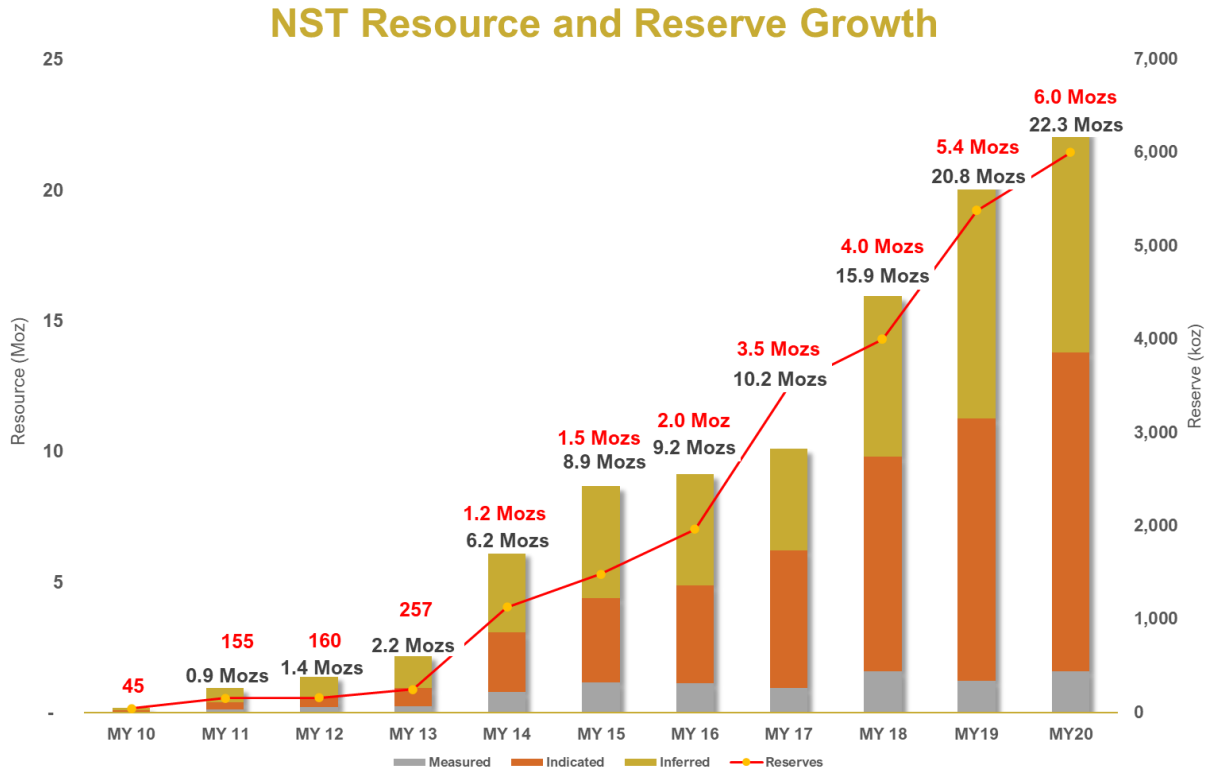
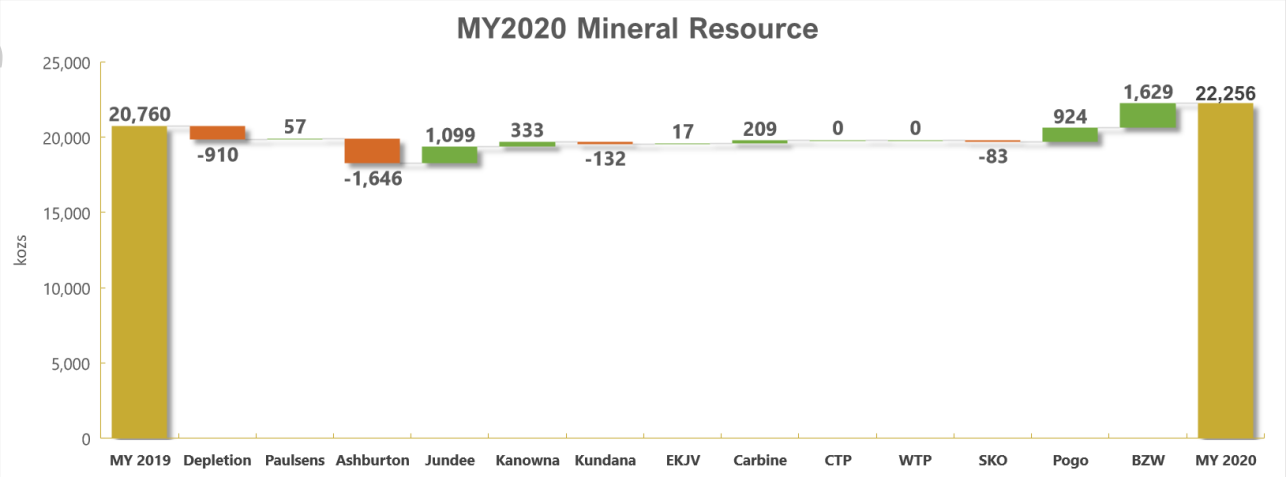


Figure 1 – Sustained Resource and Reserve growth over ten years

RESOURCES AND RESERVES, PRODUCTION AND COST GUIDANCE UPDATE (EX-KCGM)



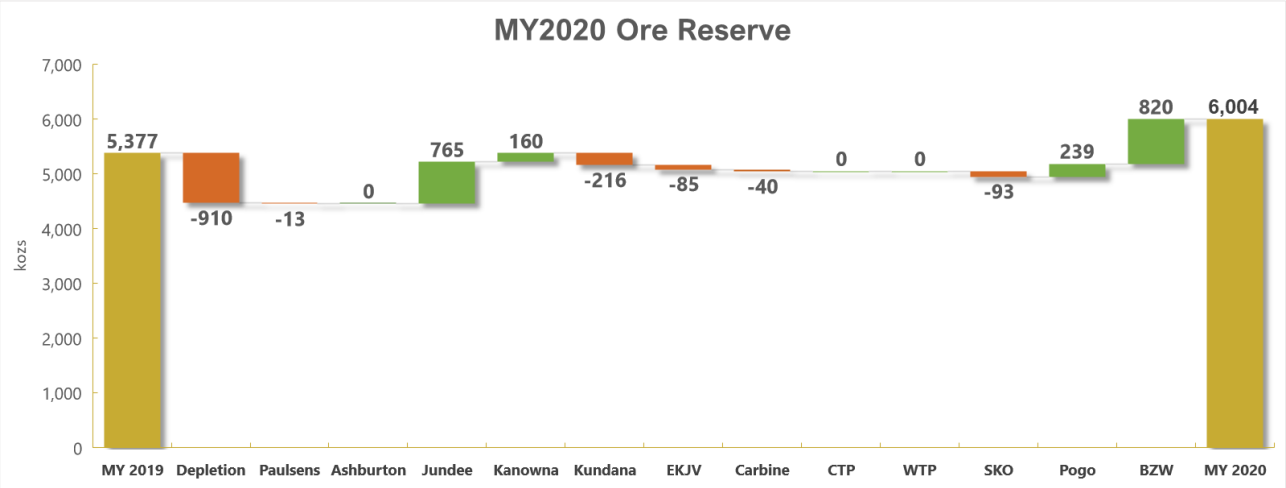


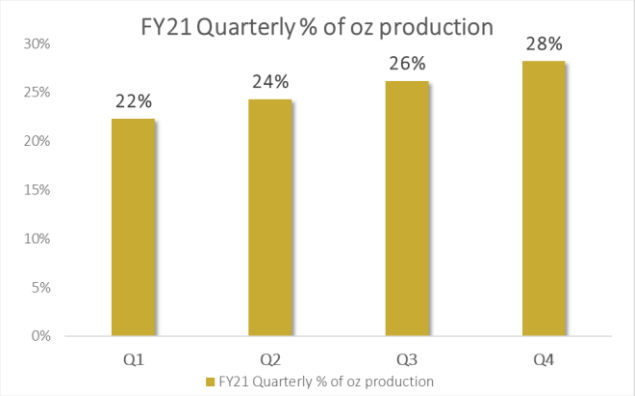
Figure 2 – Key movements, MY20 vs MY19 Mineral Resources and Ore Reserves

FY2021 Production and Cost Guidance

FY21	Production		AISC	
Guidance Range	Oz	Oz	A$/oz	A$/oz
Yandal/Jundee Operations	270,000	300,000	1,200	1,275
Kalgoorlie Operations	270,000	300,000	1,650	1,750
Total Australian Operations	540,000	600,000	1,425	1,525
Guidance Range	Oz	Oz	US$/oz	US$/oz
Pogo Operations (US)	180,000	220,000	1,200	1,400

RESOURCES AND RESERVES, PRODUCTION AND COST GUIDANCE UPDATE (EX-KCGM)

The indicative quarterly guidance profile as a percentage of annual production can be seen in the graph below.



FY21 and FY22 Expansionary Capital

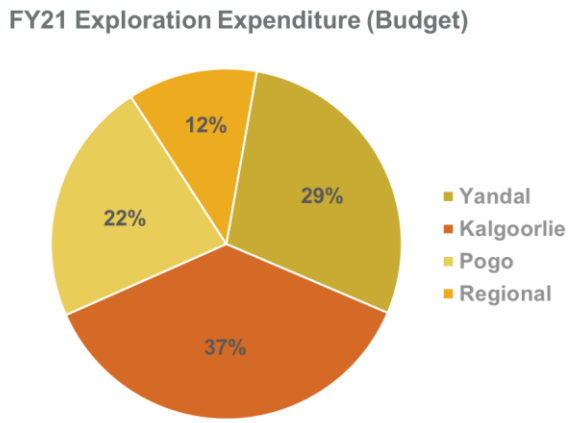
In FY21, an expansionary capital budget of A$99M has been approved to unlock substantial organic growth opportunities at the operations including:

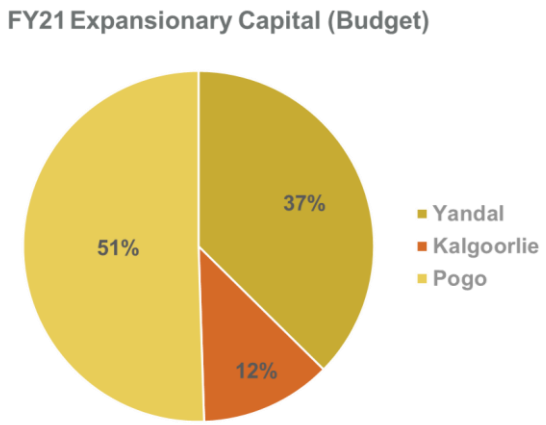
- A$37M at Yandal /Jundee, with A$16M committed to surface infrastructure upgrades including a thickener for the processing plant to decrease water usage per tonne processed and A$21M to brings new areas online including underground development and the Julius open pit.
- A$12M at Kalgoorlie Operations for capital works.
- A$50M (US$35M) at Pogo, with A$42M (US$29M) committed to improving processing & support infrastructure to lift capacity to 1.3Mtpa, as well as A$8M (US$6M) for capital works.

Growth Capital	FY21	FY22
Yandal/Jundee Operations	A$37M	A$120M
Kalgoorlie Operations	A$12M	A$25M
Pogo Operations	A$50M	A$30M
Total Estimated Capital Works	A$99M	A$175M

Exploration

A$95M is budgeted for exploration in FY21 as part of its strategy for ongoing growth in production, mine lives and cashflow. Major areas include Pogo A$21M, Jundee A$28M, Kalgoorlie Operations A$35M, and Regional A$11M.





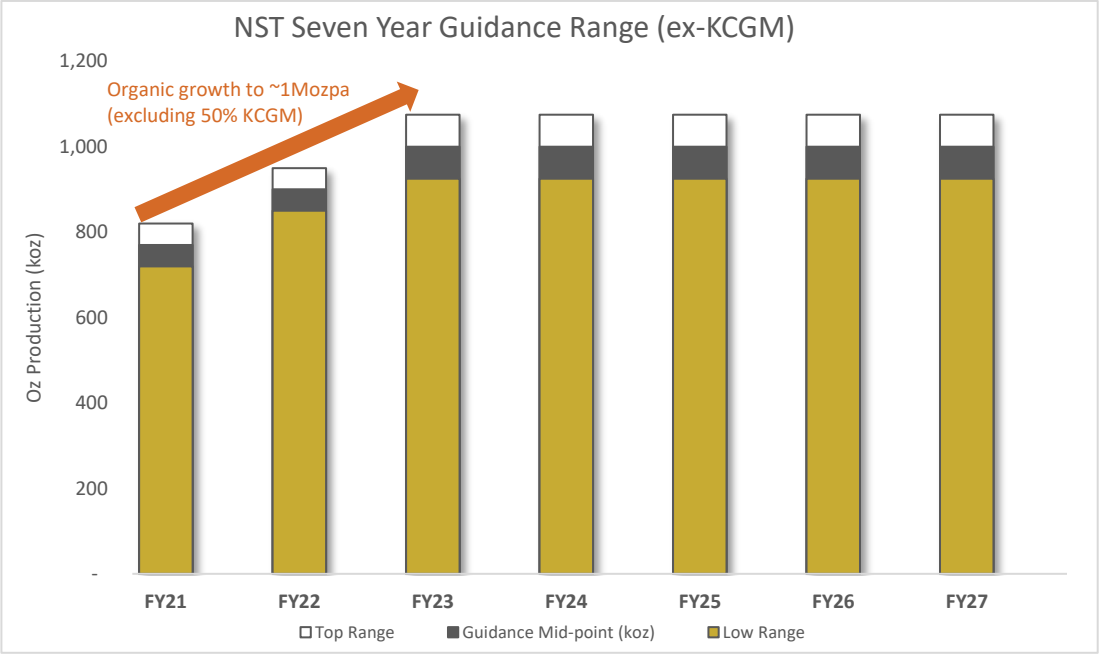
RESOURCES AND RESERVES, PRODUCTION AND COST GUIDANCE UPDATE (EX-KCGM)

Production Growth Outlook Next 7 Years

The significant growth in Reserves and Resources has enabled the Company to forecast the next 7 years of production.

FY21 production guidance is 720,000oz-820,000oz. Production is forecast to rise to ~900,000oz in FY22 and then expand again to ~1Moz in FY23. This production rate will be maintained for at least another 5 years beyond then.

The higher production rates are forecast to drive down AISC by 10%.



Guidance Range (koz)	FY21		FY22		FY23		FY24	FY25	FY26	FY27
	Low	High	Low	High	Low	High	Mid	Mid	Mid	Mid
Yandal/Jundee Operations	270	300	330	350	375	425	400	400	400	400
Pogo Operations	180	220	250	300	275	325	300	300	300	300
Kalgoorlie Operations	270	300	270	300	275	325	300	300	300	300
NST Total	720	820	850	950	925	1,075	1,000	1,000	1,000	1,000

Technical Asset Overview

Yandal Gold Operations

The recently acquired Echo Resources Bronzewing Project will be merged with the Jundee Mine and re-named the Yandal Operations. This expanded operation will benefit from operational synergies and significant growth opportunities.

Bronzewing delivers significant continuous tenure in the form of ~170km of the prolific Yandal greenstone gold belt. Jundee mine, with 2.7Mtpa of processing infrastructure, is in the north and the Bronzewing Project, with 1.8Mtpa of processing capacity (on care and maintenance) sits in the south of the belt.

The Bronzewing Project adds Resources of 1.6Moz and Reserves of 820,000oz and when combined with Jundee, takes Resources at the Yandal Operations to 6.9Moz and Reserves to 2.8Moz. This inventory has the potential to support a production profile of ~400,000oz per annum.

RESOURCES AND RESERVES, PRODUCTION AND COST GUIDANCE UPDATE (EX-KCGM)

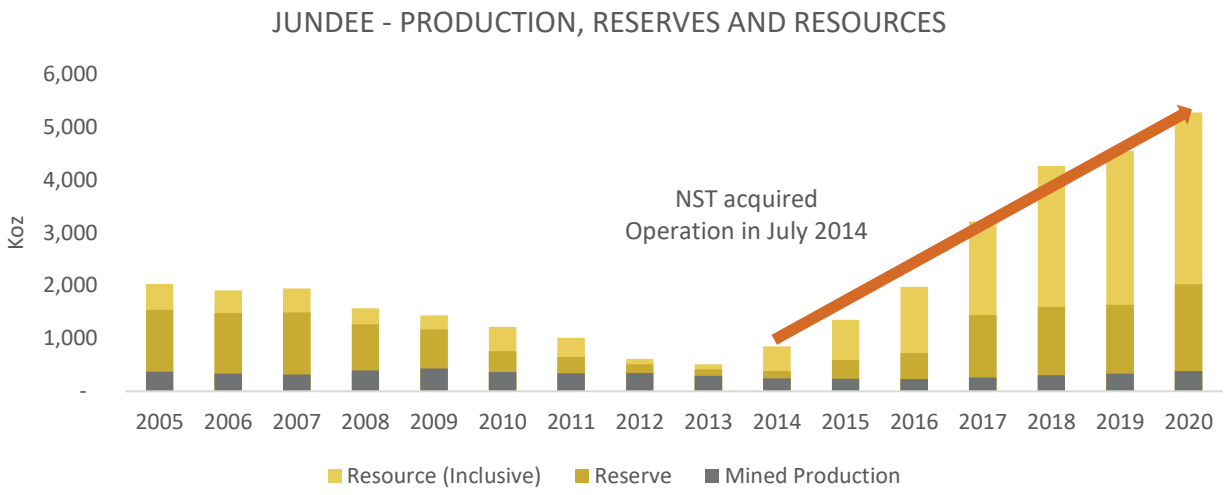
Yandal - Jundee Mine

Jundee Resources up 16% to 5.3Moz (after depletion of 379,500oz);

- Underground Resources are 4.8Moz, an increase of 600,000oz
- Surface/Open Pit Resources are steady at 400,000oz

Jundee Reserves up 25% to 2.0Moz (after depletion of 379,500oz);

- Underground Reserves are 1.9Moz
- Surface/Open Pit Reserves are stable at 100,000oz



Yandal – Bronzewing Project

Bronzewing Surface/Open Pit Resources are 1.6Moz

Bronzewing Surface/Open Pit Reserves are 800,000oz

Studies have advanced the options for bringing the Bronzewing Project into commercial production at the rate of ~100,000ozpa using the Orelia Pit as the primary ore source. The allocated capital for this organic growth is A$100 million in FY22. This would take the Yandal Operations to ~400,000ozpa inclusive of Jundee operations in the next two to three years.

Further evaluation will continue in FY21 to determine if the expansion of Jundee Processing Centre is a more efficient use of capital than refurbishing the 1.8Mtpa Bronzewing Plant. There are advantages in utilising the network of haul roads and world class infrastructure at Jundee to enable this organic growth and access the multiple opportunities of defined Reserves and Resources along the Yandal belt.

An upgrade of the Jundee plant capacity would also deliver significant cost-per-tonne savings across the whole operation.

Pogo Gold Operations

Pogo Resources up 13% to 6.7Moz at 9.8gpt (after depletion of 200,700oz);

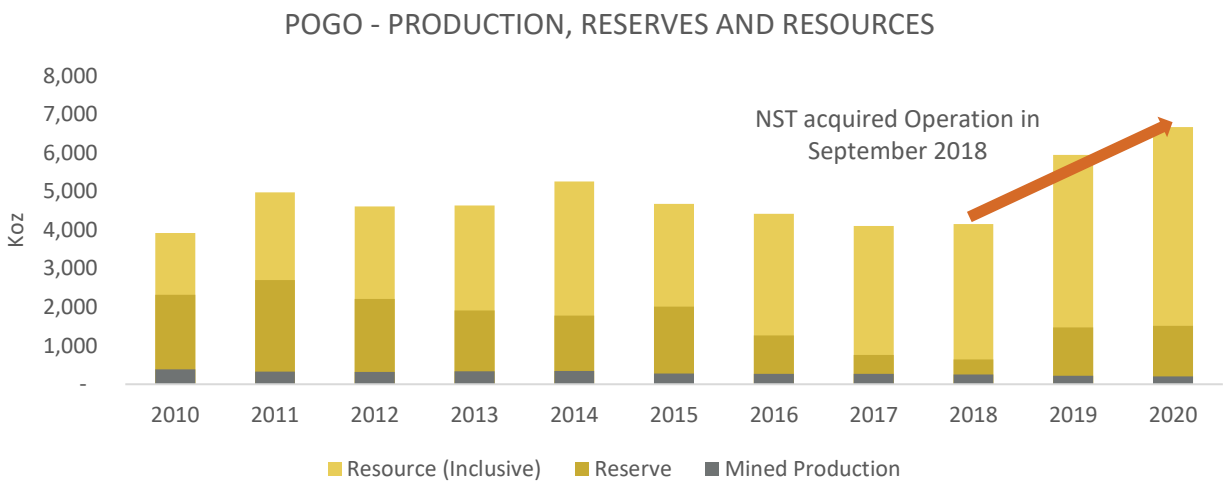
- Due to COVID-19 impacts, only 62% of the budgeted drilling was achieved in FY20. There is significant potential for further Resource growth with drilling
- The adjacent Goodpaster project initial Resource drill out will commence in FY21. Up to A$20 million of the exploration budget has been allocated to this project
- The Pogo Resource of 6.7Moz represents the largest inventory in the history of the project

Pogo Reserve of 1.5Moz at 8gpt (after depletion of 200,700oz);

- Measured and Indicated Resources have increased by 40% from FY20
- Due to COVID-19 impacts, limited drilling was completed to convert the large 6.7Moz Resource base into Reserves. There is a significant opportunity to substantially grow the Reserve base as normal drilling activities resume

RESOURCES AND RESERVES, PRODUCTION AND COST GUIDANCE UPDATE (EX-KCGM)

Processing capacity upgrade to 1.3 million tonne per annum is scheduled for completion in the middle of calendar year 2021, in preparation for the increase in mining physicals.



Kalgoorlie Gold Operations

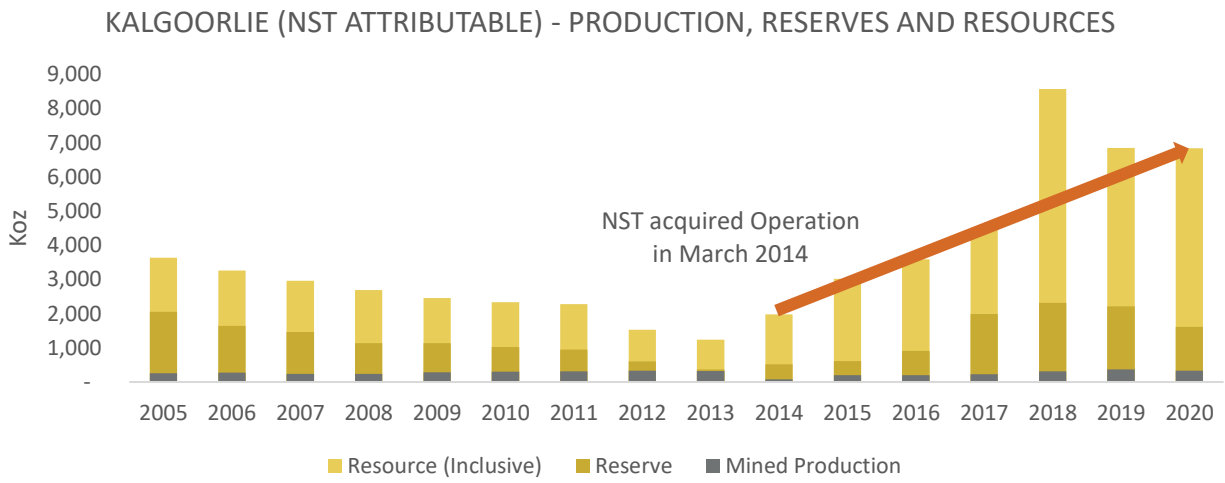
Kalgoorlie Reserves reduced 25% to 1.6Moz (after depletion of 330,200oz); New estimate reflects a significant reduction in the Raleigh Reserve and the higher cost base used in the calculations;

- Kanowna Underground Reserves were steady at 700,000oz
- NST 100%-owned Kundana Underground Reserves reduced to 300,000oz
- EKJV 51%-owned Kundana Underground Reserves reduced to 400,000oz
- South Kalgoorlie Operations Reserves reduced to 200,000oz
- Significant opportunity to address the cost structure and convert a substantial amount of mineral inventory

Kalgoorlie Resources are 6.8Moz (after depletion of 330,200oz)

- Kanowna Underground Resources grew by 16% to 2.2Moz
- NST 100% Kundana Resources are 1.2Moz
- EKJV 51% Kundana Resources are 1.0Moz

The Kalgoorlie Operations is Northern Star's most leveraged asset to higher gold prices



RESOURCES AND RESERVES, PRODUCTION AND COST GUIDANCE UPDATE (EX-KCGM)

Authorised for release to ASX by Bill Beament, Executive Chair.

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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 (excluding the Central Tanami Gold Project, the Bronzewing Project, the Anthill Project and the Mt Clement Project) 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 (excluding the Bronzewing Project) is based on information compiled by Jeff Brown, 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 Brown has 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 Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Brown 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.

The information in this announcement that relates to the Bronzewing Project is extracted from the Echo Resources Ltd announcement entitled "Yandal Gold Project BFS & Growth Strategy" released on 23 April 2019 and is available to view on www.asx.com.au.

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 "Yandal Gold Project BFS & Growth Strategy" released on 23 April 2019 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.

The information in this announcement that relates to the Anthill Project is extracted from the Intermin Resources Limited (now Horizon Minerals Limited) announcement entitled "Anthill Resource Grows 60% to Over 125,000 ounces " released on 18 December 2018 and is available to view on www.asx.com.au.

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 "Anthill Resource Grows 60% to Over 125,000 ounces" released on 18 December 2018 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.

The information in this announcement that relates to the Mt Clement Project is extracted from the Artemis Resources Limited announcement entitled "Substantial Resource Increase at Mt Clement Gold & Silver Project" released on ASX Announcement dated 26 July 2011 and is available to view on www.artemisresources.com.au.

RESOURCES AND RESERVES, PRODUCTION AND COST GUIDANCE UPDATE (EX-KCGM)

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 "Substantial Resource Increase at Mt Clement Gold & Silver Project" released on ASX Announcement dated 26 July 2011 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.

Currency Conversion Rate

*All currency conversions in this announcement have been converted at a currency of A$/US$ conversion rate of A$0.719.

APPENDIX A: RESOURCES & RESERVES

MINERAL RESOURCES STATEMENT FOR YEAR ENDED 30 JUNE 2020

MINERAL RESOURCES as at 30 June 2020

	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	1,201	1.2	45	6,070	1.4	270	3,158	1.1	116	10,429	1.3	432
Underground	297	1.4	13	32,854	3.6	3,786	11,039	2.8	1,007	44,191	3.4	4,807
Stockpiles	604	1.3	25	-	-	-	-	-	-	604	1.3	25
Gold in Circuit	-	-	10	-	-	-	-	-	-	-	-	10
Sub-Total Jundee	2,102	1.4	93	38,924	3.2	4,057	14,197	2.5	1,124	55,224	3.0	5,274
BRONZEWING PROJECT												
Surface	4,634	2.4	358	16,439	1.9	989	5,310	1.7	282	26,383	1.9	1,629
Underground	-	-	-	-	-	-	-	-	-	-	-	-
Sub-Total Bronzewing	4,634	2.4	358	16,439	1.9	989	5,310	1.7	282	26,383	1.9	1,629
CONSOLIDATED YANDAL PROJECT												
Total Yandal Project	6,737	2.1	452	55,633	2.8	5,055	19,507	2.2	1,406	81,876	2.6	6,912
POGO PROJECT												
Surface	-	-	-	-	-	-	354	12.0	136	354	12.0	136
Underground	-	-	-	9,492	10.2	3,121	11,408	9.3	3,411	20,901	9.7	6,532
Stockpiles	-	-	-	-	-	-	-	-	-	-	-	-
Gold in Circuit	-	-	4	-	-	-	-	-	-	-	-	4
Sub-Total Pogo	-	-	4	9,492	10.2	3,121	11,763	9.4	3,548	21,255	9.8	6,672
KANOWNA GOLD PROJECT												
Surface	6	2.7	1	1,044	2.7	91	2,415	1.5	120	3,465	1.9	211
Underground	3,157	3.2	320	11,238	2.9	1,036	6,251	2.9	590	20,646	2.9	1,947
Stockpiles	43	2.2	3	-	-	-	-	-	-	43	2.2	3
Gold in Circuit	-	-	11	-	-	-	-	-	-	-	-	11
Sub-Total Kanowna	3,206	3.3	335	12,282	2.9	1,127	8,666	2.6	711	24,154	2.8	2,172
KUNDANA GOLD PROJECT												
Surface	-	-	-	-	-	-	-	-	-	-	-	-
Underground	594	4.4	84	4,016	4.7	607	4,589	3.2	477	9,199	4.0	1,168
Stockpiles	30	3.3	3	-	-	-	-	-	-	30	3.3	3
Gold in Circuit	-	-	11	-	-	-	-	-	-	-	-	11
Sub-Total Kundana Gold	624	4.4	89	4,016	4.7	607	4,589	3.2	477	9,229	4.0	1,173
EAST KUNDANA JOINT VENTURE												
Surface	-	-	-	78	5.6	14	71	5.7	13	149	5.6	27
Underground	1,030	6.2	206	2,921	5.2	492	2,156	4.4	302	6,107	5.1	1,000
Stockpiles RHP	6	4.8	1	-	-	-	-	-	-	6	4.8	1
Stockpiles Raleigh	0	1.7	0	-	-	-	-	-	-	0	1.7	0
Stockpiles GEM (100%)	2	3.2	0	-	-	-	-	-	-	2	3.2	0
Gold in Circuit	-	-	-	-	-	-	-	-	-	-	-	-
Sub-Total East Kundana JV	1,039	6.2	207	2,999	5.2	506	2,227	4.4	315	6,264	5.1	1,028
SKO GOLD PROJECT												
Surface	-	-	-	-	-	-	-	-	-	-	-	-
Underground	1,421	3.0	137	9,329	3.0	894	9,382	3.0	903	20,132	3.0	1,934
Stockpiles	-	-	-	-	-	-	-	-	-	-	-	-
Jubilee ROM stocks	12	3.1	1	-	-	-	-	-	-	12	3.1	1
Gold in Circuit	-	-	3	-	-	-	-	-	-	-	-	3
Sub-Total SKO	1,433	3.1	141	9,329	3.0	894	9,382	3.0	903	20,145	3.0	1,938
CARBINE PROJECT												
Surface	-	-	-	2,387	2.2	167	996	1.9	62	3,383	2.1	229
Underground	-	-	-	803	4.1	105	1,469	3.9	184	2,272	4.0	289
Sub-Total Carbine	-	-	-	3,190	2.7	272	2,465	3.1	246	5,655	2.9	518
PAULSENS PROJECT												
Surface	-	-	-	129	3.1	13	1,766	1.9	106	1,895	2.0	119
Underground	341	5.8	64	88	5.6	16	43	6.6	9	473	5.8	89
Stockpiles	11	1.6	1	-	-	-	-	-	-	11	1.6	1
Gold in Circuit	-	-	0	-	-	-	-	-	-	-	-	0
Sub-Total Paulsens	353	5.7	65	217	4.1	29	1,809	2.0	115	2,379	2.7	209
ASHBURTON PROJECT												
Surface	-	-	-	98	1.6	5	444	1.2	17	542	1.3	22
Stockpiles	-	-	-	-	-	-	-	-	-	-	-	-
Sub-Total Ashburton	-	-	-	98	1.6	5	444	1.2	17	542	1.3	22
CENTRAL TANAMI PROJECT JV												
Surface/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												
Surface/Underground	107	7.8	27	1,079	6.0	208	1,449	5.8	271	2,635	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	3,010	5.4	523
NORTHERN STAR TOTAL	**16,935**	**2.9**	**1,581**	**102,496**	**3.7**	**12,214**	**67,143**	**3.9**	**8,461**	**186,574**	**3.7**	**22,256**

Note:

1. Mineral Resources are inclusive of Ore Reserves.
2. Mineral Resources are reported at various gold price guidelines: a. A$2,250/oz Au - All Australian assets except Ashburton; b. A$1,850 /oz Au - Ashburton; US$1,500/oz Au - USA assets.
3. Rounding may result in apparent summation differences between tonnes, grade and contained metal content.
4. Numbers are 100 % NST attributable.

Competent Persons:

1. Michael Mulroney

APPENDIX A: RESOURCES & RESERVES

ORE RESERVES STATEMENTS FOR YEAR ENDED 30 JUNE 2020

ORE RESERVES as at 30 June 2020

	PROVED			PROBABLE			TOTAL RESERVE		
	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces
NST ATTRIBUTABLE RESERVE	(000's)	(gpt)	(000's)	(000's)	(gpt)	(000's)	(000's)	(gpt)	(000's)
JUNDEE GOLD PROJECT									
Surface	1,201	1.2	45	1,395	1.5	66	2,597	1.3	111
Underground	297	1.4	13	13,370	4.3	1,865	13,668	4.3	1,878
Stockpiles	604	1.3	25	-	-	-	604	1.3	25
Gold in Circuit	-	-	10	-	-	-	-	-	10
Sub-Total Jundee	2,102	1.4	93	14,766	4.1	1,931	16,868	3.7	2,024
BRONZEWING PROJECT									
Surface	5,100	2.0	332	10,844	1.4	487	15,944	1.6	820
Underground	-	-	-	-	-	-	-	-	-
Stockpiles	-	-	-	-	-	-	-	-	-
Gold in Circuit	-	-	-	-	-	-	-	-	-
Sub-Total Bronzewing	5,100	2.0	332	10,844	1.4	487	15,944	1.6	820
CONSOLIDATED YANDAL PROJECT									
Total Yandal Project	7,202	1.8	426	25,610	2.9	2,418	32,812	2.7	2,844
POGO PROJECT									
Surface	-	-	-	-	-	-	-	-	-
Underground	-	-	-	5,867	8.0	1,507	5,867	8.0	1,507
Stockpiles	-	-	-	-	-	-	-	-	-
Gold in Circuit	-	-	4	-	-	-	-	-	4
Sub-Total Pogo	-	-	4	5,867	8.0	1,507	5,867	8.0	1,511
KANOWNA GOLD PROJECT									
Surface	-	-	-	990	2.3	73	990	2.3	73
Underground	2,415	2.9	224	4,800	2.7	414	7,216	2.8	638
Stockpiles	43	2.2	3	-	-	-	43	2.2	3
Gold in Circuit	-	-	11	-	-	-	-	-	11
Sub-Total Kanowna	2,459	3.0	239	5,790	2.6	486	8,249	2.7	725
KUNDANA GOLD PROJECT									
Surface	-	-	-	-	-	-	-	-	-
Underground	255	4.9	40	1,893	4.0	243	2,148	4.1	284
Stockpiles	30	3.3	3	-	-	-	30	3.3	3
Gold in Circuit	-	-	2	-	-	-	-	-	2
Sub-Total Kundana Gold	285	4.9	45	1,893	4.0	243	2,177	4.1	289
EAST KUNDANA JOINT VENTURE									
Surface	-	-	-	75	4.4	11	75	4.4	11
Underground	665	5.2	112	1,642	4.7	248	2,307	4.9	360
Stockpiles RHP	6	5.1	1	-	-	-	6	5.1	1
Stockpiles Raleigh	0	1.7	0	-	-	-	0	1.7	0
Stockpiles GEM (100%)	2	3.2	0	-	-	-	2	3.2	0
Gold in Circuit	-	-	0	-	-	-	-	-	0
Sub-Total East Kundana JV	673	5.2	113	1,718	4.7	259	2,391	4.8	372
SKO GOLD PROJECT									
Surface	-	-	-	-	-	-	-	-	-
Underground	60	3.7	7	1,490	3.4	162	1,550	3.4	169
Stockpiles	-	-	-	-	-	-	-	-	-
Jubilee ROM stocks	13	3.1	1	-	-	-	13	3.1	1
Gold in Circuit	-	-	3	-	-	-	-	-	3
Sub-Total SKO	72	4.7	11	1,490	3.4	162	1,562	3.4	173
CARBINE PROJECT									
Surface	-	-	-	581	2.6	49	581	2.6	49
Underground	-	-	-	-	-	-	-	-	-
Stockpiles	-	-	-	-	-	-	-	-	-
Sub-Total Carbine	-	-	-	581	2.6	49	581	2.6	49
PAULSENS PROJECT									
Surface	-	-	-	-	-	-	-	-	-
Underground	186	5.1	31	84	4.0	11	269	4.8	41
Stockpiles	11	1.6	1	-	-	-	11	1.6	1
Gold in Circuit	-	-	-	-	-	-	-	-	-
Sub-Total Paulsens	197	4.9	31	84	4.0	11	281	4.6	42
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	10,889	2.5	869	43,032	3.7	5,135	53,921	3.5	6,004

Note:

1. Ore Reserves are reported at various gold price guidelines: a. A$1,750/oz Au - All Australian assets except Bronzewing; b. A$1,850 /oz Au - Bronzewing; US$1,350/oz Au - USA assets.
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

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report
Jundee (Surface) - 30 June 2020
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 Northern Star Resources (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 RC 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.

APPENDIX B: TABLE 1

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.
	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.

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 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.

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 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.	Jundee is an Archean 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: 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.
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.

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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.	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 Jundee open pit deposits 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 g/t Au was used as a guide to model the mineralised envelopes for the open pit resources and a 1.0 g/t 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.
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.

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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.	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.	All Open Pit Mineral Resource models use a 1m straight composite generation based on RC sample length where the parent block sizes are 10 m in strike, 3m in RL, and 3m across strike direction. Sub-block sizes are 1m in strike, 1m in RL, and 1m across strike direction. Vause block models have a parent block sizes of 5 m in strike, 2.5 m in RL, and 4m across strike direction. Sub-block sizes are 2.5 m in strike, 1.25m in RL, and 1m across strike direction. Average drill spacing ranges between 25m x 25m and 10m x 10m. Ore Reserves are generally based on 20m x 20m drilling up to a maximum of 40m x 40m. Mineral Resources are generally based on 40m x 40m drilling up to a maximum of 80m x 80m.
	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 g/t 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.
	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.

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Criteria	JORC Code explanation	Commentary
		• 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 0.6g/t 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 $2,250 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 g/t Au cut-off grade.
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 within $2,250 AUD optimisation shell.
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 all 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 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.	RC bulk density values used were based on analysis of grab samples obtained during excavation of open cut mines. Calculated averages were applied to density boundaries for each model. DD bulk density values are 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 deposits. These values are also in agreement with over 10 years of production data.

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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 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.	Measured Resources are defined from grade control models based on geological mapping, diamond and RC drill holes which are imported into Vulcan software and modelled in 3D. Indicated Resources are defined by drilling which is generally 25m x 25m and may range up to 40m x 40m maximum. Material classified as Indicated are supported by a minimum of 5 RC and Diamond drill holes or a minimum of 3 drill holes when drill spacing is 25m x 25m or less and there is grade and geological continuity. 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 accurate based on a long, 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 four internal audits by previous operators (NYO) 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 deposits 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.	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.

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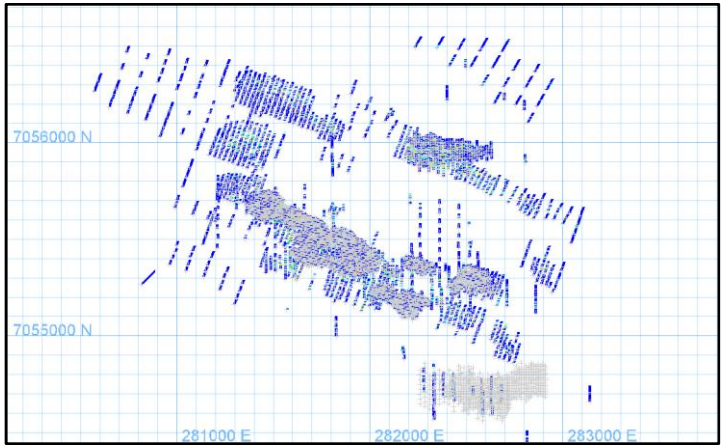
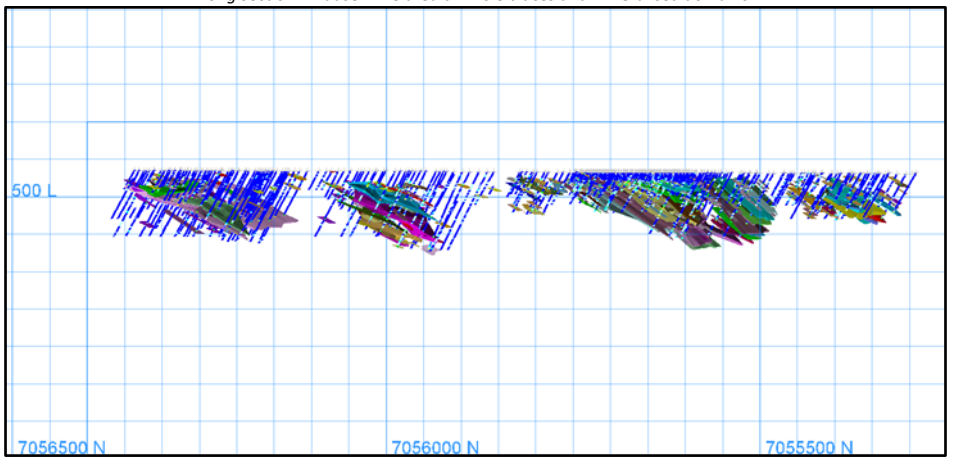
VAUSE RESOURCE

Plan view: Vause mine area Drill hole collars

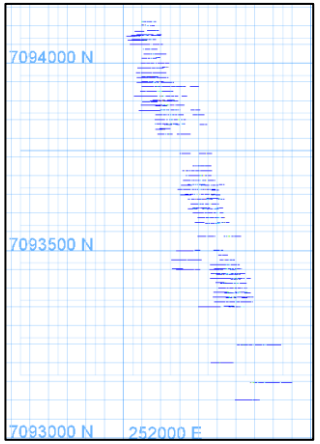


Long Section – Vause mine area drillhole traces and mineralised domains

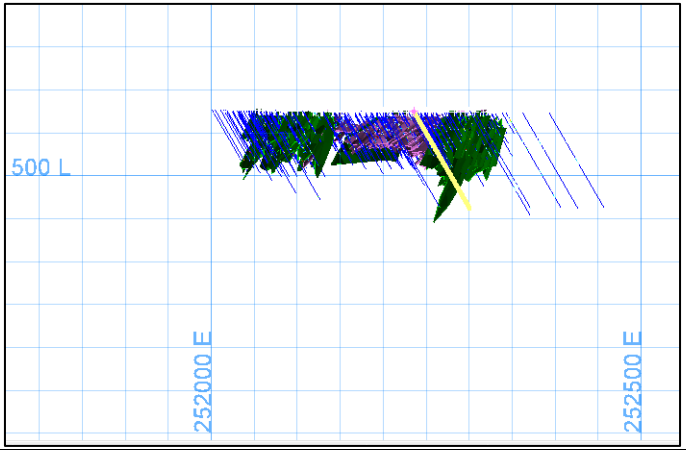


DESERT DRAGON RESOURCE

Plan view: Desert Dragon mine area Drill hole collars



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



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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 Vause Project 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.
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 25 years. The processing parameters have been based on metallurgical test work and experience from previous and current ore types 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.

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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.	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.
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 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 from 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. Vause is a 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.
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. Vause Project is a 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.

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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$1,750 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.	Transportation costs for ore haulage from satellite pits to Jundee have been based on current NSR contractor quotes. Transportation costs also include an allowance 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$1,750 per ounce has been used in the optimisation of the Vause 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$1,750 ± $250 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:	
	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.

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Criteria	JORC Code explanation	Commentary
	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 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 Vause Ore Reserve Estimate is high based on current mine and historical 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.

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report
Jundee (Underground) – 30 June 2020
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 > 0.1gpt 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 half core NQ2 or BQ: Whole core sampling. 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 85% 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 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 PMAES 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.	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 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. • 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 0.1gpt. 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.

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Criteria	JORC Code explanation	Commentary
		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 are verified by the Senior Resource Geologist.
	The use of twinned holes.	There are 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 world wide 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 ore-bodies. 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 or where validated by Geologists. Previous drilling have 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 MGA94 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 June 2020 is 37º 58' 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. 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 > 0.1gpt 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 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 perpendicular to the main mineralisation trends. The orientation achieves unbiased sampling of all possible mineralisation and the extent to which this is known.
	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.

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Criteria	JORC Code explanation	Commentary
		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. All recent NSR sample data has been extensively QAQC reviewed both internally and externally. Pre NSR data audits found to be minimal 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.	The Jundee project consists of tenements comprising 62 mining leases and 1 general purpose lease, covering a total area of approximately 57,422.2 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 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: 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 summarise all drill information used. (See diagram).
	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.

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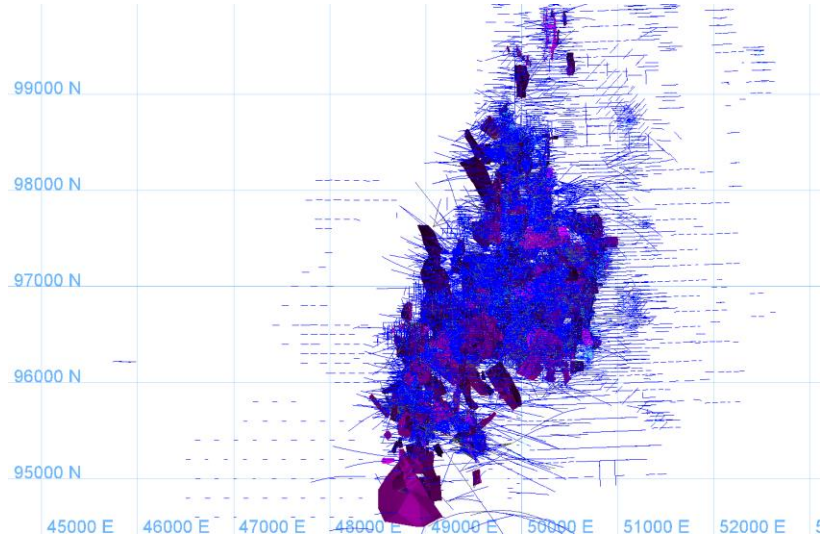
Criteria	JORC Code explanation	Commentary
	Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.	Short intervals 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.
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.	The results released are considered representative of the results received to date.
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 FY21 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.

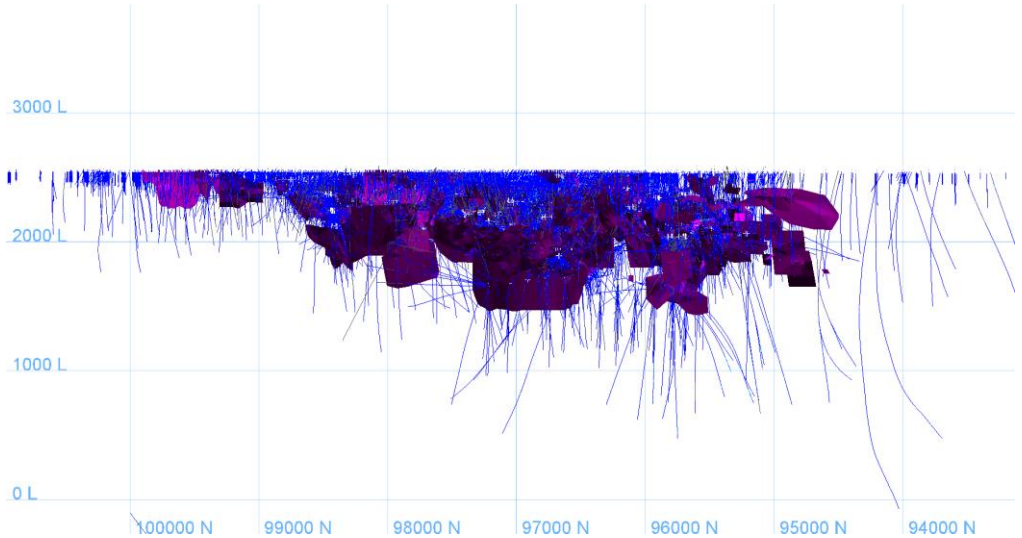
APPENDIX B: TABLE 1

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 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 Person's for this Resource report has worked on site for extensive periods between 2005 and 2018.
	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 nuggety nature of the orebody on a local scale. The confidence is supported by all the information and 21 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.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations have been completed or put forward.

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Criteria	JORC Code explanation	Commentary
	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 of 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 meter downhole composite. Detailed exploratory data analysis is carried out on each deposit, using Snowden Supervisor software. The majority of the Resource is estimated using ordinary kriging (OK). A minor proportion of the Resource is estimated using inverse distance squared (ID^2) or Nearest Neighbor 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 ID^2 estimates were used, treatment of extreme high grades were 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 parent and sub block methodology where the parent block size is 5m in strike, 5m in RL, and 5m in RL. Sub-block sizes are 0.25m in strike, 0.25m in RL, and 0.25m across strike direction.
	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 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 ID^2, treatment of the high grade assays occur at the estimation stage.

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Criteria	JORC Code explanation	Commentary
		Top cuts vary by domain and range from 10gpt – 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 considered to be 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 taken into account 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 AUD$2,250/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.	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 should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	Jundee 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 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 88,600 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.

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Criteria	JORC Code explanation	Commentary
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Measured Resources are defined 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 maximum. Lodes classified as Indicated are supported by a minimum of 5 face chips 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 considered to be 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 is 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
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 in addition to actual design and evaluation work conducted at Jundee site. Familiarity with the mine site and historical performance was considered in providing the Ore 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 2020 Reserves contain a new mining method utilising paste fill 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.	The Jundee Gold Project is a fully operational mine and has been in operations for over 20 years. 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.

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Criteria	JORC Code explanation	Commentary
		Mining costs are based on current Jundee mining operation cost with additional 20% of variable cost as safety factor. There is a high level of confidence in the parameters used.
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 longhole 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 longhole stoping extraction. Deemed appropriate due to ongoing successful implementation of design assumptions in the current mining operation. Some areas included remnant area assessed using paste fill 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.	85% mining recovery applied to the stope where 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). Averaging 80% mining recovery factor applied to the paste fill areas.
	Any minimum mining widths used.	The minimum mining width for stopes is 2.2m.
	The manner in which 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 Ore 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.
Metallurgical factors or assumptions	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.
	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 lab testing and on-going operational experience. Recoveries range from 76.1% up to 91.65% depending on the mine area.
	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?	Not applicable

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Criteria	JORC Code explanation	Commentary
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 $1,750/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 $1,750/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 $1,750/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 plant and quotes from experienced mining contractor. The economic forecast is representative of the current market condition. Paste fill costs were sourced from other paste fill sites and consultant recommendations.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	The revised business plan, based on the updated Reserves is still in progress, regarding NPV ranges. 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.

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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.	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 Ore 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 Person's 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 Ore 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 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.	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
Jundee (Ramone) – 30 June 2020
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 > 0.1gpt 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.	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 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 0.1gpt 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 are verified by the Senior Resource Geologist.
	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 is 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.
	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.

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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.	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 utilising 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 ranging from 25m x 25m to 40m x 40m 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 x 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 > 0.1gpt 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 degrees 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 Blommestein (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.	Ramone is located on Mining Lease M53/0347 which 100% owned by Northern Star Resources Limited. The tenement in good standing 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.	Not applicable, 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 096 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.	Not Applicable, 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.	Not Applicable, 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.	Not Applicable, no new significant results reported.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	Not Applicable, no new significant results reported.
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results.	Not Applicable, 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.	Not Applicable, 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').	Not Applicable, no new significant 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.	Not Applicable, no new significant results reported.

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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.	Not Applicable, 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).	Future work will consider the potential for an underground development beneath the existing open pit operation.
	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 2020.
	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.
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 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.

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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.	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 and grade control models 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 0.5 m in strike, 0.65m in RL, and 0.5 m across strike direction for the open pit resources. For the underground resources the model has a parent block size of 12 m in strike, 10 m in RL, and 4m across strike direction. Sub-block sizes are 0.5 m to 4 m in strike, 0.625 m to 5 m in RL, and 0.5 m to 4 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.
	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 with further examination 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 occur 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.

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Criteria	JORC Code explanation	Commentary
	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 0.45gpt 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 1.1gpt Au cut-off grade.
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 0.45gpt Au within the optimisation pit shell using AUD$2,250/oz gold price. Underground resources have been reported through MSO generation using a minimum mining width of 2 m coupled with 1.1gpt Au cut-off grade and an AUD$2,250/oz 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. 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 kgpt. Cyanide consumption is projected to be at 0.9 kgpt. 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 mill, 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	The Project currently possesses all necessary government permits, licences 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 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 meters. 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.
	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 and grade control data is line with the model expectations and supports the accuracy and confidence in the resource model.

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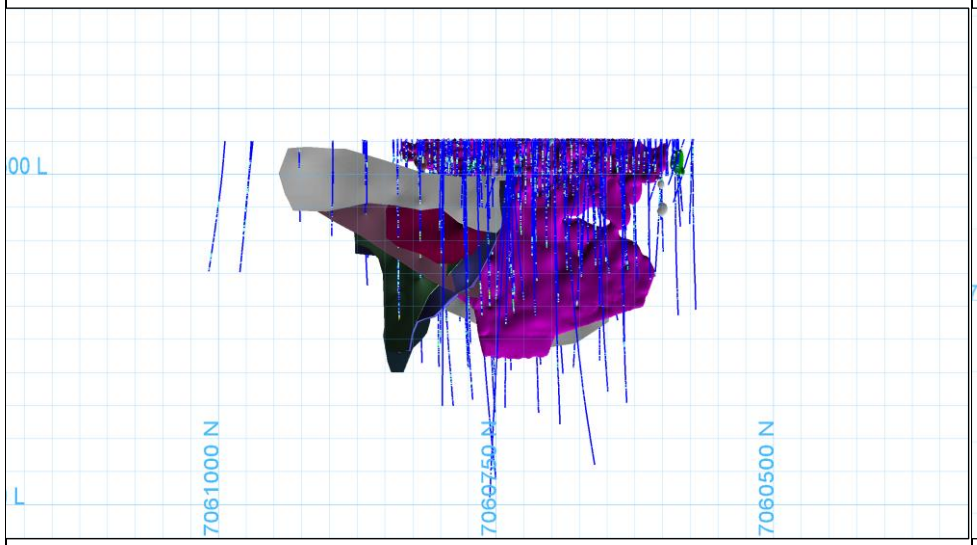
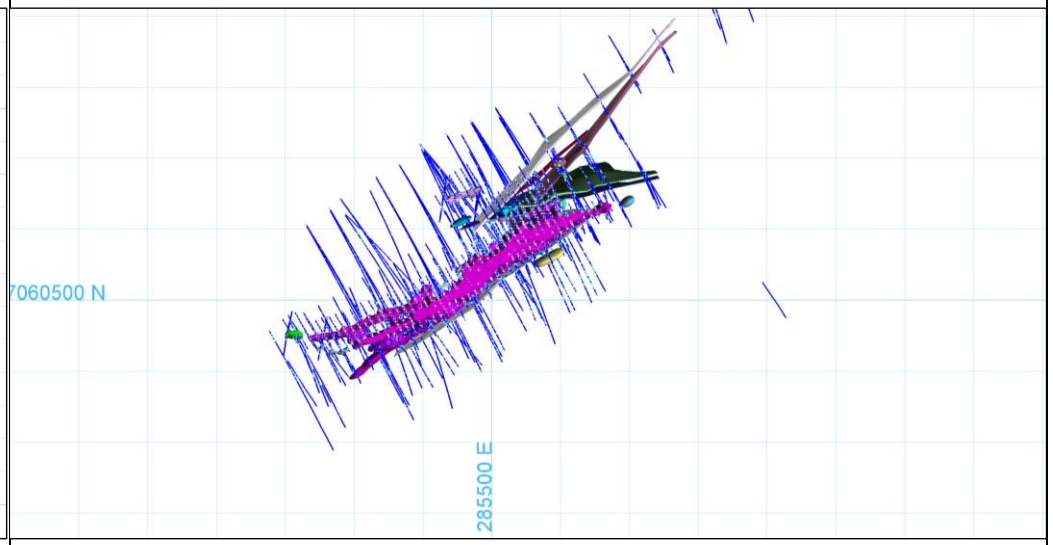
RAMONE - REPRESENTATIVE PLANS & CROSS SECTIONS

RAMONE RESOURCE



Long Section: Ramone resoruce drillhole traces and mineralised domains



Plan view – Ramone resoruce 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.	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
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 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 current study level is consummate with a pre-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.	**Underground** The Ramone underground mining area has been previously mined as a satellite Open Pit operation providing additional mill feed to the Jundee Processing Plant. The processing parameters have been based on previous Ramone Open Pit ore material processed and actual costs of the Jundee processing plant. **Open Pit** 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.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	**Underground** 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. Open Pit The pit cut-off grade has been calculated based on the key input components (processing, recovery and administration).
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).	**Underground** 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. **Open Pit** The pit cut-off grade has been calculated based on the key input components (processing, recovery and administration).
	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** A top down narrow vein longhole open stope extraction is currently the main mining method employed at Jundee and is considered appropriate for the Ramone orebody. No backfilling of stopes is planned. **Open Pit** 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 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.
	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. A detailed interface review was conducted to ensure separation between underground and open pit Reserve material.
	The mining dilution factors used.	**Underground** 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 using current mine practices and deemed appropriate for use at Ramone. **Open Pit** A mining dilution factor of 10% of zero grade has been applied for the reporting of Reserve physicals.
	The mining recovery factors used.	**Underground** 85% mining recovery applied to the stope where pillars have not been incorporated into the design and 95% for detailed design where pillars have been considered. **Open Pit** A mining recovery of 95% has been applied.
	Any minimum mining widths used.	The minimum mining width for underground stopes is 2.2m. Open Pit uses a width down to 20 metres for final pit extraction from the base of pit has been used.

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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.	For underground, 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. For open pit inferred material is not considered for the Ore Reserves but is considered for LOM planning purposes.
	The infrastructure requirements of the selected mining methods.	The Ramone underground requires underground capital development and other site infrastructures and will be function as a satellite operations utilising the current Jundee accommodation village, workshop, administration facilities, ROM pad and processing facility.
Metallurgical factors or assumptions	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.
	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.	A recovery factor of 90% has been used for the economic evaluation and is consistent with results achieved during the mining of the open pit fresh ore.
	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?	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.	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. Ramone underground requires an extension of licence to mine the underground deposit utilising current waste dump.
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. Ramone underground will be operating as satellite as the current Ramone Open Pit mine where accommodation village, workshop, office, water bores, ROM pad, processing facility will be utilising current Jundee mine.
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 estimation of Open pit mine operating costs was based on a contractor mining and maintenance operation using first principles to determine equipment productivities and associated operating hours to generate mine schedules. Provided contract pricing were than applied to the schedule to calculate all unit costs.
	The methodology used to estimate operating costs.	The operating cost estimates are based upon the existing mining contract in place at Jundee with appropriate allowances for satellite operating requirements.
	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 $1,750.
	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 $1,750/oz.

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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 $1,750/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 plant and quotes from experienced mining contractor. The economic forecast is representative of the current market condition.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	The revised business plan, based on the updated Reserves is still in progress, regarding NPV ranges.
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.

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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.	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 Ramone has been considered and factored into the Reserve assumptions where appropriate.

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JORC Code, 2012 Edition – Table 1 Report
Pogo Gold Mine – 30 June 2020
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 2020. A total of 7,047 DD holes for 3,742,280 feet (1,140,160 m) and 89 underground RC holes for 13,101 feet (3,993 m) were drilled to inform 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 daily underground face chip sampling. The dataset used to generate Liese, North Zone, Fun Zone and South Pogo Mineral Resource estimate included 4,845 channel samples with lengths 1 ft – 5 ft and South Pogo resource used 63 sludge holes with length 2 ft – 17.5 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 1.0ft (0.3m) and a maximum sampled interval of 5ft (1.5m). Underground RC drilling is sampled on regular 5 ft intervals (1.5 m). Where utilised, sludge holes in South Pogo mineralisation domains were sampled on 2.5 ft lengths with holes washed out after each sample. Face channel sampling, used in the Fun Zone, Liese, South Pogo and North Zone Mineral Resource estimate, are spray-marked then sampled on 1 ft to 5 ft lengths across the entire width of the vein (where practicable). 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. DD core with lesser underground RC chips, were the predominant sampling methods used to inform the Resource estimate. Face channel samples constituted 42% of data and sludge hole drilling at less than 1% was 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: 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. • Infill DD drilling for defining or converting Resources to a higher confidence category are whole core sampled. • 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: Sludge holes included in the Mineral Resources for South Pogo only were drilled by an underground long hole rig and collected from open holes into buckets on 2.5 ft intervals, with each interval washed out by water prior to sampling. • Face-channelling: The channel sample lines are always perpendicular to the ore body orientation. Sample intervals are determined by geology, including lithology contacts, mineralisation, alteration or structure. The intercepts of mineralisation showed strong correlation with diamond drilling and provided a greater data density for the estimate. For NQ core samples, minimum sample size of 1.0 ft (0.3 m) and a maximum sampled interval of 5ft (1.5m). 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 (0.8m). When the HQ samples are half-core cut, the maximum sample is extended to 5ft (1.5m). Quartz vein, fault zones, silica flooding and quartz stockwork zones are sampled plus the adjacent five feet (1.5m) 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 g sub-sample of all sample types is then selected for fire assay with a gravimetric finish (surface holes) or atomic absorption spectroscopy (AAS) finish (underground holes).
	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. Surface drill holes are typically collared using PQ / HQ diameter tools and reduced to NQ2/NQ2 where necessary. Underground RC drilling (used during 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 South Pogo estimate only, are sampled on 2.5 ft lengths, with holes washed out after each sample. Face channel sampling, used in the Liese, South Pogo, 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

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Criteria	JORC Code explanation	Commentary
		ft – 5 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 provides details on the quantity and types of drill core drilled by year at the Pogo deposit as at 26 June 2020:

Feet Drilled by Hole Type

	15U	BQ	BQTK	HQ	HQ/NQ	MCR	NQ	NQ/BQ	NQ2	PHB	PHD	PHJL	PQ	Unknown	RC
unknown				34002					4385	215				82708	
1994															
1995							1374							1985	
1996							2011							11090	
1997														19143	
1998		1175					2000							46219	
1999		3333			1519									90095	
2000			25926.5		1104		45646.3		11455					2113	
2001							30772.5							2112	
2002							31594								
2003							16889.5								
2004							46274							1056	
2005							34772.6		22622						
2006							38341.4	4016	12					269	
2007									35885						
2008				6826					99857	80				999	
2009									105277					3267	
2010								240	101434					13908	
2011							855		162367					9470	
2012	220			28887.6			3620		154904	470	680		1503	12130	
2013				96202.3			19655	409	147351	1272	5621.5			8844	
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	50			
2017				67916.5			1318		162143	371	42				
2018				146244					241502.2	540	710				
2019				107104					462889					190673	13101
2020				134,165					252546						
	516	4,508	25,927	966,230	2,623	275	449,306	5,346	2,318,229	3,868	16,832	50	1,503	496,081	13,101

		Face channelling totalled 4,845 for 48,613 ft. Liese Resource Model incorporated results from 2,539 Face Channels for 25,333 ft, Fun Zone, 442 Face channels for 4,862 ft, South Pogo, 1,006 face channels for 10,307 ft and North Zone 858 face channels for 8,110 ft. Sludge hole samples totalled 63 holes for 233 ft.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	Core recovery is recorded for all DD holes. Recovery is measured to the tenth of a foot (~3cm) and recorded as a percentage calculated from measured core verses drilled intervals. All data is saved in AcQuire software. In general, recovery results are high through mineralised zones due to the competent nature of the quartz vein. In structurally complex zones, recoveries and core loss results vary. Core preparation and geotechnical logging procedures are in place for the continual assessment of results.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	Core is processed at the Pogo core processing facility. For DD holes, 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 and supervising geologist.
	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 high and no significant issues with core loss are recognised.

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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.	Core logging is carried out by a qualified Geologist 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.
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 and Grade Control 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 in 2019 used a 4.5-inch diameter face sampling hammer. RC samples were 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 core samples to BV in Fairbanks for sample preparation and a pulp is sent to the BV laboratory in Reno, Nevada or Vancouver, British Columbia for fire assay. Typically, gold assays and 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. All sample preparation and assaying of Pogo face channel samples are performed at the on-site Pogo lab. Sample preparation includes drying the face channel samples, (weight range of 2 to 7 lb), crushing to 70% passing 2mm, splitting of a 250g 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. Repeat analysis of crush and pulp samples (for all sample types) occurs at an incidence of 1 in 40 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.
	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, RC drilling field duplicates, have not been routinely assayed. Face channel second samples are taken in conjunction with primary underground face sample collection of material at every 14 ft advance of the production face.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Duplicate sample results correlate well, hence sample sizes are acceptable to accurately represent the gold mineralisation at Pogo Mine. Sample sizes are 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.

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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 in this Resource estimate as at 30 June 2020 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.	Commercially prepared certified reference materials (CRM's), inhouse standards, non-certified blanks and duplicates are randomly inserted into the sample stream at an incidence of 1 in 20. 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 and OREAS 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. 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 0.03 OPT. The laboratory QAQC protocols used include repeat analysis of crush and pulp samples at an incidence of 1 in 40 samples, screen tests (percentage of crush sample passing a 1mm mesh and pulverised sample passing a 75 µm mesh) and undertaken on 1 in 40 samples. QAQC data is reported monthly, quarterly, and yearly.
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 purpose drilled 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 transitioned 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 to ensure data integrity.
	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 dictates. A systematic procedure utilising several re-assays is in place to determine when the final assay is changed from the first gold 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.	Drill rigs are aligned using the Reflex TN14 Gyrocompass. Underground collar locations are 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 historically, a Reflex® EZ-Trac multi-shot survey instrument and currently a Trushot digital survey tool multi-shot survey instrument. Surface drill holes are surveyed at 100 ft from the collar and every 200 ft thereafter, except in areas of overburden, where the first Downhole survey is at 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.
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 50 by 50 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, is generally based on a 60 ft x 60 ft up to a maximum of 120 ft x 120 ft for reserves. Resources are based on 120 ft x 120 ft up to a maximum of 240 ft x 240 ft drill 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.

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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.	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 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.	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. All samples are selected, whole core or cut, and bagged in tied pre-numbered calico bags , grouped in larger rice bags labelled with the drill hole number and the sample sequence, and placed in large heavy duty plastic totes with a sample submission sheet. Samples are transported via road to the sample preparation facility in Fairbanks, Alaska. Upon receipt, any issues with sample condition is reported via email to Pogo personnel. All sample submissions are documented, and all assays are returned via email. Sample pulp splits from the Pogo Site Lab are stored at the Pogo mine site and those from the Bureau Veritis Lab are stored at the Vancouver facility.
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. 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 2020. 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. All issues were rectified. Various other potential issues such as missing surveys, missing sample data, and missing intervals etc. were also identified and corrected.

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 1251 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.
	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 Pogo 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 Liese Creek area 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 other companies (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 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 area in 1995, one of which was the discovery hole for the Liese vein system. This intercept 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 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 contains 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 metamorphic rocks intruded by 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

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Criteria	JORC Code explanation	Commentary
		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.	Exploration results not being released at this time.
	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 not being released at 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.	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').	Due to complex mineralisation geometry and varying intercept angles the true thickness is manually estimated on a hole by hole basis
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 of Pogo 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.	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	Nil

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Criteria	JORC Code explanation	Commentary
	method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	
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).	Infill drilling on the Central Lode System was completed late in the financial year, results are still being formulated and will be released in an updated resource. Further extensional and definition drilling is planned for FY2021 from both underground and surface positions. A drill program at Goodpaster Project is planned during FY2021 to establish a maiden resource for this project.
	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 were 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 have been entered directly into the database in the header table by the geologist responsible for the drill hole. Down-hole surveys were recorded on slips of paper into GeoLogger and a geologist marked 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. All sampling and logging data is digitally entered into a tablet then transferred to AcQuire. 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. The data entry procedures and use of templates minimise the chance of the data being corrupted.
	Data validation procedures used.	Drill intersection information used in the preparation of this release has been validated by the Competent Person. Validation included, but was not limited to, review of the database, core photographs, QAQC results and review of the assay certificates. Intervals were manually checked to ensure they truly reflect the mineralised zones. In addition, all data was validated based on comprehensive site data validation procedures.
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 conducted multiple site visits between June 2019 and July 2020. Detailed review of systems and practices were undertaken. Underground workings, drill rigs, core yard facilities, off site and off-site labs were inspected. 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 were 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 and Leapfrog software. Four of the seven major zones were modelled to support the Mineral Resource estimate, namely Liese, North Zone, South Zone and Fun Zone. The three remaining of the seven major areas contain no new drilling information with interpretations remained unchanged for East Deeps, Central Veins and Hill 4021. The confidence in the geological interpretation is reasonable although on a local scale there remains a degree of uncertainty due to the structurally complex nature of the orebody, frequent low drill intercept angle and rare spatial survey inaccuracy. The confidence is supported by information from 14 years of underground operations. Liese – 200 mineralised zones were modelled based on lithological logging, development mapping, core and face photos. To provide a comprehensive global geological model, minor low grade shear/stockwork areas were also incorporated into interpretations. 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 – Two major mineralised quartz veins were modelled at North Zone, together with 63 parallel hanging wall and foot wall lodes that are associated with the major quartz veins. North Zone veins are steeply dipping towards the east. Two sets of flat lying, west dipping quartz veins, totalling 16 lodes, were also modelled on the hanging wall and footwall of the east-dipping lodes. South Pogo – South Pogo comprised of three major, northwest dipping quartz veins with 31 parallel hanging wall and footwall lodes associated with these three major mineralised quartz veins.

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Criteria	JORC Code explanation	Commentary
		Fun Zone – Quartz veins modelled were based on lithological logging, backs mapping and registered face photos from development drives. Altered intrusive intervals were also modelled in areas of quartz vein stockwork. 109 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.	All available geological data was used in the interpretation including backs and face mapping, historic rib mapping, drilling and oxidation surfaces. Gold grades have been used to assist in the interpretation of the mineralisation. The Hill 4021 interpretation used surface mapping in conjunction with the drill data.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Alternative interpretations are possible for the less continuous lenses at each deposit. On a global scale this will have minimal impact on the resource. A higher confidence exists in the more significant continuous lenses which are often supported by mining history.
	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. In addition, drill core logging, and development mapping have been used to create 3D constrained wireframes of lithology.
	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 zones. 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 950 m in a northerly direction along strike, and 970 m down dip. A flatter component, dipping west, extends 250m by 190m. South Pogo – The moderately north-westerly dipping Mineral Resource extends approximately 1100 m in a north-easterly direction along strike, and 760 m down dip. Fun Zone – the generally moderate to steep-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.	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 (be combining groups of lodes). Vein wireframes were used to select drill hole samples. Samples from within the mineralisation wireframes were used to conduct a sample length analysis Based on the review, regularised downhole compositing (from hanging wall to footwall) of drill-hole samples is exclusively used, composite lengths ranging from 2 ft to 5 ft. FunZone and South Pogo used 2 ft, North Zone, 2.5 ft, East Deeps and Central Veins, 4 foot and Liese primary lodes composited to 5 ft lengths whilst Liese grade control areas comprising significant face data and narrower quartz veins were composited on a 2 ft regularised length. Composite lengths are based on the prominent width of mineralised lodes within the areas. Detailed exploratory data analysis is carried out on each deposit, using Snowdens' Supervisor software. Most of the Resource is estimated using ordinary kriging (OK). A minor proportion of the Resource is estimated using inverse distance (ID^2). The estimation type used is dictated by the dataset. 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 and ID^2 estimates were used, treatment of extreme high grades was dealt with by using a cap grade strategy.

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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.	The current Mineral Resource estimate is an update to the previous Mineral Resource estimate of June 2019. The current estimate accounts for both mining depletion and the addition of extensional and infill drilling. Reconciled historical production from underground operations is comparable with new estimate.
	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. • Liese – 15 Y by 15 X by 5 Z (feet) block. Drill spacing 14 to 200 feet. Mean approx. 40 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 • Eastern Deeps – 40 Y by 10 X by 10 Z (feet) block. Drill spacing 15 to 200 feet. Mean approx. 40 feet. • North Zone – 10 Y by 10 X by 5 Z (feet) block size Drill spacing highly variable from 10 to 300 feet. Mean approx. 60 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 • South Pogo – 15 Y by 15 X by 3 Z (feet) block size. Drill spacing highly variable from 10 to 240 feet. Mean approx. 60 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 • Fun Zone – 15Y by 15 X by 3 Z (feet) block. Drill spacing 10 to 200 feet. Mean approx. 60 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 • 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. • Hill 4021 – 25 by 25 by 25 (feet) sub celled to 1 x1 x 1 (feet)
	Any assumptions behind modelling of selective mining units.	A 6 ft minimum mining width for underground environment is assumed.
	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 lode codes generated from the mineralisation interpretations, which were completed with due consideration of the structural framework and lithological controls at Pogo. Low grades can form part of the mineralisation interpretation. Mineralisation boundaries were treated as hard boundaries and grade estimations are constrained by the interpretations.
	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: • Disintegration analysis of log Histogram, mean-CV and log-probability plots for values beyond a lognormal distribution • 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 point of run length composites. A range of top cuts are 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. Final Cutting is then was applied on a lode by lode basis. 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.
	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 3.15 g/t Au (0.091 oz/short ton) inside simulated Mineable Shape Optimiser (MSO) stopes at a minimum width of 6ft. This, in the opinion of the Competent Person, is a suitable lower cut-off as required by the reasonable prospects hurdle.

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Criteria	JORC Code explanation	Commentary
		Hill 4021 open pit component is reported inside a whittle shell and at a cut-off of 0.082oz/ 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.	Underground Resources are reported using a minimum mining width of 6 ft, with no dilution added on hanging wall or 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.	Pogo is an underground gold mine and CIL processing plant. Gold recovery is based on currently achieved metallurgical parameters. 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.
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/cm^3, or 0.084 short ton/ft^3 was used for the mineralisation. The density value has been based on an updated study of the average lithological densities across the mine site completed in 2019. This study consisted of a detailed statistical analysis of 2,523 measurements that have been recorded from each of the main mineralised zones. These values agree with over 10 years 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, each lithology and weathering states represented in drill hole core
	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 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 60 ft x 60 ft and may range up to 120 ft x 120 ft maximum. Lodes classified as Indicated are supported by a minimum of 6 face chip or Diamond drill holes. Inferred Resources are defined on a nominal 120 ft x 120 ft drilling pattern and may range up to 240 ft x 240 ft. Resources based on less than 120 ft x 120 ft 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).	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 in the previous two 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	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.

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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.	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.	Comparisons with previous Mineral Resource estimates and 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.	Reported Ore Reserve based on MY2020 Resource Model
	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.	Operating site Life of mine planning (pre-feasibility study level) to detailed budget model at an operating site.
	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.	Operating site Life of mine planning (pre-feasibility study level) to detailed 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. Detailed financial assessment is completed on all 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%.

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Criteria	JORC Code explanation	Commentary
	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 (6 foot) is the vein width. A 40 degree stope FW angle is applied to ensure ore recover.
	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.
	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.

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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.	US$1,350/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$1,350/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.
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.

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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 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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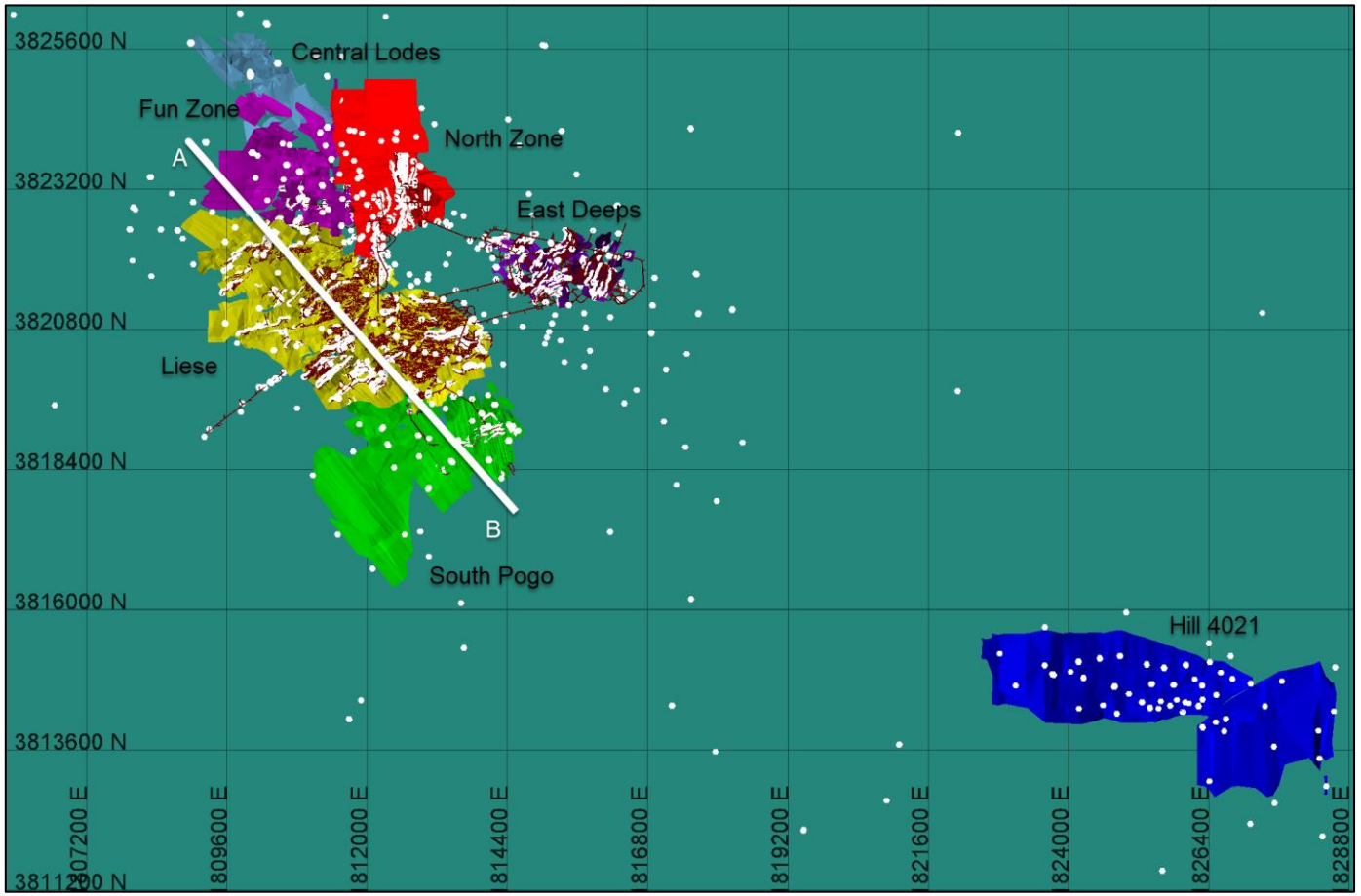

Plan view of the Pogo deposit and drill hole collars with development shown. Units are shown in feet. Grid is 2,000ft squares.

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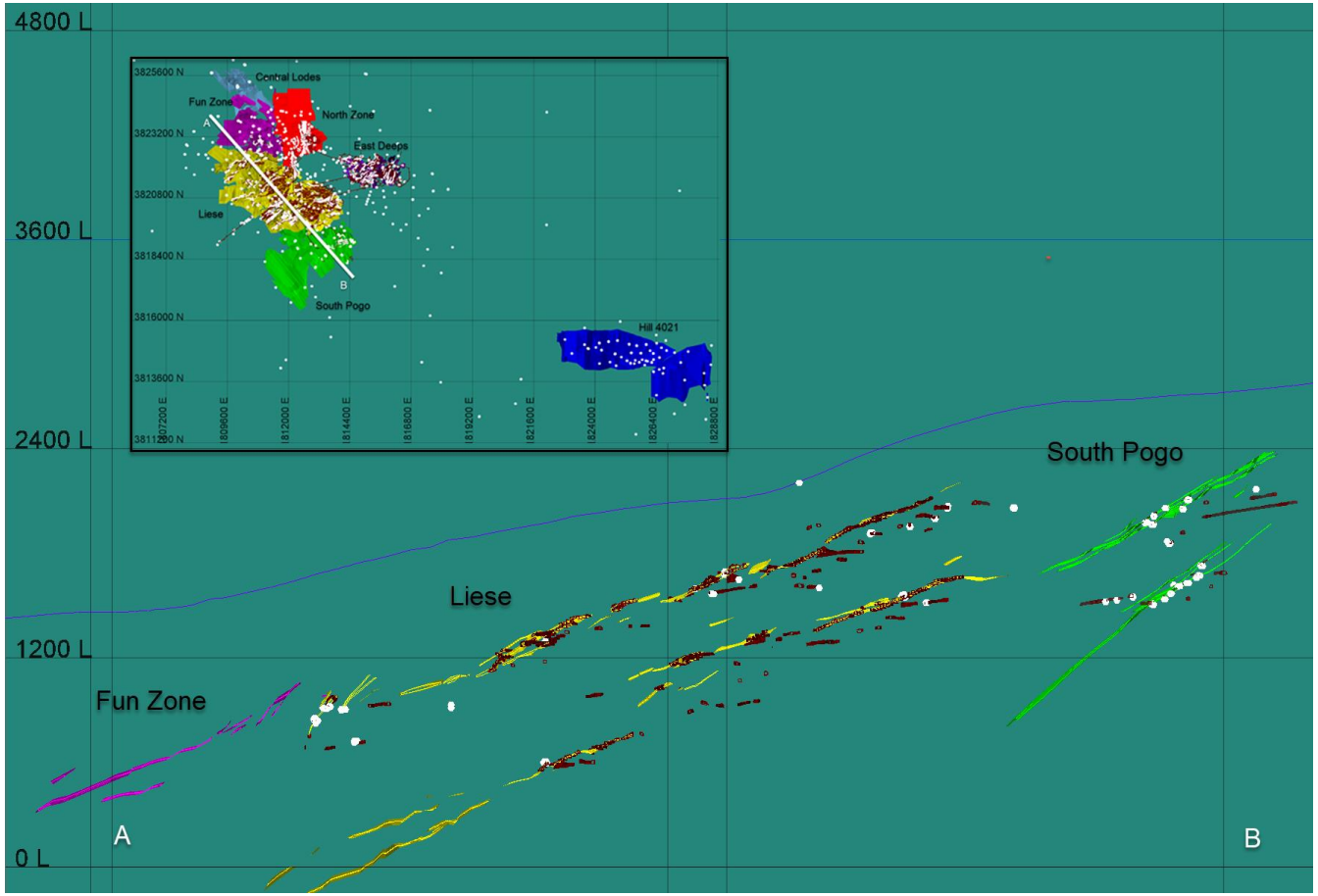

(ABOVE): Representative cross section through the Pogo deposit. Existing development is shown in brown. Topography shown in blue.

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report
Kanowna Surface (Six Mile Deposit) – 30 June 2020
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 sample preparation	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.
	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.

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Criteria	JORC Code explanation	Commentary
	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.
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.	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.
	Specification of the grid system used.	For 2014 DD drilling, each hole was gyroscopic surveyed to verify the single shot surveys.
	Quality and adequacy of topographic control.	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

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Criteria	JORC Code explanation	Commentary
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 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.

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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: 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 Competent Person has visited the site 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.
	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.

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Criteria	JORC Code explanation	Commentary
	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 AUD$2,250 and budgeted Kanowna Belle mining costs for 2019-20.
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.
	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	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.

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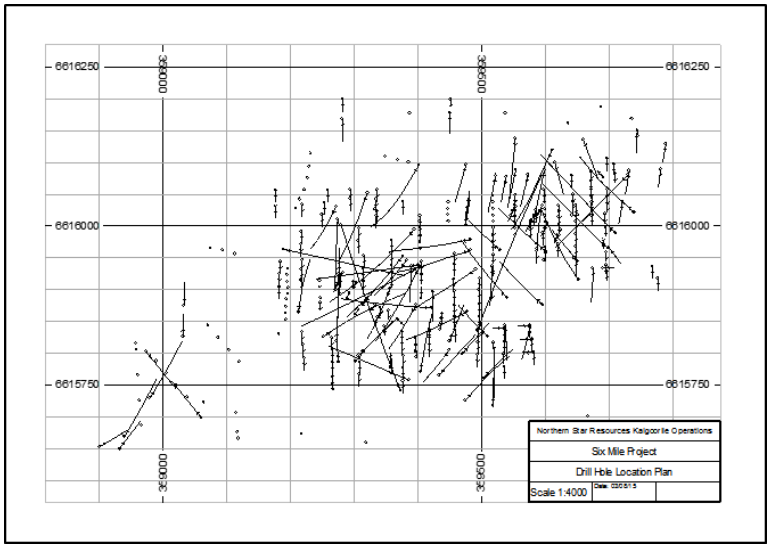
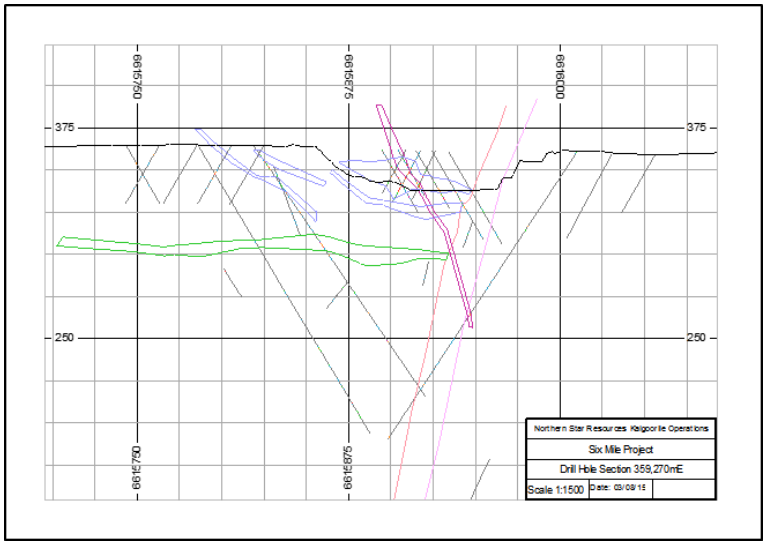
Criteria	JORC Code explanation	Commentary
Discussion of relative accuracy/ confidence	Resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.	
	The statement 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



APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report
Woodline – 30 June 2020
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 surface diamond drilling (DD) and surface Reverse Circulation drilling (RC). All RAB holes were excluded from the estimate. Reverse circulation drilling was used to obtain 1 m 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 5 m composites that were assayed with aqua-regia digest and AAS finish on a 50 g charge. All composite intervals returning greater than 0.01 g/t Au were subsequently re-sampled from 1 m intervals retained in plastic bags, dried, riffle split, and then treated as above. Diamond drill core was half-core sampled on a nominal 1 m sample length and was pulverised to produce a 50 g charge for fire assay. For the Delta gold holes, less prospective zones sampled by V-cut in 4 m 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 1 m 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 1 m to honour geological boundaries. Sample interval lengths vary from 0.3 m to 1.2 m (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 50 g 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 130-145 mm RC drill holes 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. 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 data base 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.
	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 0.01 g/t 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 DD 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 1.2 m and 0.2 m, respecting lithological or alteration contacts. The down hole depth of all sample interval extents are 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 - DD core samples submitted to the laboratory are crushed to a nominal 6mm in a jaw crusher 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. 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 to 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 were taken on a 1in 20 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. A second pulp 250-300 g 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 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*** and WDRC18***) were not sampled over the top 30 m, 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.	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.	All one metre samples were assayed with a 50g 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. The laboratories used were required to routinely repeat a fire assay from the pulp for 1 in 20 samples. Higher grade samples (above a nominal 1 g/t cut-off) were re-assayed from the original pulp until the result was deemed repeatable by the laboratory. 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.
	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 (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. Blanks were 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 have been verified by senior NSR geological staff. All recent assay data (all Barrick/NSR assay 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 have been excluded from the Resource estimation
	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 data 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 have assays in both priorities with one defaulting to zero, and the other actual grades.
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 located by survey on a local exploration grid and later referenced back to the MGA94 map grid. All pre-2017 collars were adjusted vertically to match the 2012 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. Stored in the NSR Acquire data base are various types of survey azimuths. 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). 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 20 m x 20 m 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 the paleochannel mineralisation.
	Whether sample compositing has been applied.	No sample compositing has been applied. The datasets were composited to 1m intervals prior to grade estimation. This aligns with the most common sample length taken.
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 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, supergene surfaces and the sub-vertical porphyry-related surfaces without introducing a sampling bias.

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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.	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 (Kanowna Belle). 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.
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. 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).
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 porphyry dyke that has intruded a shear zone passing through a basalt sequence. The intrusive has elevated gold grades of the order of 0.2 g/t 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.	All of the 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.	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.

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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.	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, estimated true widths are reported. Downhole lengths are 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 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 and 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.	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.
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.	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. 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.

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Criteria	JORC Code explanation	Commentary
	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 meters 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. It has been accepted that historic holes may be missing information such as start and end date, assay method and collar pick up method. Historic hole location was visually confirmed where possible, or using recent drilling as confirmation. 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 used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not 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 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 maintained a presence throughout the process.
	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.	There is a reasonable level of confidence in the interpretation of the fresh-rock and lower-most 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. 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 holes, structural measurements and previous interpretations and reports.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	The current interpretation consists of 3 oxide ore lodes and 3 fresh rock ore lodes. The oxide lodes sit within the upper saprolite and paleochannel (WD01) and the paleochannel, lower saprolite and sub-rock (WD02 and WD03). For the current interpretation, a lower cut-off grade of 0.2 g/t was used to guide the interpretation and to ensure that most of the mineralised material is captured within the oxide ore lodes. The fresh rock ore lodes are based on veining and increased shearing along a basalt-porphyry contact. All ore lodes are booleaned to the top of fresh rock surface. The current interpretation includes a wider zone of mineralisation as there does not appear to be a 'discrete' vein interpreted. The current interpretation has the fresh rock ore lodes as steeper (near vertical). The updated interpretation aligns more closely with the lithological trends identified in the model area.
	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 2017-2018 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 paleochannel.

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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.	Mineralised portion of the Woodline Paleochannel extend over 800m strike and 100 m in 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.	Grade estimation for gold was completed in Datamine Studio RM software. Geostatistical analysis and variography were completed using Snowden's Supervisor v9 software. The Woodline Resource Model consists of 6 ore shapes with a waste box surrounding these. The waste was assigned a default grade of 0.001 g/t. Each ore shape interpretation is considered as being a separate estimation domain for estimation. All estimations use hard domain boundaries. Estimations for gold used Ordinary Kriging for the oxide ore lodes and Inverse Distance Squared for the fresh rock ore lodes, unless otherwise stated. Estimates use 1m composites with grade capping applied to Gold 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 total semivariance from the variogram. Minimum and maximum samples are minimum 8 and maximum 16 for the oxide ore lodes, and minimum 5 and maximum 16 for the fresh rock ore lodes.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Each ore shape was estimated using Ordinary Kriging, Inverse Distance Squared, Inverse Distance Squared with isotropic search, and Nearest Neighbour. The final estimates are compared to the previous model estimates.
	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. A 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.	Block sizes varied depending on sample density. For the oxide ore lodes, block size was 5 x 5 x 2.5 m parent blocks. For the fresh rock ore lodes block size was 10 x 10 x 10 m parent blocks. 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 made.
	Description of how the geological interpretation was used to control the resource estimates.	Ore lodes were created using sectional interpretation. The ore lodes were used to define the mineralisation above 0.2 g/t. 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 topcut 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)

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Criteria	JORC Code explanation	Commentary
	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.	Blocks above the pit optimisation shell have been reported above 0.50 g/t using a $2,250/oz gold price assumption.
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, however high clay content has been identified in the channel mineralisation.
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 meet or exceed environmental compliance requirements. The Kalgoorlie 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.	No Specific Gravity (SG) measurements have been recorded within the Woodline model area. There are, however, references to SG measurements in historic reports and these were used as a guide for the 1709 Resource model. The 2004 Resource model uses these same density values hard coded into the model based on the oxide surfaces. These values are: • Saprolite: 1.8 t/m^3 • Transitional: 2.0 t/m^3 • Fresh rock: 2.8 t/m^3
	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.	Assumptions on the average bulk density of individual lithologies are based off historic reports. SG measurements will be required before mining to assess if these values are appropriate.

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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 • Geological confidence • Density of available drilling • Statistical evaluation of the quality of the kriging estimate • Confidence in historical data • DataClass of the drillholes
	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 within KalOps 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 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 Woodline Resource model 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.

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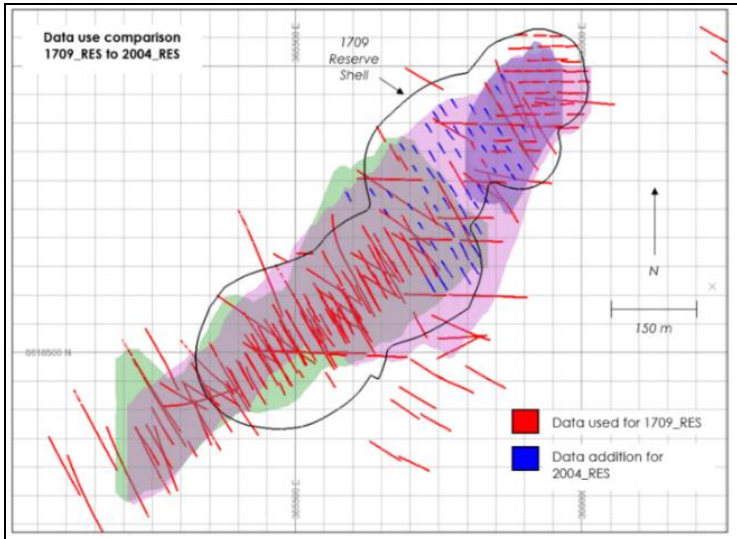
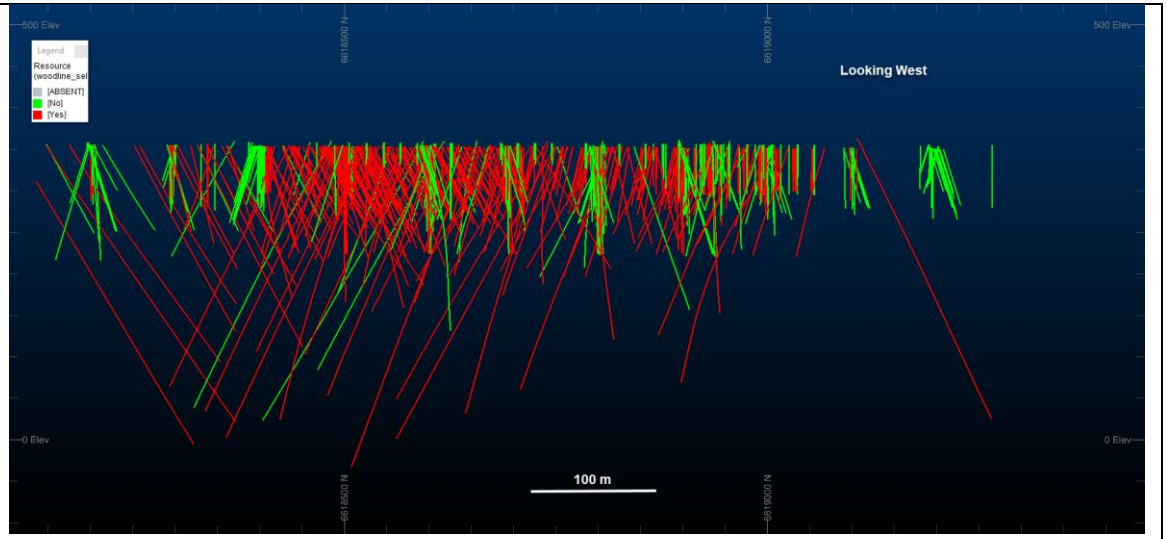


Plan View of the Woodline deposit



Long Section of the Woodline deposit

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JORC Code, 2012 Edition – Table 1 Report
White Feather Reward: Resources and Reserves – 30 June 2020
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 surface diamond drilling (DD) and surface Reverse Circulation drilling (RC). All RAB holes were excluded from the estimate. Lode | Total Holes | #DD | #RCD | #RC | 12 month RC | 12 month DD | 12 month total | % drilled in last 12 Monts | DD samples | RC samples | Total samples WF1 | 51 | 18 | 6 | 27 | 0 | 2 | 2 | 4% | 55 | 122 | 177 WF2 | 23 | 11 | 1 | 11 | 0 | 1 | 1 | 4% | 35 | 47 | 82 WF3 | 22 | 12 | 4 | 6 | 0 | 1 | 1 | 5% | 39 | 28 | 67 WF4 | 40 | 23 | 6 | 11 | 0 | 0 | 0 | 0% | 52 | 63 | 115 WF6 | 12 | 7 | 5 | 0 | 0 | 0 | 0 | 0% | 15 | 5 | 20 WF7 | 13 | 8 | 5 | 0 | 0 | 0 | 0 | 0% | 18 | 8 | 26 Sampling is by both diamond drilling (DD) and Reverse Circulation (RC) drilling completed by both NSR and previous operators. 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.
	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 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.	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.
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 to drill the White Feather deposit. Surface diamond drillholes 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. For NSR RC samples were split using a rig-mounted cone splitter on 1m intervals to obtain a sample for assay. There are limited records for historical RC splitting methods used. 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.
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 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.
	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.

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Criteria	JORC Code explanation	Commentary
	Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	Recovery was excellent for diamond core and no relationship between grade and recovery was observed. Average recovery for the project is 98%. No sample bias was 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.	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 0.3m and 1.2m (NQ2) or between 0.2m and 1m (HQ). For 2018 drilling, maximum HQ sample interval was reduced to 0.7m. 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 MinAnalytical 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 and Leachwell determinations, 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. Leachwell samples had a 1,000g 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 1,000g) 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.
	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 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. 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 drillholes 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 drillhole 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, then resampled to 1 m samples in mineralised zones. 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 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 drillholes have been particularly oblique, they have been flagged as unsuitable for resource estimation.

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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, 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 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 gazetted Kanowna Town site . 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 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 NE 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. Gold occurs as coarse grains within these 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.	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 2020 resource report. Drillholes 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 2020 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.	No material data has been excluded from this report.

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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 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').	
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 2020 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 is 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 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
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.	There are no alternative interpretations as White Feather is well understood from previous mining history.
	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, limited 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.

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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.	WF1 and halo – 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 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 – 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 – 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 - 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 – 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 – 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.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	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.
	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 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. Domain: White Feather; XMIN 367,100; YMIN 6,613,900; ZMIN -100; XMAX 367,600; YMAX 6,614,500; ZMAX 400; XINC 10; YINC 10; ZINC 20; #X 50; #Y 60; #Z 25 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.

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Criteria	JORC Code explanation	Commentary
	Description of how the geological interpretation was used to control the resource estimates.	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
	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 $AU1,750/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 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.

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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 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.
	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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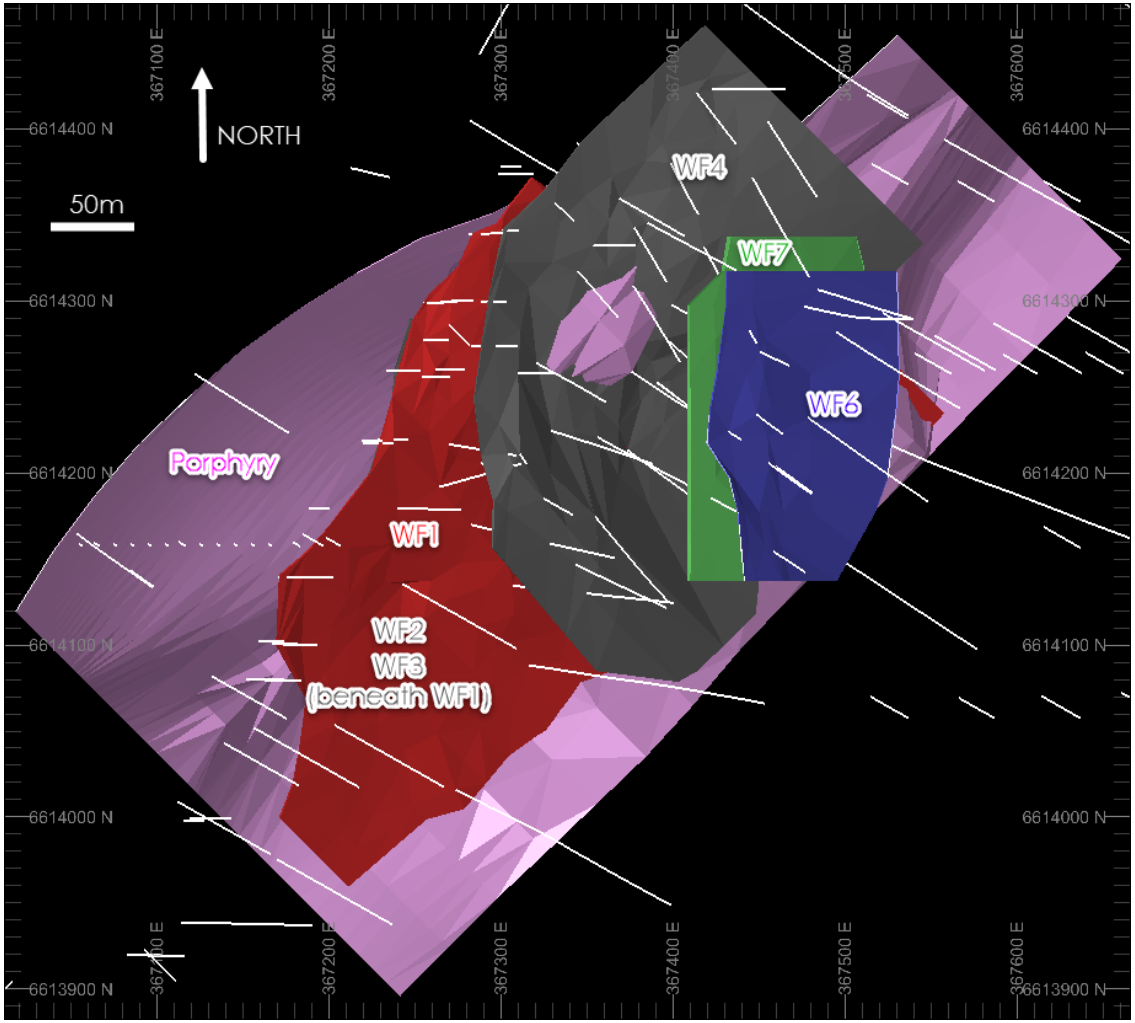

Figure 1. Plan view of the White Feather project and the data used in each resource estimate

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JORC Code, 2012 Edition – Table 1 Report
Red Hill Nemesis: Resources and Reserves – 30 June 2020
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 both NSR and previous operators. 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><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 months</th><th>DD samples</th><th>RC samples</th><th>Total samples</th></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>
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	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.
	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 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 compromise.
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 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.
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 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.
	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%.

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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.	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 NQ(2) 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. All diamond core is logged for regolith, lithology, veining, alteration, mineralisation and structure. Structural measurements of specific features are also taken through oriented zones. For NSR RC samples were split using a rig-mounted cone splitter on 1m intervals to obtain a sample for assay. 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.	Diamond drilling - 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. RC drilling - 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.
	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 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 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 the AcQuire database. 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. 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.	For NST drilling, planned holes are 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. 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 Out runs are 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 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 proportion were not 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.
	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 orientations are shallow 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 are 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 nearby 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.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Gold was discovered in October 1893 with underground mining continuing into the early 1900s and again 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 hosted within felsic porphyry intrusions of the Talbot Formation within the Boorara Domain. Intrusive porphyry structural corridor trends 060 degrees and extends approximately 4 kilometres to the north east of the Kanowna Belle Gold Mine. The Red Hill - Nemesis complex is a 'stockwork' mineralised porphyry dominated by flat to shallow dipping quartz vein sets. In detail, gold mineralisation at Red Hill is hosted within the Red Hill porphyry with three phases of mineralisation; gold hosted in the altered rock mass, gold hosted in early quartz-carbonate and quartz-carbonate-pyrite veins 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 these veins and is 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 gold hosted in late stage planar flat dipping quartz veins similar to those observed at Red Hill. The 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: 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 Red Hill – Nemesis project can be found above. The collar locations are presented in plots contained in the NSR 2019 resource report. Drillholes 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.	No material information is excluded from 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 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 2020 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 is either recorded on paper and manually entered into a database system or is captured digitally 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 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 after review of the geological continuity suggested by the drilling. Areas of the model which 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.	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 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 as it is supported with information acquired from mining and drilling. The confidence in the Nemesis geological interpretation is moderate and requires additional drilling to determine the mineralisation controls present. Red Hill project wireframes were generated 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 interpretation was created using the sectional interpretation method.
	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 have been considered.
	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.
	The factors affecting continuity both of grade and geology.	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 veins at the deposit.
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 Red Hill – Nemesis porphyry is approximately 900 m. Primary mineralised zone has been interpreted over this entire length and is known to occur to approximately 470 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.	Red Hill –Three domains have been recognised and estimated using indicator estimation based on grade; 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 ID^3 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 using Categorical Indicator Kriging. 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 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 variographic analysis was 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.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	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.
	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 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. Domain | XMIN | YMIN | ZMIN | XMAX | YMAX | ZMAX | XINC | YINC | ZINC | #X | #Y | #Z Red Hill | 366100 | 6613800 | -200 | 367410 | 6614680 | 410 | 20 | 20 | 20 | 131 | 88 | 61 Nemesis | 366100 | 6613800 | -200 | 367410 | 6614680 | 410 | 10 | 10 | 10 | 66 | 44 | 32 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.	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 distribution 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

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Criteria	JORC Code explanation	Commentary
	Discussion of basis for using or not using grade cutting or capping.	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 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. 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 $AU1,750/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 minimum mining assumptions have been made during the resource wireframing or estimation process. Both Red Hil and Nemesis Pits are currently full of dried mill tailings
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 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 2.0, 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.
	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.

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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 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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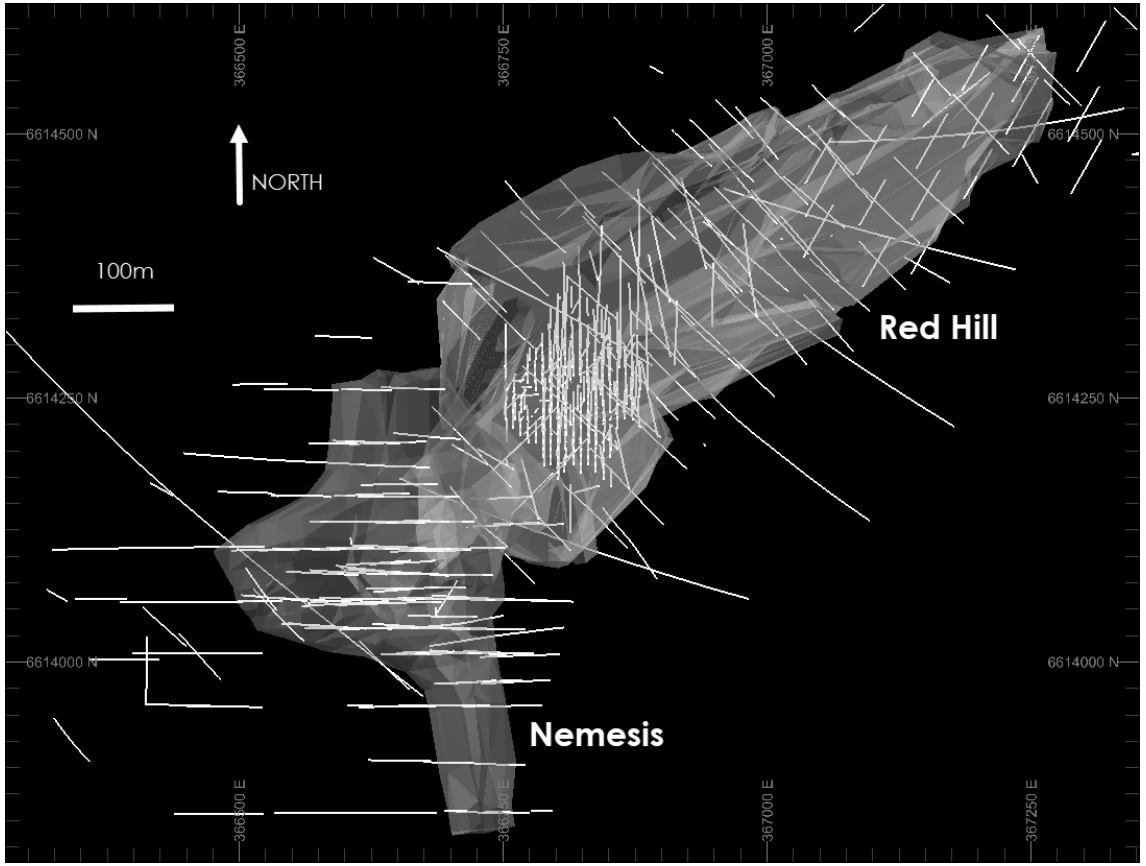

Figure 1. Plan view of Red Hill – Nemesis project and the data used in each resource estimate

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report
Kanowna Belle: Resources and Reserves – 30 June 2020
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>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>5,461</td><td>836,684</td><td>735,743</td><td>877</td><td>16%</td></tr>
<tr><td>RC</td><td>197</td><td>24,594</td><td>23,810</td><td></td><td></td></tr>
<tr><td>Underground Channels</td><td>1,405</td><td>11,372</td><td>13,543</td><td>1,182</td><td>84%</td></tr>
<tr><td>Total Number of Drillholes</td><td>7,063</td><td>872,650</td><td>773,096</td><td>2,059</td><td>29%</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>For DD samples, metre delineation 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 to 1.3m (NQ).

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) or perpendicular to the ore body.</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>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.</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 NQ2 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 rowspan="3">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>
<tr><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. Areas of potential lower recovery are generally known and controlled drilling techniques employed to maximise recovery.</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 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.</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 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.	Mineralised intersections are sampled with a maximum and minimum length of 1.3m and 0.3m, respecting lithological or alteration contacts. DD core was orientated (where possible), measured and then sampled by cutting the core in half longitudinally using an "Almonte" diamond saw. The same half of the core is 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 are stored and catalogued. Full core sampling is conducted on certain grade control holes. Routine 'field duplicates' to assess sample representivity are not performed on diamond core as these are not considered to be true field duplicates.
	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 either horizontally or perpendicular 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 mineralized 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.	Sample preparation follows industry standard practice. 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 sulphide content and flux adjusted. 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.
	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 mineralization 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, quarterly and annual 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 are inserted at a ratio of 1:20. 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 ratio of 1:20. 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 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 drillholes 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 drillhole 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-meter survey. Since May 2019, all DD holes are surveyed down hole only using DeviFlex, generally every 50m and at the end of hole, taking measurements every 3m. QAQC is performed on the speed of running and misclose rate for each gyroscopic survey. Where issues are identified, a single survey run can be chosen as preferred. This data is converted to .csv format and imported into the AcQuire database where it is validated by the project geologist. If survey data is 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 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 10m x 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.	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.

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Criteria	JORC Code explanation	Commentary
	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 Kanowna Belle ore lodes. Due to the complex overlapping nature of the Mineralised 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 was 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.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Kanowna was discovered in 1989 by Delta Gold, open pit mining occurred between 1993 and 1998 with underground operations beginning 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.	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, Sims, Hilder, Hangingwall and Footwall shoots controlled by sets of structures of various orientations oblique to Lowes. Lowes contains some 80% of known gold mineralization 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 few 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 mineralization 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 cross-cuts 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 was used directly or indirectly for the preparation of the resource estimates described in this Table.
	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 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.

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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).	The down dip and hangingwall extensions of the Kanowna Belle Mineral Resource will be drill tested from various underground drilling platforms with focus on Lowes East, and E-F Block hangingwall material.
	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 meters 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 • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling, not used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not 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 the 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.	Site visits have been undertaken

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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 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 lithological contacts. This was based on underground observations from recent development. The interpretation within A Block has also been adjusted with the HM-trending lodes the dominant orientation over West Troy.
	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 mineralized 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 v9 software. The Kanowna Belle Resource Model consists of ore lodes and Mineralised Envelopes. The Mineralised Envelopes have been included to provide a realistic estimate of grades sitting between and adjacent to currently interpreted ore lodes. The interpretation is based on the prevailing lithology and the predominant ore trend (i.e. HM, TM or SM trends). 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 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 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 total semivariance 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. Envelope – drillholes and channels were selected within the Mineralised Envelopes with the samples sitting inside ore lodes excluded. Estimations use 1 m composites with a hard topcut applied (if applicable) to remove genuine outliers. On the topcut dataset, a grade cut-off is selected that best separates the high-grade and low-grade populations based on the inflection point in the Log probability and Mean/Variance plots. Indicator variography at the chosen cut-off is completed to determine the orientation of continuity. This was checked to ensure it mirrored the structural interpretation in the area. Two volume models were created – a volume model for the Mineralised Envelope using the wireframes and a high-grade domain by removing samples that fall below the selected cut-off. A nearest neighbour estimate is run to back flag blocks in the high-grade domain. Grade estimates are run for both high-grade and low-grade sub-domains at 2.5 m x 2.5 m x 2.5 m block size to ensure granularity. These sub-domains are combined with any blocks estimated on the third pass (or not at all) set to default values of 0.1 g/t.
	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 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%. Samples are only sent for sulphur analysis assay if the assay sample returns a value than 2 m (true thickness) at 2 g/t or any sample greater than 10 g/t. Sulphur grade is estimated on the combined model as opposed to a lode by lode estimation. Where ore lodes have no sulphur data, a default value of 0.01% is set. Topcuts, variography and estimation approach are completed as per the gold estimation procedure described above.

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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.	Block sizes vary depending on sample density. Due to the nature of the mineralisation, a 5 m x 5 m x 5 m parent block size is used. The Mineralised Envelopes are estimated within a 2.5 m x 2.5 m x 2.5 m parent block size to ensure reasonable granularity. 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 Mineralised Envelopes were created using sectional interpretation. The ore lodes were used to define the high-grade mineralisation, whilst the Mineralised Envelopes 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. The top cut values are applied using 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 topcut is applied if there are extreme outliers within an ore domain or the area has a history of poor reconciliation.
	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 1.58 g/t cut off within 3.0 m minimum mining width (excluding dilution) MSO's using a $A2,250/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.	All metallurgical assumptions are based on extensive operating history of the material through the Kanowna Belle processing facility.

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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 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 a default of 2.77 t/m^3 (Kanowna Belle) or 2.81 t/m^3 (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 'vugs' or voids.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Assumptions on the average bulk density of individual lithologies are 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 transitional (2.52) material, due to lack of detailed 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 reflects 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.	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.

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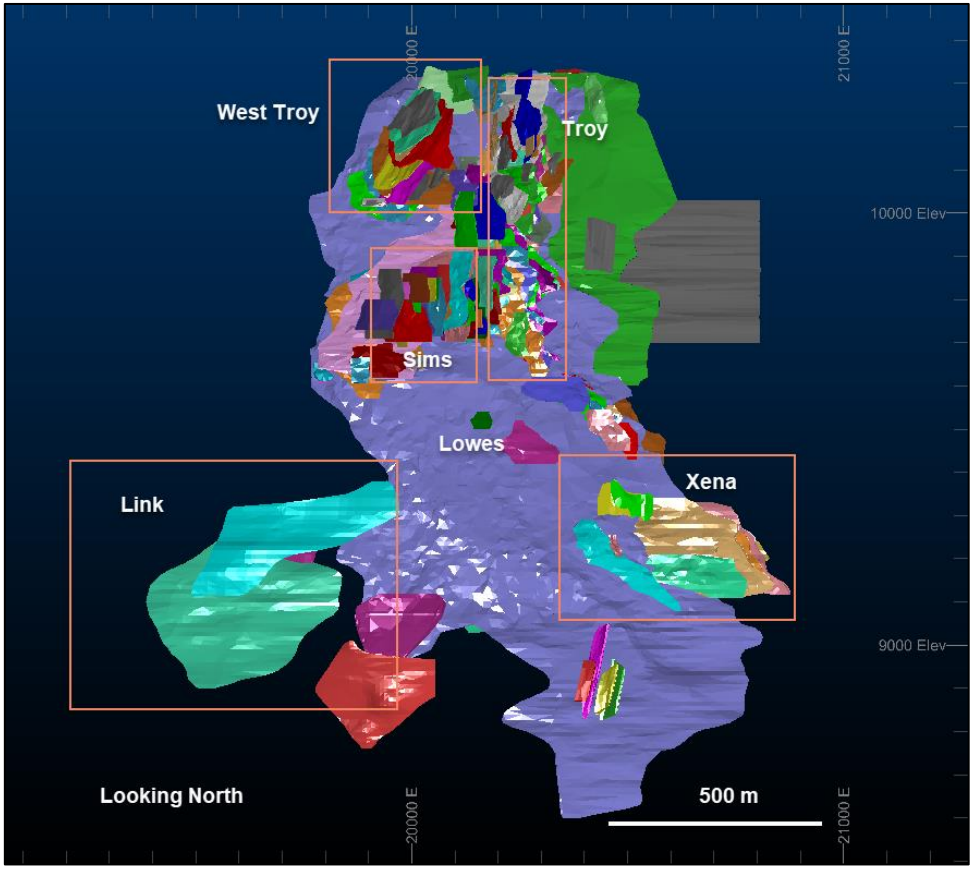

Figure 1. Long section view of the Kanowna Belle deposit

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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.	Northern Star Resources Limited (NSR) June 2020 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.	**Underground** Ore Reserves are re-optimised on a yearly basis taking the most up to date geological 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 variable stoping cut off and evaluated using design software. Stope shapes generated are mineable stope shapes. 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. 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 open pit 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 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 associated with increased ground support and fill requirements. **Open Pit** The pit cut-off grade has been calculated based on the key input components (mining, processing, recovery, gold price 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.

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Criteria	JORC Code explanation	Commentary
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).	**Underground** 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 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.	**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 nominally subdivided vertically in mining blocks of 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 is 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 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.	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. A detailed interface review was conducted to ensure separation between underground and open pit Reserve material.
	The mining dilution factors used.	**Underground** 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 0.8m dilution by width for stopes below 5m width. **Open Pit** Reserve physicals are reported within generated minable shapes. Dilution accounted for within the mining shape is 29%; that is waste material carried within the mining shape.
	The mining recovery factors used.	**Underground** 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. **Open Pit** For open pit material, mining recovery is built into the SMU dimensions.
	Any minimum mining widths used.	For underground, a minimum mining width of 3.0m has been used. For open pit areas, the minimum minable selective mining unit (SMU) dimensions are 3.5 m Wide x 2.5 m High x 4.0 m Long.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	For underground, designed stopes with greater than 50% Inferred/Unclassified blocks are excluded from the reported Ore Reserve. For open pit inferred material is not considered for the Ore Reserves but is considered for LOM planning purposes.

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Criteria	JORC Code explanation	Commentary
	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 workshop on the 9860 level. Multiple vertical raises exist within the mine to assist with material storage and haulage. 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, 15 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, 15 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, 15 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. Most 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 being 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 an underground 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 a schedule of rates supplied by the contractor for the underground operation. To ensure estimated costs are reasonable they are compared to historic operating costs. The estimation of Open pit mine operating costs was based on a contractor mining and maintenance operation using first principles to determine equipment productivities and associated operating hours to generate mine schedules. Provided contract pricing were than applied to the schedule to calculate all unit costs.
	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.

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	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$1,750/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 assumed sold direct to the market.
	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 annual Reserve optimisation. Cut-off grades, derived from 12 month forward looking unit costs, form the basis of the 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$1,500 to A$2,000 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.	Ore Reserves include Proved (if any) and Probable classifications based off the underlying Resource model classifications whereby Measured resource may convert to Proved or Probable, and Indicated material convert 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 Ore Reserves reporting processes has been subjected to an internal review by NSR Senior Technical personnel in July 2020.

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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 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.	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 2020
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 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.

Hole Type	No. of Collars	Total Meters	No. of Samples	Number of additional collars	% of additional drillholes
Diamond	805	177,352	127,380	90	13%
Underground Channels	344	3,123	3,052	23	7%
Total Number of Drillholes	**1,149**	**180,475**	**130,432**	**58**	**11%**

	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	For DD samples, metre delineation 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 to 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).
	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.	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.
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.).	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.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	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, more than 95%, but this will vary between areas based on the presence of faulting. Overall, there have been no significant sample recovery problems for Velvet.
	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 or Panglo Unconformity. Areas of potential lower recovery are generally known before hand and controlled drilling techniques employed to maximise recovery.

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Criteria	JORC Code explanation	Commentary
	Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	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.
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 mineralized 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 mineralization 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. Mineralised 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 are 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 either horizontally or perpendicular 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 mineralization 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, 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.
	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.

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Criteria	JORC Code explanation	Commentary
		• Unannounced laboratory inspections Standard control samples and blanks purchased from certified commercial suppliers are inserted at a ratio of 1:20. 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 ratio of 1:20. 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 drillholes 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 drillhole 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, , taking measurements every 3m. QAQC is performed on the speed of running and 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 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 Velvet. Channel samples are generally 4-5 m spaced, where present.
	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	Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	Most 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.

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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.	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 was 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.
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 34 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 of 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.

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Criteria	JORC Code explanation	Commentary
		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 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.	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 mineralized 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.
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).	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.

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Criteria	JORC Code explanation	Commentary
	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/mineralization 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 with minor issues with data 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.	Not applicable
eological 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.	There are no alternative interpretations
	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 mineralized structures.

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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 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 Mineralised Envelopes. The Mineralised Envelopes have been included to provide a realistic estimate of grades sitting between and adjacent to currently interpreted ore lodes. The interpretation is based on the prevailing lithology and the predominant ore trend (i.e. VM01). 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. Only VM05 was subdomained by grade using a soft boundary. Estimations for Gold 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 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. 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 drillholes. The model was coded with these selected thresholds to create a domain field (0, 1 or 2). The composite drillholes were then back flagged with the domain values. Subdomains 1 and 2 was then estimated using Ordinary Kriging with an anisotropic search and using DA with a forced plunge. Subdomain 3 was estimated using Inverse Distance with an isotropic search and DA with no forced plunge and a larger block size (10x10x10) as the drillhole spacing is wider at depth. Envelope – drillholes and channels were selected within the Mineralised Envelopes with the samples sitting inside ore lodes excluded. Estimations use 1 m composites with a hard topcut applied (if applicable) to remove genuine outliers. On the topcut dataset, a grade cut-off is selected that best separates the high-grade and low-grade populations – based on the inflection point in the Log probability and Mean/Variance plots. Indicator variography at the chosen cut-off is completed to determine the orientation of continuity. This was then checked to ensure it matched the structural interpretation in the area. Two volume models were created – a volume model for the Mineralised Envelope using the wireframes, and then a high-grade domain by removing samples that fall below the selected cut-off. A nearest neighbour estimate is run to back flag blocks in the high-grade domain. Grade estimates are run for both high-grade and low-grade sub-domains at 2.5 m x 2.5 m x 2.5 m block size to ensure reasonable granularity. These sub-domains are then combined, with any blocks estimated on the third pass (or not at all) set to default values of 0.1 g/t.
	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 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%. 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. The estimation approach for sulphur has been reviewed since the June 2019 Resource models. Sulphur is now estimated on the combined model as opposed to a lode by lode estimation. Top cuts, variography and estimation approach were completed as per the gold estimation procedure described above.
	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 5 m x 5 m x 5 m parent block size was used so that the patchy nature of the mineralisation can be represented within the estimate. The Mineralised Envelopes are estimated within a 2.5 m x 2.5 m x 2.5 m parent block size to ensure reasonable granularity. 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.

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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. The top cut values are applied in several steps, using 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 1.58 g/t cut off within 3.0 m minimum mining width (excluding dilution) MSO's using a $AUD2250/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.
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.

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Criteria	JORC Code explanation	Commentary
		Compliance with air quality permits is particularly important at Kanowna because of the roaster operation. 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 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 2.77t/m^3 (Kanowna Belle) or 2.81t/m^3 (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 vugs 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 drillholes • 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 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 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 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.	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.

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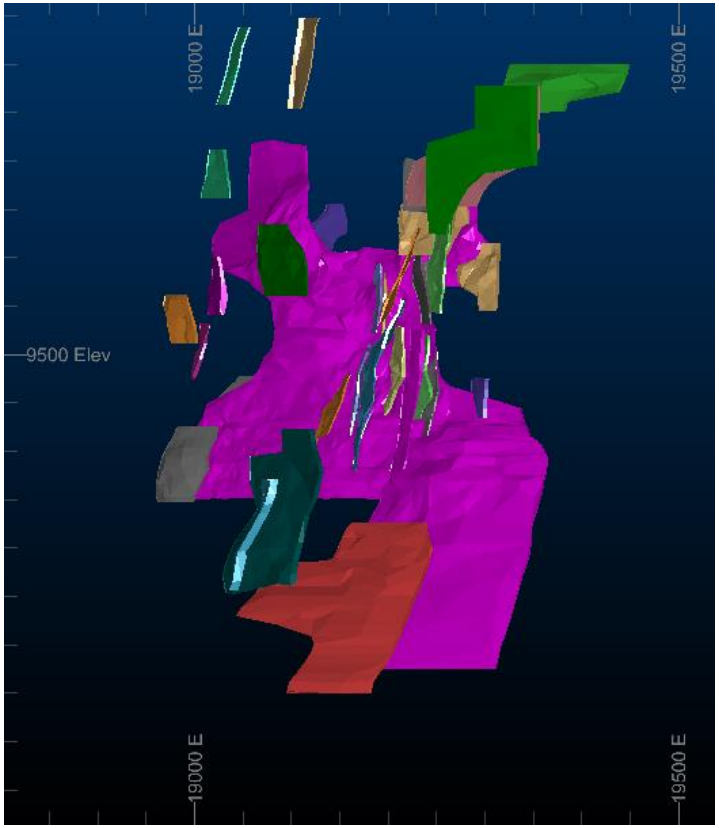

Figure 1. Long Section of the Velvet deposit

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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 2020 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 geological 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 variable stoping cut off and evaluated using design software. Stope shapes generated are mineable stope shapes. 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. 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 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 associated with increased ground support and fill requirements.
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 nominally subdivided vertically in mining blocks of 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. A 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 0.8m dilution by width for stopes below 5m width.

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Criteria	JORC Code explanation	Commentary
	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 workshop on the 9860 level. Multiple vertical raises exist within the mine to assist with material storage and haulage. 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, 15 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, 15 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, 15 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. Most 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 being 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 a schedule of rates supplied by the contractor for the underground operation. To ensure estimated costs are reasonable they are compared to historic operating costs.
	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$1,750/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 assumed sold direct at Corporate gold 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 annual Reserve optimisation. Cut-off grades, derived from 12 month forward looking unit costs, form the basis of the 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$1,500 to A$2,000 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.	Ore Reserves include Proved (if any) and Probable classifications based off the underlying Resource model classifications whereby Measured resource may convert to Proved or Probable, and Indicated material convert to Probable Reserve.

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Criteria	JORC Code explanation	Commentary
	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 2020.
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.	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
Xmas: Resources and Reserves – 30 June 2020
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, surface diamond drilling (DD), surface reverse circulation drilling (RC), surface RC drilling with diamond tails (RC_DD) and face sampling (FS). RAB holes were excluded from the estimate and where sufficient diamond drillholes were present, RC holes were also excluded. Xmas: DD 133 # of Holes, 34,641 Total m's, 13,584 # of Samples; FS 58, 274, 419; RC 32, 2,521, 2,102; RC_DD 15, 7,247, 2,505; Total 238, 44,683, 18,610
	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 (0.2 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. 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 40g charge was selected for fire assay.
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 to drill the Xmas deposit. Surface diamond drillholes were completed using HQ2 (63.5 mm) core whilst underground diamond drillholes where completed using NQ2 (50.5mm) core. 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.
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 interval into the hole log.
	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. Average recovery across the Kundana camp is at 99%. Much of the core loss at Xmas is in the footwall of the main lodes, where a softer shear zone exists in the SAQ lithological unit.
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. 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. All underground faces are logged and sampled to provide both qualitative and quantitative data.
	The total length and percentage of the relevant intersections logged.	For all drill holes, the entire length of the hole was 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.	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 exploration drilling. 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 mineralization 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 underground 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 µm.
	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 the Kundana core samples as an entire batch. A minimum of 3% of the total 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.	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 areas around the target zone and of prospective high-grade mineralisation a fire assay to extinction method is used. Samples have five 40 g charges go through the above fire assay process. The average of these 5 charges is then taken and used as the primary assay value. These extent and selection of which zones are fire assayed to extinction is decided upon by the logging geologist at the sample selection stage.
	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 rate of 1 per 20 samples. The insertion points are selected at random but are at least 1 in every 20 samples. 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. When visible gold is observed in core, a quartz flush is requested after the sample. No field duplicates were submitted for diamond core. Pulp duplicates are requested after zones of suspected mineralisation. However, areas which are fire assayed to extinction are not selected to have pulp duplicates analysed These are indicated on the sample sheet and submission sheet. 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 drillholes 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 drillhole 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 survey, using the Devi flex survey tool is completed taking measurements every 3 m to ensure accuracy of the hole. This is a 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.	Drillhole spacing varies across the deposit. For resource targeting drilling spacing was typically a minimum of 60 m x 60 m. This allowed for RSD and GC infill drilling down 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.	Most of the mineralisation in the Xmas deposit dips 65° to the West. 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 drillholes 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 M16/157 tenement, 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.

APPENDIX B: TABLE 1

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 the White Flag Joint Venture 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. Pegasus 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. This regional scale shear zone also contains several large-scale faults cross cutting the major shear zone at an approximately north-south orientation. Mineralisation along the Strzelecki trend consists of a shear hosted vein. This is present on the contact between a quartz rich silica flooded Quartz Arenite (SAQ) unit and intermediate Andesite (Black Flag Group) unit. This Quartz Arenite unit is a small sedimentary unit situated on the contact of the coarse-grained mafic Powder Sill Gabbro. The Xmas ore body sits on the Strzelecki trend between the large regional Pope John and Lucifer faults. Recent denser spaced drilling and development completed has indicated the presence of smaller, mine scale faults.
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 Xmas deposit can be found above. The collar locations are presented in plots contained in the NSR 2020 resource report. Drillholes vary in dip from +44° to -76°, with hole depths ranging from 20 m to 876 m, with an average depth of 248 m. The assay data acquired from these holes are described in the NSR 2020 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 mineralized 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 2020 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 deposit with the intention of extending areas of known mineralisation. Drilling is continuing to the south towards the Pope John fault and historic Strzelecki workings. 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. 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 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. An extensive review of all the historic data for Xmas was undertaken in 2018 and Data Class (DC) values from 0-3 assigned to each drill hole and channel, 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. • DC 2 = Recent data; minor issues with data 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 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 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 Strzelecki and Xmas lodes 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 Xmas 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.

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Criteria	JORC Code explanation	Commentary
		The interpretation of the Xmas 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. The confidence in the geological interpretation of Xmas is high due to the nature of the mineralization with drilling showing the existence of continuity at a 40 m x 40 m spacing.
	Nature of the data used and of any assumptions made.	Xmas mineralisation is based on drill and face data (lithology, structure, alteration, and mineralization logs). The primary assumption is that the mineralization is hosted within structurally controlled quartz veins, which is considered robust. The current understanding is that there is a brittle offset on the Pope John fault between the Strzelecki and Xmas lodes.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	No alternative interpretations have been considered.
	The use of geology in guiding and controlling Mineral Resource estimation.	The interpretation of the main Xmas structure (XMV) is based on the presence of logged quartz percentage, quartz veining/shearing and continuity between sections of these structures and adjacent mineralized structures. The XHW lode is in the hanging wall of XMV. XHW has been interpreted based on the presence of logged quartz.
	The factors affecting continuity both of grade and geology.	Structure is continuous over the length of the Xmas deposit with either quartz or the controlling structure used to guide this interpretation. The Pope John fault gives a brittle offset between the Strzelecki and Xmas mining areas and is interpreted to be post mineralization. Mineralisation on the Xmas trend is truncated at the north by the Pope John fault and at the south by the Lucifer fault. Grade continuity within the XMV is not inconsistent and as such, the mineralisation has had spatial sub-domaining applied, based on gold grade. A semi-soft boundary has been used for the sub-domains during the estimation. The high-grade continuity within the XMV exists as a south trending plunge, the low-grade subdomain has a north trending plunge.
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 Xmas deposit extends over 800 m of strike at the top of the deposit (near surface) with a dip extent of 1,000 m. The XMV is ~ 0.5 m wide and can be up to 1.5 m wide with a minimum width of ~ 0.1 m. The XHW has a 150 m strike and 80 m down dip extent. XHW is ~ 0.2 m wide.
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 Xmas mineralisation is comprised of the Xmas Main Vein (XMV) and Xmas Hanging wall (XHW) lodes. All mineralisation domains used 1.0 m composites with direct grade estimation. The Resource Estimation has been completed using Ordinary Kriging (OK), utilising a three-pass search strategy using Datamine Studio RM v 1.6 software. Details of the estimation parameters for each mineralisation zone are summarised below. XMV - divided into two subdomains based on grade: high-grade and low-grade. The subdomains were combined, and an influence limitation top cut selected at 200 g/t Au. A lower cut grade of 10 g/t was selected to create the lower cut model (this is described in grade cut strategy below). Once top cut, variography was completed on the combined composite file, indicating grade continuity in a Southern plunge direction for the high-grade subdomain. A northern plunge direction was selected for the low-grade domain. The data had a search range of ~40-50 m in direction 1 and 30-45 m in direction 2. Three passes were used for estimation with distances based on variography. XHW was analysed and a top cut of 150 g/t Au selected. Due to the low number of samples (4 in total), variography was not possible. The XHW domain borrowed variography from the XMV for the OK estimate. The data had a search range of ~200 m in direction 1 and 150 m in direction 2. Three passes were used for estimation with distances based on the XMV variography.
	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 (ID^2) and Nearest Neighbour (NN) completed as a comparison. Estimates using a soft and semi-soft boundary (with the Strzelecki and Xmas composites combined) have also been compared and reviewed. Estimates for the SMV and XMV 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.

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Criteria	JORC Code explanation	Commentary
		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.	Hanging wall and footwall wireframe surfaces were created using sectional interpretation. These were used to define the XMV and XHW mineralised zones based on the shearing, veins and gold grade. XMV (Xmas main vein) steeply dipping structure with quartz veining evident from drilling. XHW (Xmas hanging wall) small steeply dipping structure in the hanging wall of the XMV. For mine planning purposes a waste model is created by projecting the hanging wall and footwall surfaces 50 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. Top cuts were selected based on a statistical analysis of the data to not impact the mean by more than 5% and reduce the coefficient of variation to around 1.2 and vary by domain (ranging from 150 to 200 g/t for Xmas). The top cut values are applied in several steps using 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. 25 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 search ranges.
	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 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.	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 1.64 g/t cut off within 2.5 m minimum mining width including no dilution MSO's using a $AUD2,250/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	No mining assumptions have been made during the resource wireframing or estimation process.

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Criteria	JORC Code explanation	Commentary
	not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	
Metallurgical factors or assumptions	The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	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.	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 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 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 licenses 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. 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 Xmas was completed in conjunction with a review of the density values at Raleigh. As a result, either the mean densities by lithology were coded into the database. Where there were no measurements for a specific lithology and default of 2.77t/m^3 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 1,854 bulk density measurements at Xmas. Assumptions were also made based on regional averages, on the default densities applied to oxide (1.8t/m^3) and transitional (2.3t/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 Person's 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. No external audits have been undertaken on Xmas.
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 Xmas-Strzelecki style of mineralization. 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
	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 Xmas mineralization. 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.

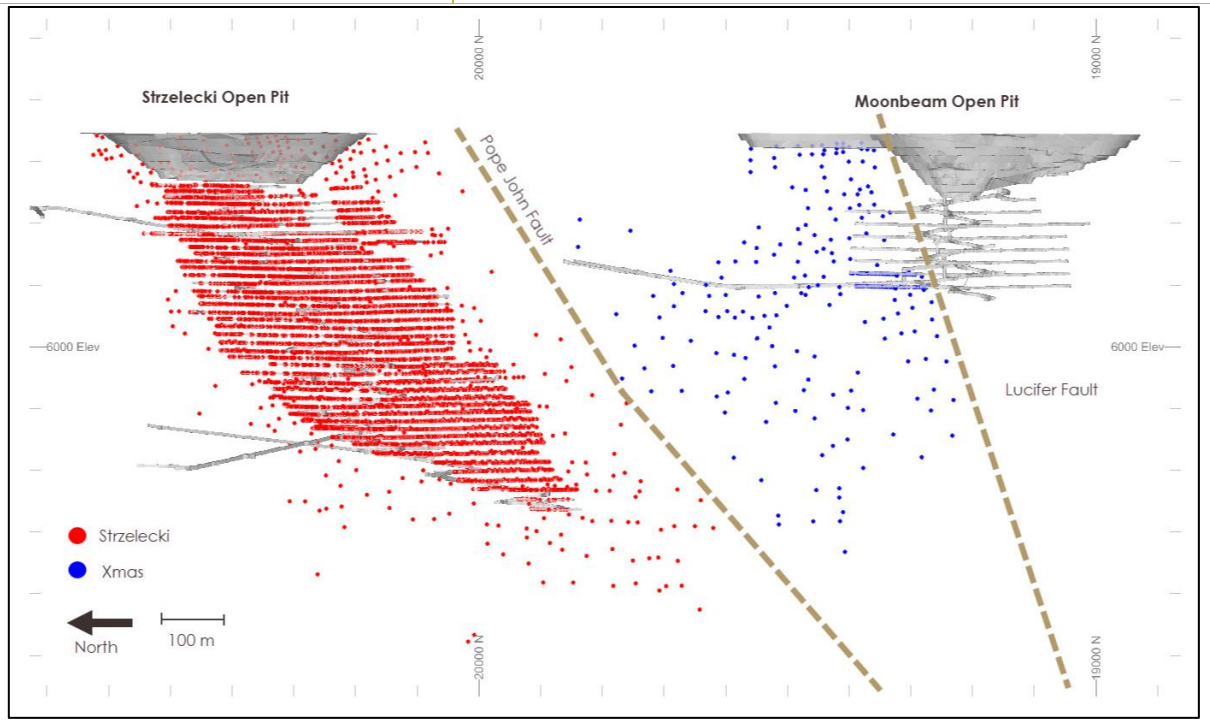

Figure 1. Long section view of the Xmas deposit and data used in the Resource Estimate

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 2020 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

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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.	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.
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 $1,750/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, Strzelecki 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). Top down open stoping methods are applied and the levels are broken into selectively sized stoping blocks to maximise production.
	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.	10% dilution has been applied to all stopes.
	The mining recovery factors used.	A calculated 70% recovery is applied to unfilled uphole stopes to account for pillar requirements.
	Any minimum mining widths used.	A minimum stope mining width of 2.5m has been used. This considers a minimum stope width of 1.7m +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.
	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.	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 more than 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.	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.

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Criteria	JORC Code explanation	Commentary
	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.	The Millennium operation 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 $1,750/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 $1,750/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 assumed sold direct at the Corporate gold 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.
	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 2020
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.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	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.	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 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 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, AurionGold, 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.	The collar locations are presented in plots contained in the NSR 2020 resource report. Drillholes vary in survey dip from +65° to -90°, with hole depths ranging from 5.8 m to 1,700 m, with an average depth of 163 m. The assay data acquired from these holes are described in the NSR 2020 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.	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.	Assay results are length weighted to make continuous intersections with up to 2m of internal waste may be included.
	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 assay results have been top cut for the purpose of this report. A lower cut-off of 1 g/t 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.
	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').	Downhole widths are 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.	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 to extend the Indicated Resource deeper by additional drilling and identify new mineralised shoots on the Barkers Main Vein structure. Testing extension of Barkers-style mineralisation to the south is also a priority, with drilling set to commence early in FY2021.
	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 unvalidated data excluded from the MRE
	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 (MP).
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	MP have not undertaken a site visit, although the Northern Star personnel liaised with during the MRE process and responsible for the mineralisation interpretation have been to site and reviewed the core for this deposit.
	If no site visits have been undertaken indicate why this is the case.	Not applicable
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 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 defined by drilling intercepts to be in excess of 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 drillhole intercepts and the second being a moderate to steep southerly plunge.

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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.	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 assigned 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.
	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 drillhole 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 drillhole 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 drillhole 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 drillhole 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 drillhole 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.	The mineral resource estimate has been reported at a 1.64 g/t cut off within 2.5 m minimum mining width (excluding dilution) MSO's using a $AU2,250/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 wire framing 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 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 previous MRE's for the Barkers Deposit. 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.	Assumptions on the average bulk density of individual lithologies from the regional Kundana data set based on 21,549 bulk density determinations. Default densities have been applied to oxide (1.9 t/m3) and transitional (2.3 t/m3) material, due to lack of data in this area. These values are in line with regional averages.
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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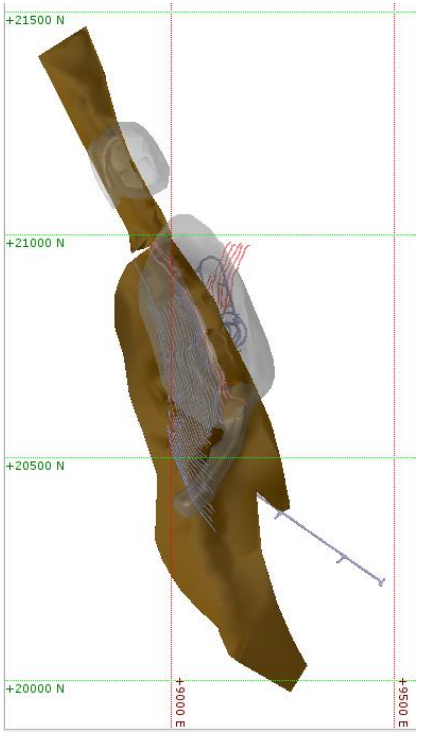
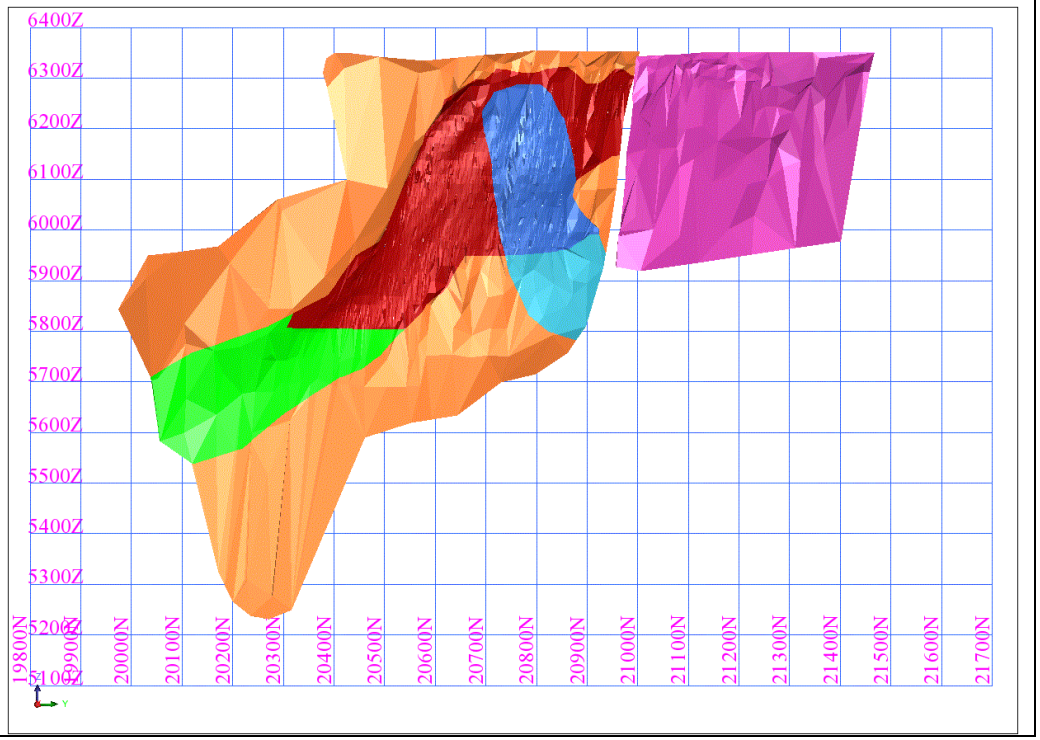
BARKERS PLAN & LONG SECTION DIAGRAMS

Plan view of the Barkers resource wireframe with infrastructure overlay



Longitudinal Projection looking west showing the Barkers and Barkers North 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.	Northern Star Resources Limited June 2020 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 sites visits.
	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.	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.	Update 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 A$1,750/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.
	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 footwall through levels at 20m vertical spacing. A top down sub level open stoping method is applied. The selected mining method was evaluated during the initial Pre-Feasibility study and was deemed the most appropriate.
	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.	10% dilution is applied to unfilled up hole stopes.
	The mining recovery factors used.	90% recovery is applied to conventional uphole stopes with no pillar requirements. A calculated 50% recovery is applied to unfilled uphole stopes where geotechnical analysis has identified areas of lower mining recovery, or where pillars are required to be left behind.
	Any minimum mining widths used.	A minimum stope mining width of 3.0m has been used.
	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.
	The infrastructure requirements of the selected mining methods.	Infrastructure in place, currently located at an operating mine.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.	Ore from the Kundana operations is treated at both the Jubilee Mill and Kanowna Belle milling facilities, both owned by NSR. The Kanowna Belle 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. The Jubilee Mill has an existing conventional CIL processing plant in operation since 1987. The plant has a nameplate capacity of 1.2Mtpa.
	Whether the metallurgical process is well-tested technology or novel in nature.	Plus 10 years milling experience with Kundana ores.

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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.	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.	Kundana 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. Operational expansions to Barkers is 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 the most recent budget costs and is reconciled against actual costs to ensure accuracy.
	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 $1,750/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 $1,750/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$1,750/oz.
	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, Centenary South and Centenary Deeps: Resources and Reserves – 30 June 2020
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 underground diamond drilling (DD), surface diamond drilling, surface Reverse Circulation drilling (RC) 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 (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.
	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. 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 40g charge was selected for fire assay.
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 are used to drill the Kundana deposits. Surface diamond drill holes were completed using HQ2 (63.5 mm) whilst underground diamond drill holes where completed using NQ2 (50.5mm). 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.
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 blocks by the driller. This is then captured by the logging geologist and entered as interval into the hole log.
	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. Average recovery across the Kundana camp is at 99%.
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. 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. Most 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.
	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 drillholes, the entire length of the hole was logged.

	Millennium			Centenary Crown			Centenary South			Centenary Deeps		
	# of Holes	Total m's	# of Samples	# of Holes	Total m's	# of Samples	# of Holes	Total m's	# of Samples	# of Holes	Total m's	# of Samples
DD	395	77,193	38,199	49	29,907	168	57	16,139	89	220	38,930	23,104
FS	1,255	5,988	10,221	836	4,055	1,403	463	1,621	556	3,310	9,751	13,331
RC	102	11,216	6,960	104	23,409	321	18	1,987	28	101	7,200	7,037
RC_DD	3	893	549	1	194	1	-	-	-	-	-	-
Total	1,755	95,290	55,929	990	57,565	1,893	538	19,747	673	3,631	55,881	43,472

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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 sampled for exploration drilling and some Resource Definition drilling. Grade Control drilling is almost always whole core sampled with some earlier campaigns half core sampled. In the case of half core sampling, half 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 mineralization 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 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 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.	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 40g 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 senior 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 drillholes 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 drillhole 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, drillhole 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 deviflex 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.	Drillhole 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. This include hangingwall and footwall probing where the ore body is greater than development drive width.
	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 is 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. Drillholes 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 drillholes 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.
	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 White Flag Joint Venture with the development and operation of South Pit. Modern mining continued since late 1988 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 2016.
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).
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 and Centenary deposits is too large to be included in this report. . The collar locations are presented in plots contained in the NSR 2020 resource report. Drillholes vary in survey dip from +59 to -90, with hole depths ranging from 15 m to 848 m, with an average depth of 201 m. The assay data acquired from these holes are described in the NSR 2020 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 drill hole information is not material and does 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 2 m of barren material (considered < 1 g/t) between mineralized 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.
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.
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.

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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).	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 is 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 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 is not used in the estimation process. Several drilling programs completed between 2014 and 2016 had erroneous meter depths recorded, these drill-holes have been omitted from the ore wireframe interpretations and flagged as invalid. Where there were no QAQC issue with the assays, the correct intervals were recorded, the translation to 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. • 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 used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not 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.
	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, Centenary South and Centenary Deeps 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, Centenary South and Centenary Deeps 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.

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Criteria	JORC Code explanation	Commentary
	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 Centenary 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 the shear is present and higher grade where quartz is evident. Within Millennium North, the shear increases 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 Zuelika shear system extending over 10's of kilometres. Millennium K2 structure is averages 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 and Centenary Deeps 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. 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 the combined subdomains. Both subdomains have a search range of ~60 m in direction 1 and 35 m in direction 2. Three passes were used for estimation with distances based on variography. 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. Both subdomains have a search range of ~35 m in direction 1 and 30 m in direction 2. 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. Both subdomains have a search range of ~65 m in direction 1 and 40 m in direction 2. HWNTH/FWNTH/HW/FW (Millennium)- hanging wall (HWNTH) and foot wall (FWNTH) grade halos for the northern portion of K2. 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 distant to development. Top cut analysis was completed on each domain separately. Variography was completed on HW/HWNTH combined and FW/FWNTH combined. FWNTH/FW domains both had a search range of ~30 m in direction 1 and 30 m in direction 2 for both high and low-density subdomains. The HW domain had a search range of ~60 m in direction 1 and 30 m in direction 2 for both high and low subdomains. The HWNTH domain had a search range of ~40 m in direction 1 and 40 m in direction 2 for both high and low 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. Both subdomains have a search range of ~80 m in direction 1 and 50 m in direction 2. 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. 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. K2 (Centenary Deeps) - divided into two grade subdomains based on data density; high density around development levels and lower density distant to development. Both subdomains were analysed together for top cuts. Variography was completed on both subdomains combined with channel data removed. Both subdomains have a search range of ~80 m in direction 1 and 70 m in direction 2. 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. All domains and subdomains had a search range of ~80 m in direction 1 and ~40 m in direction 2. Decas1/Decas 2- each comprised of one domain analysed separately for top cuts. An isotropic search was used for both domains. Both domains had search ranges of 25 m in all directions. Estimation was completed using a hard boundary for both domains.

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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.	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 sampling, 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. 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. Decas 1 and Decas 2 - steeply dipping structure with quartz veining evident from drilling and development. 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. Top cuts were selected based on a statistical analysis of the data 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 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 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 1.64 g/t cut off within 2.5 m minimum mining width (excluding dilution) MSO's using a $A2,250/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.	All metallurgy assumptions are based on extensive operating history for the K2 ore materials through the Kanowna Belle and HBJ processing facilities.
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 meet or 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 2.8t/m^3 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 331 bulk density measurements at Millennium/Centenary. Assumptions were also made based on regional averages, on the default densities applied to oxide (1.9t/m^3) and transition (2.3t/m^3) material.
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 reflects 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.

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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.	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, Centenary South and Centenary Deeps ore zones. Each is a global estimate reflecting 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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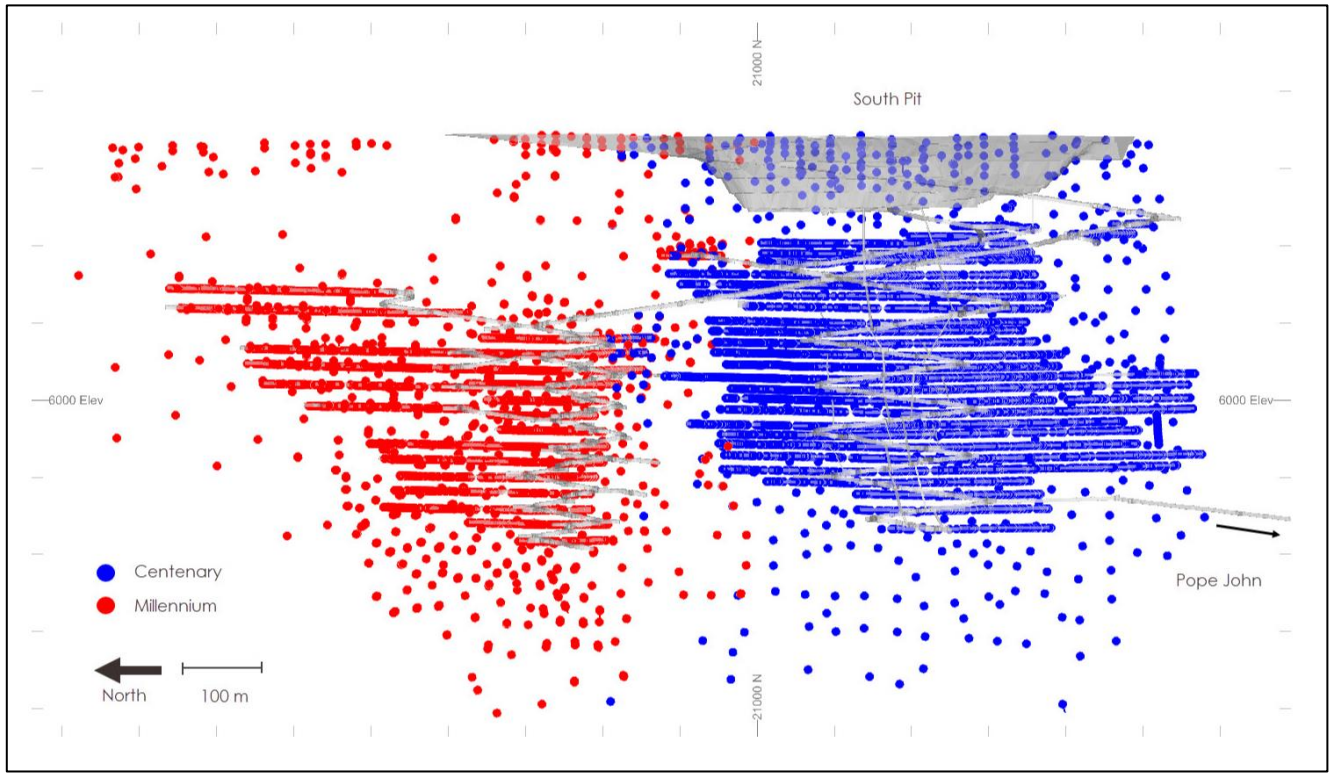

Figure 1. Long section view of the Millennium-Centenary deposits and the data used in each resource estimate

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 2020 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.	Not applicable

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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.	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 A$1,750/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 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 Centenary open pit. The ore is accessed from the hanging wall from levels at 20m spacing (25m in Millennium North). Top down open stoping methods are applied and the levels are broken into selectively sized stoping blocks to maximise production.
	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 operating Raleigh, Rubicon, Hornet and Pegasus mine 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.	10% dilution has been applied to all stopes in Millennium and Millennium North. The Centenary Deeps orebody is located within the Centenary Shale host rock, known to cause external dilution. All stope shapes designed in this region have been assumed to overbreak to the drive width and individual dilution factors have been applied based on stope width.
	The mining recovery factors used.	A calculated 70% recovery is applied to unfilled uphole stopes to account for pillar requirements.
	Any minimum mining widths used.	A minimum stope mining width of 2.5m has been used. This considers a minimum stope width of 1.7m +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.
	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.	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.	Plus 20 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 20 years milling experience with Kundana ores.

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Criteria	JORC Code explanation	Commentary
	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 20 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.
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 operating 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 A$1,750/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 A$1,750/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 assumed 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.

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report
Pope John: Resources and Reserves – 30 June 2020
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 underground diamond drilling (DD), surface diamond drilling (RC) and face channel (FC) sampling. RAB holes were excluded from the estimate. Pope John # of Holes / Total m's / # of Samples DD: 131 / 33,348 / 15,448 FS: 1,298 / 6,304 / 10,881 RC: 38 / 5,164 / 2,726 RC_DD: 27 / 12,307 / 4,209 Total: 1,494 / 57,123 / 33,264
	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. Face channel sampling is constrained within geological and mineralised boundaries with a minimum (0.2 m) and maximum (1.0 m) channel 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. Core designated for half core was cut 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.
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 to drill the Pope John deposit. Surface diamond drillholes were completed using HQ2 (63.5 mm) core whilst underground diamond drillholes where completed using NQ2 (50.5mm) core. 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.
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 interval into the hole log.
	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. Average recovery across the Kundana camp is at 99%.
Logging	Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.	All diamond core and RC chips are 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. Most 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.

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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. 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 drillholes, 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 exploration drilling. 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.	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 mineralization 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 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 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 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 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 dedicated twinned holes were drilled for this data set. Re-drilling of some of the drillholes 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 drillhole 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, drillhole 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 deviflex survey is completed taking measurements every 3 m to ensure accuracy of the hole. The is a 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.	Drillhole 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. Drillholes 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 drillholes 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 White Flag Joint Venture 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 2015 and commenced mining in 2017.
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 portion 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, the K2 horizon is offset approximately 200m to the south west and becomes the Moonbeam deposit. The Pope John lode is locally offset by several smaller mine scale faults in between the 2 larger regional faults. The K2 mineralization 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.	No new significant results reported. Collar locations are presented in plots contained in the NSR 2020 resource report. Drillholes vary in survey dip from +29° to -84°, with hole depths ranging from 80 m to 753 m, with an average depth of 282 m. The assay data acquired from these holes are described in the NSR 2020 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.	No new significant results reported, 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 new significant results reported. Any 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 mineralized 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.	No new significant results 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.
	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.
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 mineralization. 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 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: • 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 but not proximal to 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 too dissimilar dip, width and/or tenor to recent drilling. Not used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not 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 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. Several other smaller structures have been intersected during development with offset of up to a metre. These structures have been wireframed to account for any potential ore volume loss. 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.
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 625 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 Pope John K2, K2E, footwall (FW) and hanging wall (HW) domains used 1.0 m composites with direct grade estimation of gold. Except for K2E, the gold grade estimation has been completed using Ordinary Kriging (OK), utilising a three-pass search strategy using Datamine Studio RM v 1.6 software. Details of the estimation parameters for each mineralisation zone are summarised below. K2 - divided into two subdomains based on data density and two further subdomains (upper and lower) based on grade. The high-density subdomain surrounds development levels and lower density subdomain is distant to development. Within the data density subdomains, the face data and drill hole data were analysed and top cut using the influence limitation approach separately. 145 g/t Au and 50 g/t Au was used 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 SE plunge direction. The high-density data had a search range of 30 m in direction 1 and 2, the low-density data subdomain had a search range of 225 m in direction 1 and direction 2. Three passes were used for estimation with distances based on the variogram. The upper grade subdomain comprises predominantly low-grade RC drilling. The lower grade subdomain comprises high grade drilling and channels from the remainder of the K2 domain and includes both data density subdomains. The upper and lower grade subdomains were estimated separately using a hard boundary to restrict the movement of metal between the two areas. K2E - estimated using ID^2 with a three-pass search strategy, using an isotropic search ellipse, 50 m by 50 m by 50 m. A drill hole restriction of a maximum of 3 samples per drill hole was applied to all 3 search passes. This ensures that at least two drillholes are used to inform the estimate. HW Halo/FW Halo - 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 distal to development. Within the subdomains, the face data and drill hole data were analysed and top cut using the influence limitation approach separately. The HW halo used 13 g/t Au and 7.5 g/t Au for face and drillholes respectively, the FW halo used 30g/t Au and 7.5 g/t Au for faces and drillholes, respectively. The top cut subdomain composite files were combined for variography for each halo. 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. 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 3.5 m along strike and at 20 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 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.

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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. Top cuts were selected based on a statistical analysis of the data to not impact the mean by more than 5% and reducing the coefficient of variation to around 1.2; these vary by domain (ranging from 7.5 to 145 g/t for individual domains). The top cut values are applied in several steps, using 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 1.64 g/t cut off within 2.5 m minimum mining width (excluding dilution) MSO's using a $AU2,250/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 meet or 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.	An 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 a default of 2.8t/m^3 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.

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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.	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 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 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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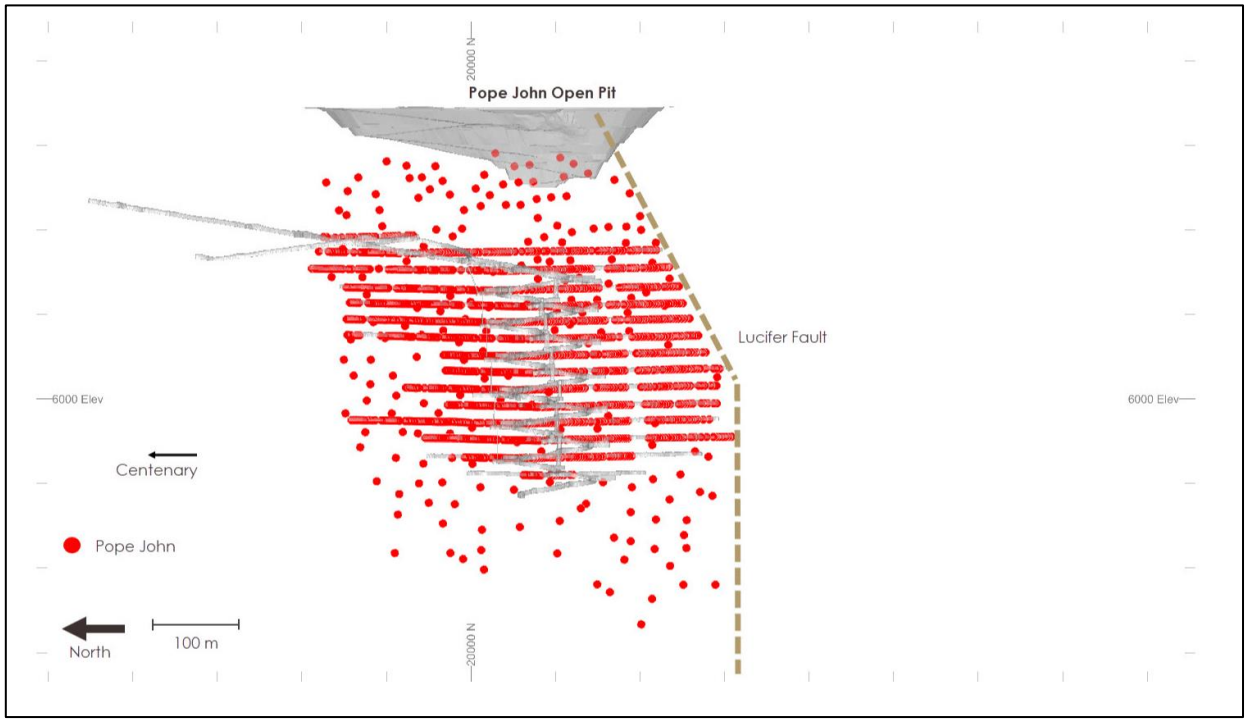

Figure 1. Long section view of the Pope John deposit and data used in the Resource Estimate

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 2020 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 $1,750/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). Top down open stoping methods are applied, and the levels are broken into selectively sized stoping blocks to maximise production.
	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.	10% dilution has been applied to all stopes.
	The mining recovery factors used.	A calculated 70% recovery is applied to unfilled uphole stopes to account for pillar requirements.
	Any minimum mining widths used.	A minimum stope mining width of 2.5m has been used. This considers a minimum stope width of 1.7m +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.
	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.	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 more than 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.	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.

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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.	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 $1,750/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 $1,750/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 assumed sold directly to market at the nominated Corporate gold price.
	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.	Corporate guidance.
	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.

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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:	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.	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 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.	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 2020
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 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. Strzelecki # of Holes / Total m's / # of Samples DD: 245 / 57,914 / 34,446 FS: 4,789 / 6,816 / 9,287 RC: 94 / 6,746 / 6,100 RC_DD: 3 / 1,275 / 620 Total: 5,131 / 72,751 / 50,453 RC holes utilised in the estimate are all above the UG workings and near surface. The majority of these are within the depleted open pit area.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	DD core is sampled within geological boundaries with a minimum (0.2 m) and maximum (1.0 m) sample length. Historical face samples range from 0.01m vein point samples to full face channels.
	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.	Historical face and DD data makes up a large portion of the data. The sample collection methods and assay methods are variable due to the timespan over which these samples were collected. The samples were collected in line with normal practices at the time. The majority of these historic samples affect already depleted areas. The details outlined in this report focus on details of the recent diamond drilling data collection practices as specifics on data collection methods for historical data were not recorded or no longer available. 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 the face samples used were from the historic Strzelecki mining. Many of these only targeted the vein and were point samples with a depth of 0.01m. All of the recent samples added in the STZR* series drilling 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.
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.).	There is limited information on the specifics of historical data. The following provides details mainly on the practices undertaken for the recent UG diamond drilling. Underground DD techniques were predominantly used to drill the Strzelecki deposit. Surface diamond drill holes were completed using HQ2 (63.5 mm) core whilst underground diamond drill holes where completed using NQ2 (50.5mm) core. Currently, core is orientated using the Boart Longyear Trucore Core Orientation system. In some 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.
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 captured by the logging geologist and entered as interval into the hole log.
	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 acceptable for diamond core and no relationship between grade and recovery is observed. Average recovery across the Kundana camp is at 99%. Much of the core loss at Strzelecki is in the footwall of the main lodes, where a softer shear zone exists in the SAQ lithological unit.

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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.	There is limited information on the specifics of historic geological logging. The following provides details mainly on the practices undertaken for the recent UG diamond drilling and is partially applicable to historical core logging. 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. Historical underground face samples range from multiple to single samples. Many faces contain a singular point sample in the ore zone down to 0.01m in length. Others contain the ore sample as well as waste samples up to ~4.5m in length.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	For all recently drilled holes all core logging is qualitative with mineralised zones assayed for quantitative measurements. Every core tray is photographed wet. A large portion of historic core and underground faces no longer have photos available.
	The total length and percentage of the relevant intersections logged.	For all recently added drill holes, the entire length of the hole was logged. For historic drill holes, there are areas with incomplete data.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	There is limited information on the specifics of detailed sample preparation techniques utilized for historic drilling. The following provides details mainly on the practices undertaken for the recent UG diamond drilling and is partially applicable to historical core logging. Where available details of historical practices have been provided. Diamond core is cut using an automated core saw. The type of drilling determines the level of sampling/cutting completed. Half core is taken for most exploration drilling. 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 utilized in areas where the ground conditions result in very broken core and cutting the core is not practical. There has been no recent Grade Control (GC) drilling into the Strzelecki deposit.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	For 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. 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.	Historic sample preparation data is incomplete. However, the samples that do have a variation of fire assay or screen fire assays recorded indicates there was adequate preparation applied to use these sample methods. As such the preparation of the historic samples lacking this data detail has been deemed appropriate. Preparation of NSR samples was conducted at Bureau Veritas Kalgoorlie and Perth 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 -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 75µm.
	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 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.	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.	Specifics of historic assay methods are not completely available. However, as the methods were in line with standard practices of the day, they have been deemed suitable for use. Assays methods that are recorded are fire assays and screen fire assays in high grade zones. Charge size, prill composition and size as well as final analysis methods are not recorded for historical data. 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 areas around the target zone and of prospective high-grade mineralization a fire assay to extinction method is used. Samples have five 40 g charges go through the above fire assay process. The average of these 5 charges is then taken and used as the primary assay value. These extent and selection of which zones are fire assayed to extinction is decided upon by the logging geologist at the sample selection stage.
	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 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 zones of suspected mineralization. However, areas which are fire assayed to extinction are not selected to have pulp duplicates analysed. 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. Non-editable 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. 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 survey, using the Devi flex survey tool is completed taking measurements every 3 m to ensure accuracy of the hole. This is a 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 60 m x 60 m. This allowed for infill RSD drilling at 30 m x 30 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.	The mineralisation in the Strzelecki deposit dips 65° 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.

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Criteria	JORC Code explanation	Commentary
	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 hole intersections are 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 M16/72, M16/157 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.
	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. In early 2014, Northern Star Resources purchased the Kundana camp from Barrick Gold and mining recommenced in March 2014.
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. This regional scale shear zone also contains several large-scale faults cross cutting the major shear zone at an approximately north-south orientation. Mineralization along the Strzelecki trend consists of a shear hosted vein. This is present on the contact between a quartz rich silica flooded Quartz Arenite (SAQ) unit and intermediate Andesite (Black Flag Group) unit. This Quartz Arenite unit is a small sedimentary unit situated on the contact of the much larger coarse-grained mafic Powder Sill Gabbro. The Strzelecki main vein is the Strzelecki trend north of the Pope John fault and extending up to 20650N. This exists on the Quartz Arenite Andesite contact. The Strzelecki footwall vein is situated parallel within the footwall Andesite. There are several smaller mine scale faults offsetting the main and footwall Strzelecki 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: 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 information is presented in this release. The collar locations are presented in plots contained in the NSR 2020 resource report. Drill holes vary in survey dip from +85 to -90, with hole depths ranging from 5 m to 1606 m, with an average depth of 244 m. The assay data acquired from these holes are described in the NSR 2020 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 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 new information is presented in this release. 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 mineralized 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.

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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 new information is presented in this release. 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.
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 deposit with the intention of extending areas of known mineralisation. Drilling is continuing to the south towards the Pope John fault and historic Strzelecki workings. 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. 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.

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Criteria	JORC Code explanation	Commentary
	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. An extensive review of all the historic data for Strzelecki was undertaken in 2018 and Data Class (DC) values from 0-3 assigned to each drill hole and channel, 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. • DC 2 = Recent data; minor issues with data 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 too dissimilar dip, width and/or tenor to recent drilling. Not used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not 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 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 Strzelecki and Xmas lodes 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 Strzelecki 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 for Strzelecki. The interpretation of the Strzelecki mineralization wireframes was conducted using the sectional interpretation method. 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 realistic wireframe. Where only drilling data was present sectional interpretation was completed at approximately 10 - 20 m spacing. Wireframes have been checked for unrealistic volumes and updated where appropriate. The geological interpretation of Strzelecki is considered robust due to the nature of the mineralization and that large portions of the deposit have been developed and mined.
	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 for Strzelecki Main Vein and Strzelecki Foot Wall. The primary assumption that the mineralization is hosted within structurally controlled quartz veins is considered robust. The current understanding is that there is a brittle offset on the Pope John Fault between the Strzelecki and Xmas lodes.
	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 Strzelecki structure (SMV) is based on the presence of logged quartz percentage, quartz veining/shearing and continuity between sections of these structures and adjacent mineralised structures. The SFW is a footwall lode approximately 40 m west of the SMV. Geologically, it sits on the contact between an intermediate volcaniclastic sediment and interleaved mafic and felsic volcanics. The lode presents as a narrow vein, usually between 0.1 and 0.4 metres. Gold is vein hosted, with little to no mineralised alteration halo.

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Criteria	JORC Code explanation	Commentary
	The factors affecting continuity both of grade and geology.	Structure is continuous over the length of the Strzelecki deposit with either quartz or the controlling structure used to guide this interpretation. The Pope John fault gives a brittle offset between the Strzelecki and Xmas mining areas and is interpreted to be post mineralization. The mineralised structure pinches out at the northern extent of the Strzelecki deposit before any offsetting structure terminates mineralisation. The grade continuity is consistent within the SMV and exists as a high-grade south trending plunge, up to 200m.
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 strikes approximately N-S over a length of 850 m and dips steeply to the West with the down-dip extents more than 1,500 m. The SMV is ~ 0.5 m wide and can be up to 1.5 m wide with a minimum width of ~ 0.1 m. The SFW has a strike of ~300 – 400 m and down dip extent of 450 m. SFW is ~ 1 m wide and can be up to 1.5 m wide with a minimum width of ~ 0.1 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.	The Strzelecki mineralisation is comprised of Strzelecki Main Vein (SMV) and Strzelecki Foot Wall (SFW). All mineralisation domains used 1.0 m composites with direct grade estimation. The Resource Estimation has been completed using Ordinary Kriging (OK), utilising a three-pass search strategy using Datamine Studio RM v 1.6 software. Details of the estimation parameters for each mineralisation zone are summarised below. SMV - divided into two subdomains based on data density: high density around development levels and lower density distal to development. The subdomains were combined, and an influence limitation top cut selected at 600 g/t Au. A lower cut grade of 10 g/t was selected to create the lower cut model (this is described in grade cut strategy below). Once top cut, variography was completed on the combined composite file, indicating grade continuity down plunge to the south. The data had a search range of ~200 m in direction 1 and 150 m in direction 2. Three passes were used for estimation with distances based on variography. SFW - divided into two subdomains based on data density: high density around development levels and lower density distal to development. The subdomains were combined, analysed and top cut at 250 g/t Au. Once top cut, variography was completed on the combined composite file. The data had 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 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 (ID^2) and Nearest Neighbour (NN) completed as a comparison. Estimates using a soft and semi-soft boundary (with the Strzelecki and Xmas composites combined) have also been compared and reviewed. The SMV estimate has 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.	Data spacing varies considerably within the deposit ranging from underground development samples taken approximately every 2 m along strike and at 15 m vertically spaced intervals within drill hole intercepts which varied from close spaced 20 m (along strike) to 20 m (down dip) spacing through to more widely spaced intercepts at 50 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 2 m, a 5 m x 5 m x 5 m block size was chosen. For lower density drilling (where no development was present) with wider spacing, a block size of 10 m x 10 m 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.	Hanging wall and footwall wireframe surfaces were created using sectional interpretations. These were used to define the SMV and SFW mineralised zones based on the shearing, veins, and gold grade. SMV (Strzelecki main vein) steeply dipping structure with quartz veining evident from drilling and development. SFW (Strzelecki footwall) steeply dipping structure in the footwall of the SMV, quartz veining evident from drilling and development. For mine planning purposes a waste model is created by projecting the hanging wall and footwall surfaces 50 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 250 to 600 g/t for Strzelecki). The top cut values are applied in several steps using 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. 25 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 search ranges.
	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 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.	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 1.64 g/t cut off within 2.5 m minimum mining width including no dilution MSO's using a $AUD2,250/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 or recovery assumptions have been made during the MRE.

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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. 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 Strzelecki was completed in conjunction with a review of the density values at Raleigh. As a result, either the mean densities by lithology or the previously used mean densities by lithology (in between Raleigh and 1809 estimate) were coded into the database. Where there were no measurements for a specific lithology and default of 2.8t/m^3 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 same density values have been applied to Strzelecki.
	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 1,854 bulk density measurements at Xmas. Assumptions were also made based on regional averages, on the default densities applied to oxide (1.8t/m^3) and transition (2.3t/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 Person's 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. No external audits have been undertaken on Strzelecki.
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 Strzelecki 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 Strzelecki mineralization. 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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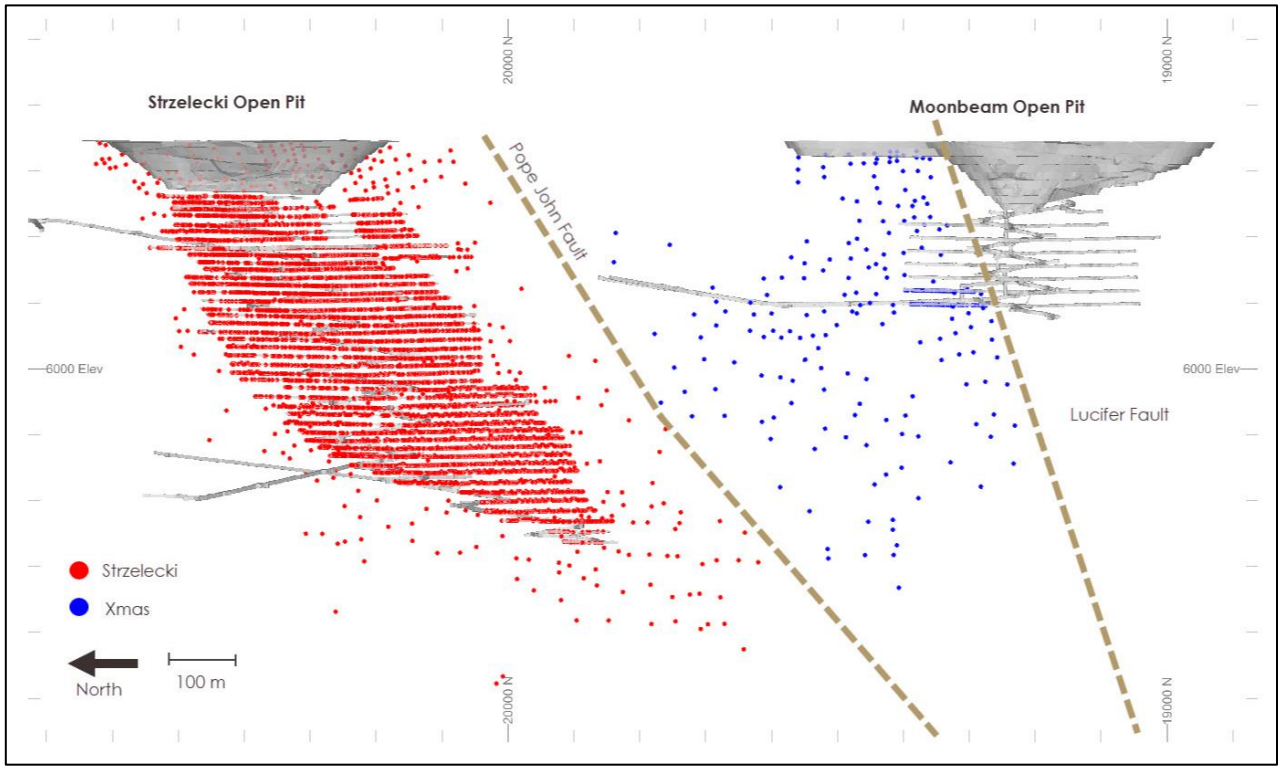

Figure 2. Long section view of the Strzelecki deposit and data used in the Resource Estimate

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 2020 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 undertaken.
	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 $1,750/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.	The Millennium underground mine (incorporating Millennium, Centenary, Pope John, Moonbeam, Strzelecki 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). Top down open stoping methods are applied, and the levels are broken into selectively sized stoping blocks to maximise production.
	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.	10% dilution is applied to unfilled up hole stopes.
	The mining recovery factors used.	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 2.5m has been used. This considers a minimum stope width of 1.7m +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.
	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.	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 more than 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.	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.

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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 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.	The Millennium operation 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 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 $1,750/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 $1,750/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 assumed sold direct at the Corporate gold price.
	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.

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Criteria	JORC Code explanation	Commentary
	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
Falcon Deposit: Resources and Reserves – 30 June 2020
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 underground and surface diamond drilling (DD), surface reverse circulation drilling (RC) and surface RC drilling with diamond tail (RC_DD) were used to collect material for analysis. Falcon | # of Holes | Total m's | # of Samples | | DD | 154 | 49,755 | 46,693 | | FS | - | - | - | | RC | - | - | - | | RC_DD | 1 | 672 | 417 | | Total | 155 | 50,427 | 47,110 |
	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. A sample size of at least 3kg 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 40g 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 RC and DD techniques were used to drill the Falcon deposit. Surface diamond drill holes were completed using HQ2 (63.5 mm) whilst underground diamond drill holes were completed using NQ2 (50.5 mm). 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. Fresh rock was sampled as either full core or half core. Core cutting was completed using an automated core saw. Where drill core has been half core sampled, the remaining core has been retained.

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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 or Perth facilities; commencing with sorting, then checking and drying samples 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 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 non-editable 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 using a total station survey instrument in mine grid (Kundana 10). The actual hole position is then located by the mine survey 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, with most of the drilling between 120 x 120 m and 40 x 40 m spacing. Some areas proximal to development have been drilled at a 20 x 20 m drill 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 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 (70°) to the west (local grid). Diamond drilling was designed to target the mineralisation as close to perpendicular as practical. Due to the collar locations available, much of the drilling was completed from foot wall to hanging wall.
	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 independent 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 are located within the M16/309 and M15/993 Mining leases 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 mineralization 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. 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 mineralisation 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 mineralisation is 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 is varied as supported by structural measurements taken from drill core.
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 Falcon deposit can be found above. The collar locations are presented in plots contained in the NSR 2020 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 2020 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 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 mineralized 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').	Not applicable.
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.

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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).	Wide spaced drilling will continue to test continuity of the mineralised trend along strike and at depth, utilising drill platforms at RHP and Raleigh mines. Tighter spaced drilling will also be conducted in specific areas to better define the future drill density requirement of the deposit.
	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.

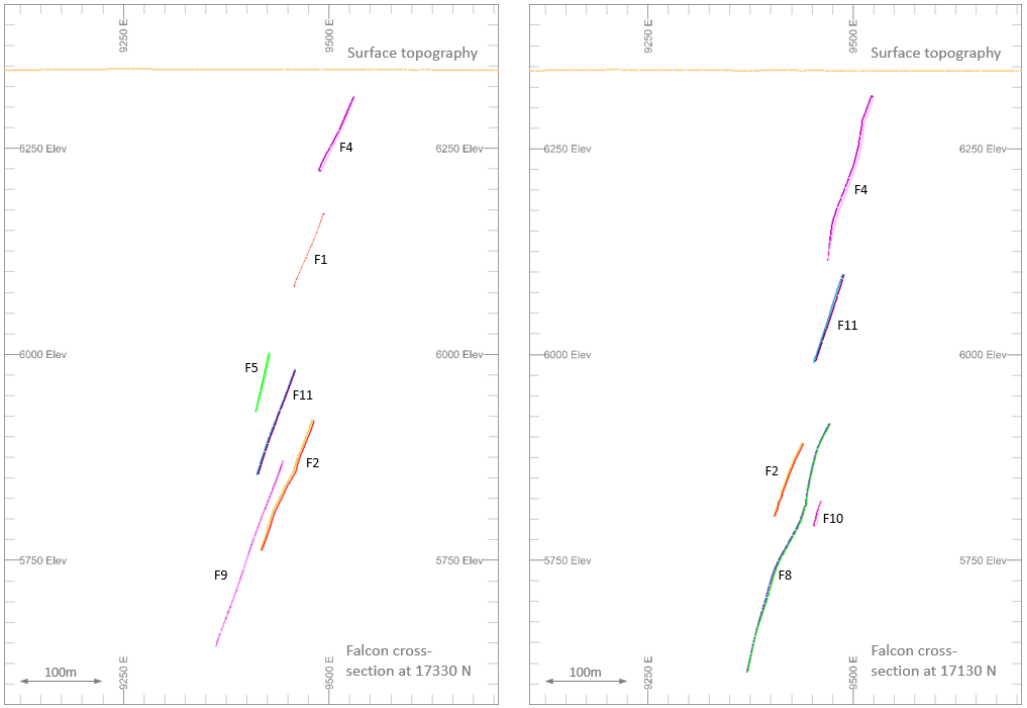

Figure 1. Cross section views of Falcon ore lodes

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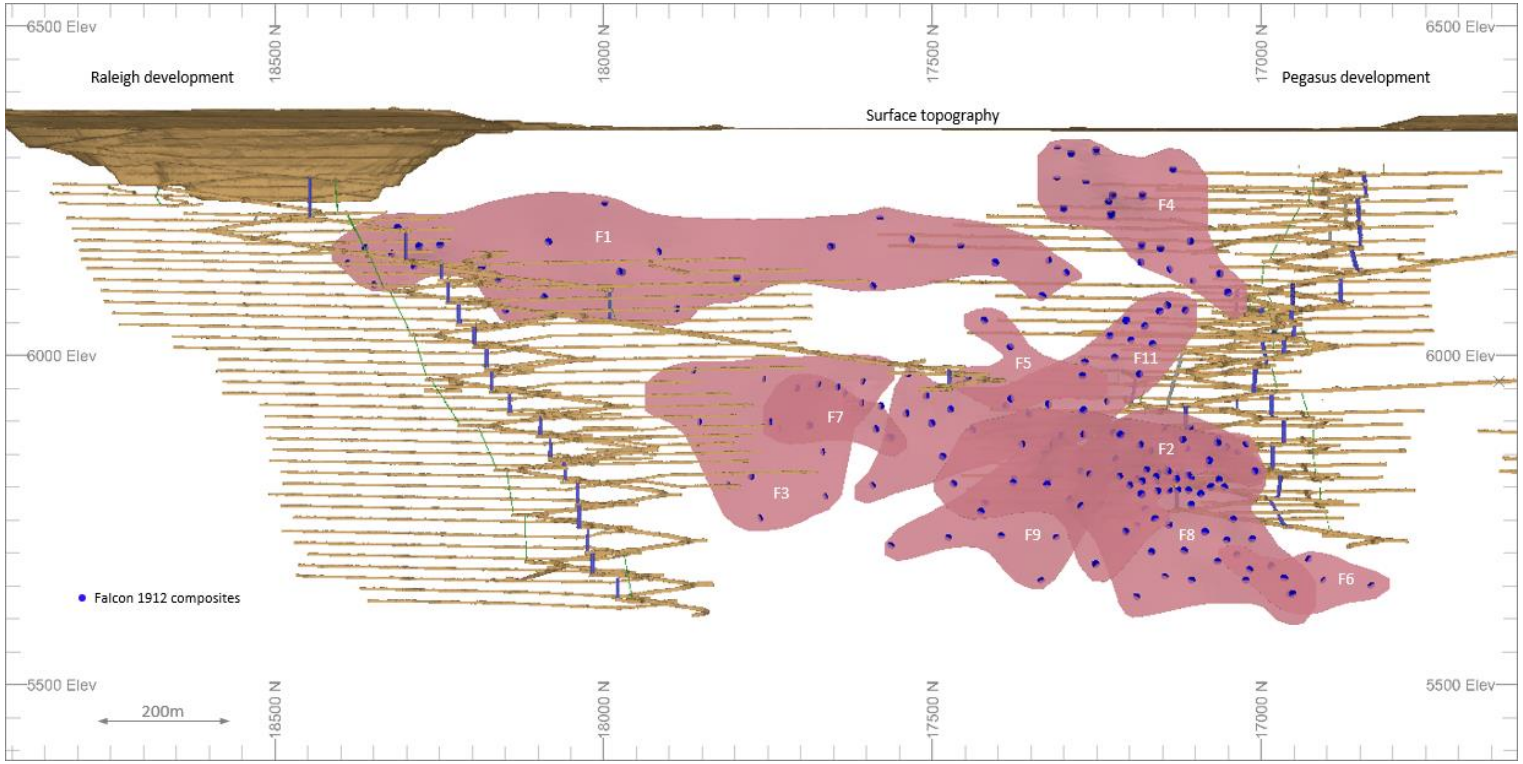

Figure 2. Long section view looking east of the Falcon deposit and data used for estimation

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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 is 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 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 is not 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. • DC 1 = Historic data; same criteria as DC 2 but cannot be verified with recent drilling. Not used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not 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.	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 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. Interpretation of the Falcon mineralised envelopes were 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. Shorter strike-length 'pods' have also been considered a possibility and development completed on the Falcon lodes to date suggests this may be the case. The potential for alternative interpretations has been considered when applying Resource Classification to the MRE..
	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 interbedded sediments forms a rheological and stratigraphic control to mineralisation 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 in order for a mineralised envelope to be created for estimation.
	The factors affecting continuity both of grade and geology.	Offsetting structures are not present in the adjacent Pode deposits although significant undulations exist which may have some impact on continuity of the mineralised trends. Mineralised envelopes for Falcon are confined to the interbedded sediment (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.

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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.	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 estimate 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 data density. To reflect the geological variability, 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, 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. 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. 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; all samples above 0.30 g/t and 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 limited sample points where a coherent variogram model is not possible, Inverse Distance was used for both the proportional and grade estimates. For all other areas, Ordinary Kriging was used. The final model is created by summing the products of the block proportion estimate and high and low-grade estimates which is a weighted combination of the two models returning a single gold grade for the original block. All estimation use a three-pass search strategy 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. Shape specific estimation parameters are outlined below. Falc1 – Data is top cut to 20 g/t using the influence limitation approach. Variography was completed on the composited data file. 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. LG and HG data set estimates use the same search ranges as the categorical estimate. Falc2 – Data was top cut to 20 g/t using the influence limitation approach. A hard, top cut of 40 g/t was also applied to remove any genuinely anomalous results. Variography was completed on the composited data file. For categorical estimate, search ranges of 120 m in direction 1, 80 m in direction 2 and 40 m in direction 3. Three passes were used for estimation with distances based on variography. For both the LG and HG estimates, a generic variogram has been used to estimate the HG and LG models. Falc3 – Data was top cut to 30 g/t using the influence limitation approach. Variography was completed on the composited data file. For categorical estimate, search ranges of 190 m in direction 1, 130 m in direction 2 and 50 m in direction 3. Three passes were used for estimation with distances based on variography. LG and HG data set estimates use the same search ranges as the categorical estimate above. 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, 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. For categorical estimate, search ranges of 110 m in direction 1, 70 m in direction 2 and 50 m in direction 3 were used. A generic variogram has been used to estimate the HG and LG models. Falc5 – Data was top cut to 40 g/t using the influence limitation approach. 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 with grade continuity inferred from adjacent shapes. For categorical estimate, search ranges of 70 m in direction 1, 50 m in direction 2 and 30 m in direction 3 were used. LG and HG data set estimates use the same search ranges as the categorical estimate above. Falc6 – No top cuts were applied due the low coefficient of variance and lack of genuine outliers. 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 shapes. For categorical estimate, search ranges of 70 m in direction 1, 50 m in direction 2 and 30 m in direction 3 were used. Three passes were used for estimation with distances based on adjacent lodes. LG and HG data set estimates use the same search ranges as the categorical estimate above. Falc7 – Data was top cut to 15 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 shapes. For categorical estimate, search ranges of 70 m in direction 1, 50 m in direction 2 and 30 m in direction 3 were used. Three passes were used for estimation with distances based on adjacent lodes. LG and HG data set estimates use the same search ranges as the categorical estimate above.

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Criteria	JORC Code explanation	Commentary
		Falc8 – Data was top cut to 35 g/t using the influence limitation approach. In addition to this, a hard top cut of 50 g/t has been applied to limit impact of genuine outliers on the influence limitation model. For categorical estimate, search ranges of 110 m in direction 1, 90 m in direction 2 and 50 m in direction 3 were used. A generic variogram has been used to estimate the HG and LG models. Falc9 – No top cuts were applied due the low coefficient of variance and lack of genuine outliers. No variography was completed for the Falc9 lode as not enough sets of data points were available for realistic variogram calculation. An ID^2 model was used to inform all Falc9 block estimates. Grade continuity trend has been inferred from nearby shapes. For categorical estimate, search ranges of 70 m in direction 1, 50 m in direction 2 and 30 m in direction 3 were used. LG and HG data set estimates use the same search ranges as the categorical estimate above. Falc11 – Data was top cut to 30 g/t using the influence limitation approach. For categorical estimate, search ranges of 190 m in direction 1, 130 m in direction 2 and 50 m in direction 3 were used. LG and HG data set estimates use the same search ranges as the categorical estimate above. 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 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 20 x 20 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 (generally the distance corresponding to 80% of the total semivariance is used for pass 1, and the range of the variogram used for pass 2), or isotropic ranges based on data density where insufficient data was present for variographic 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.	Hanging wall and foot wall 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 to reduce the impact of outlier values on the average grade. Top cuts were selected based on a statistical analysis of the data. The top cut values are applied in several steps, using 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 topcut, 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, 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.

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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.	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 1.90 g/t cut off within 2.5 m minimum mining width (excluding dilution) MSO's using a $A2,250/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, a default of value 2.8t/m^3 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 (1.9 t/m^3) and transitional (2.3 t/m^3) material, due to lack of data in this area. These values are in line with regional averages.
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 • Confidence in current interpretation • 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.

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Criteria	JORC Code explanation	Commentary
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resource model methodology is appropriate and reflects 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 representative of the Falcon 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 2020
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), Rotary Air Blast (RAB) and Diamond (DD) drilling. RAB drilling was excluded in resource estimation work. Golden Hind | # of Holes | Total m's | # of Samples | DD: 41 | 16,437 | 14,654 RAB: 1 | 14 | 8 RC: 84 | 8,291 | 7,529 RC_DD: 11 | 3,662 | 2,784 Total: 137 | 28,404 | 24,975
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	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).
	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 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.
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 Golden Hind deposit. Srface diamond drillholes 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.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	Any core loss in diamond drilling is recorded on the core block by the driller. This is 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
	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 of the ore lode is challenging at Golden Hind. Triple tubing drilling techniques have been employed by the drilling contractor in order to alleviate reduced recovery, due in part to the nature of the material being drilled and to the drill orientation oblique to the target structure. In order to mitigate the impacts on the estimate, samples which have logged core loss through the ore zone are excluded.
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 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.

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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 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.	As a majority of the data in the Golden Hind data set is historic, it is unknown what QC procedures have been used. For more recent data (2015 onwards), 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. 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 drillholes 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 drillhole 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. For more recent data (2015 onwards), 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.	Drillhole 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 (due to drill platform location), drilling was not completed or re-designed once a suitable platform became available. Drillholes with low intersection angles are excluded from resource estimation where more suitable data is available.

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Criteria	JORC Code explanation	Commentary
	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 drillholes 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 independent 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 information in this report is located within M16/309 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. 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 mineralisation is located along the Strzelecki-Raleigh 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.	Asummary of the data present in the Golden Hind deposit can be found above. The collar locations are presented in plots contained in the NSR 2020 resource report. Drillholes 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 2020 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.	No material information has been excluded from 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.	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.
	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.

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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.	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 widths cannot be estimated, the intercepts are clearly labelled as down hole 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.	Appropriate plans and section have been included at the end of this Table and in the body of 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).	There are plans for drilling at Golden Hind in FY20-21 with 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 is 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 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 is not 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 Golden Hind 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.

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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 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.
	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 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 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 defined. 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, located to the south of Raleigh South mining area . The continuity of the RMV from Sir Walter to Golden Hind is not well understood and the northern extent of the Golden Hind wireframe will be updated following completion of the 2020 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 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 volcanoclastics or andesite. The RMS is not always present and is 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 veining is developed.
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 Golden Hind structure is approximately 1500 m long and is limited by limited drilling to the north and diamond drilling at depth. The Golden Hind mineralisation occurs in a major regional shear system, the Strzelecki structure that extends over 10's 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.

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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.	All Golden Hind 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 was 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. No variography was completed for the RMV North domain due to the low number of samples (22 total). The RMV Central domain had a search ellipse 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 ID^2 method, the search ellipse 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 drillhole type have been applied. RMS domain was analysed with no top cut applied. Variography was completed on the full-length composite file, 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.
	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 ID^2) and Nearest Neighbour 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 intensity, veins and gold grade. RMV (Golden Hind) is a steeply dipping structure with quartz veining evident from drilling. RMS (Golden Hind) is a steeply dipping sheared lower grade 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.

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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. 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 topcut, 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 split into an Underground and Open Pit Resource model. The Open Pit Resource is reported above a $AUD2,250/oz optimised pit shell within SMUs of 2.5 m x 2.5 m x 2.5 m. Cut off grade used for Open Pit reporting is 1.13 g/t. The Underground Resource is reported below the $AUD2,250/oz optimised pit shell at a 1.90 g/t cut off within 2.5 m minimum mining width (excluding dilution) MSO's.
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.
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 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, a default value of 2.7 t/m³ was applied. Density was then estimated by Ordinary Kriging or ID^2, 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.

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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.	No voids are encountered in the ore zones and underground environment as Golden Hind is unmined.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	The average bulk density of individual lithologies is based on 502 bulk density measurements at the Golden Hind deposit. Assumptions were based on regional averages for 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.
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.

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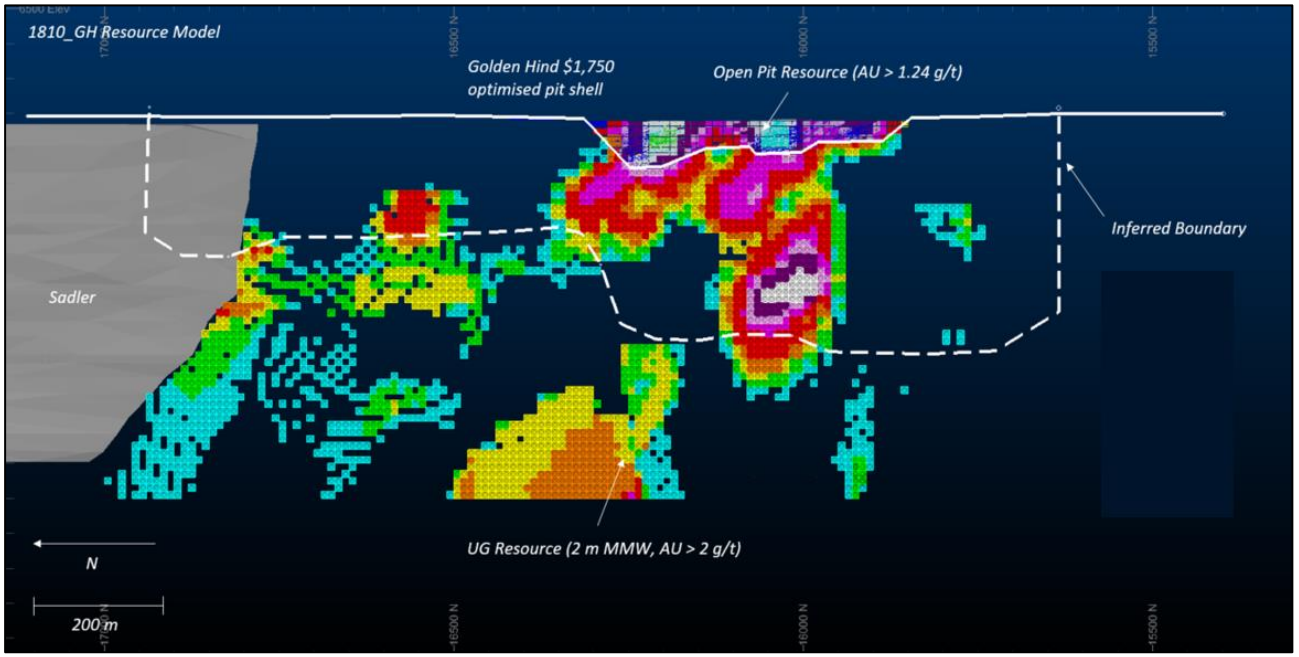

Figure 1. Long section view of the Golden Hind deposit

APPENDIX B: TABLE 1

JORC Code, 2012 Edition – Table 1 Report
Kundana Area Deposits (Drake, Pegasus, Rubicon and Hornet): Resources and Reserves – 30 June 2020
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.	Several sample types were 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.

	Drake			Pegasus			Rubicon			Hornet		
	# of Holes	Total m's	# of Samples	# of Holes	Total m's	# of Samples	# of Holes	Total m's	# of Samples	# of Holes	Total m's	# of Samples
DD	17	8,538	4,264	498	131,197	91,720	417	90,706	69,222	828	173,423	128,498
FS	-	-	-	3,130	14,792	25,918	1,551	7,162	12,764	3,220	15,031	25,057
MR_DD	-	-	-	4	247	132	-	-	-	-	-	-
RB	-	-	-	-	-	-	-	-	-	4	122	84
RC	41	5,219	3,829	90	8,916	5,611	6	457	266	140	13,650	9,533
RC_DD	3	1,179	955	44	15,914	10,203	13	3,665	2,976	1	96	89
Total	61	14,935	9,048	3,766	171,065	133,584	1,987	101,989	85,228	4,193	202,322	163,261

	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. 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.
	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. Core designated for half core was cut using an automated core saw. The mass of material collected was dependent on the drillhole 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 FY20, a 40 g charge was selected for fire assay all 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 Kundana deposits. Surface diamond drill holes were completed using HQ2 (63.5 mm) core, whilst underground diamond drill holes were completed using NQ2 (50.5mm) core. Historically, core was orientated using the Reflex ACT Core orientation system. Currently, core is oriented 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 drilledfollowed by diamond tails. Pre-collar depth was determined in the drill design phase depending on the target being drilled and production constraints.
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 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 of 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 is observed. Average recovery across the Kundana camp is at 99%.
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.

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Criteria	JORC Code explanation	Commentary
		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.
	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 is dependent on the type of drilling completed. Half core is utilised for exploration drilling. Some exploration drill holes have been whole core sampled and all Grade Control drilling 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 from any zone 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 drillholes and a 40 g 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 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 gpt 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.

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Criteria	JORC Code explanation	Commentary
Verification of sampling and assaying	The use of twinned holes.	No specific twinned holes were drilled. Re-drilling of some drillholes 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 drillhole 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 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 drilling at an 80 x 80 m nominal spacing is infilled during Resource Definition 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 drillholes 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 recent 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 on the M16/309 Mining lease 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.
	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 with production from the Rubicon open pit 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: 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 RHP deposits can be found above. The collar locations are presented in plots contained in the NSR 2020 resource report. Drill holes vary in survey dip from +46 to -88 degrees, with hole depths ranging from 10 m to 1,413 m with an average depth of 244 m. The assay data acquired from these holes are described in the NSR 2020 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 drill hole data is not material to 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.	All reported assay results have been length weighted to provide an intersection width. A maximum of 2 m of barren material (considered <2 gpt) between mineralized samples has been permitted in the calculation of these widths. Typically grades over 2 gpt 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 @ ##.#gpt including ##.#m @ ##.#gpt.
	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
	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.

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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.	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 2020 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. Fifteen 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 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 2020 resource report.

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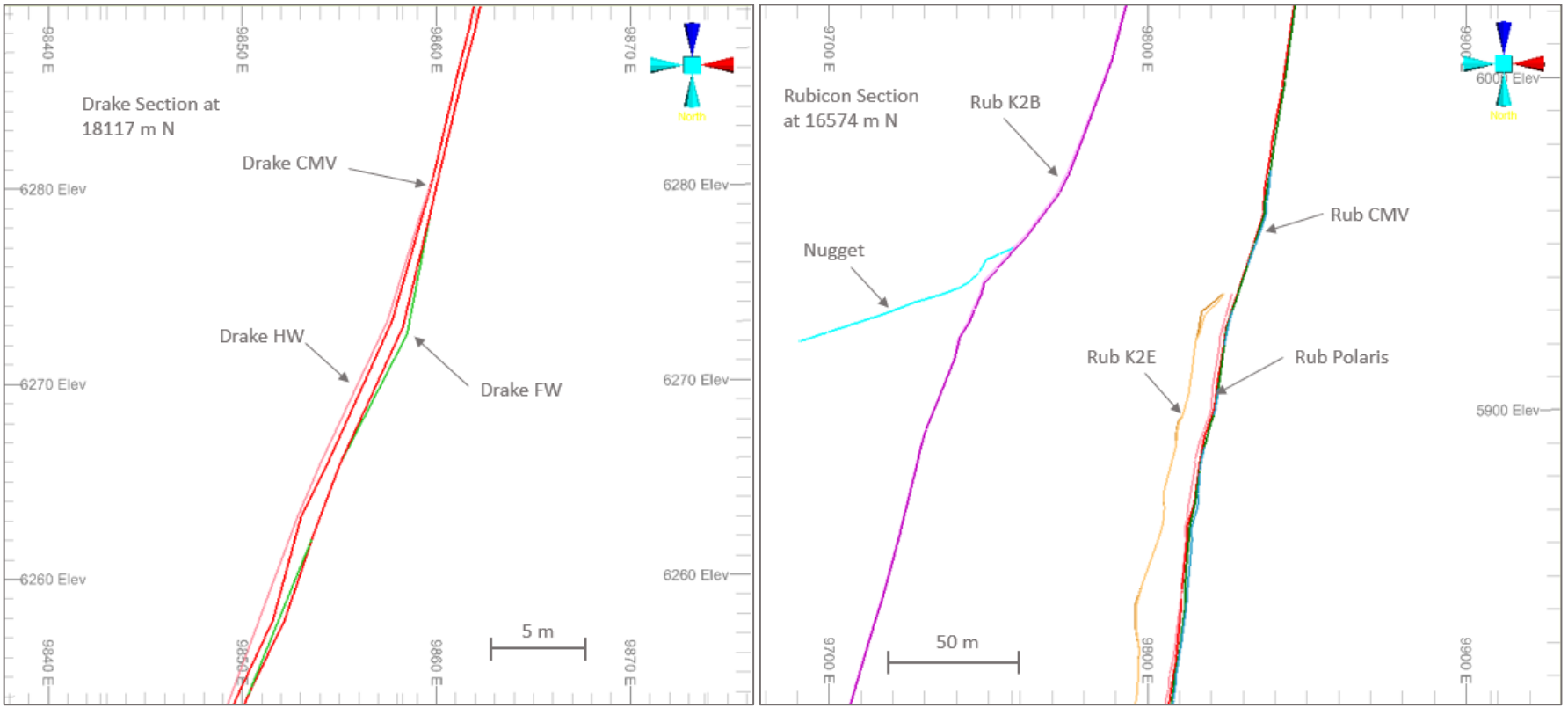

Figure 1. Cross section views of Drake and Rubicon ore lodes

APPENDIX B: TABLE 1

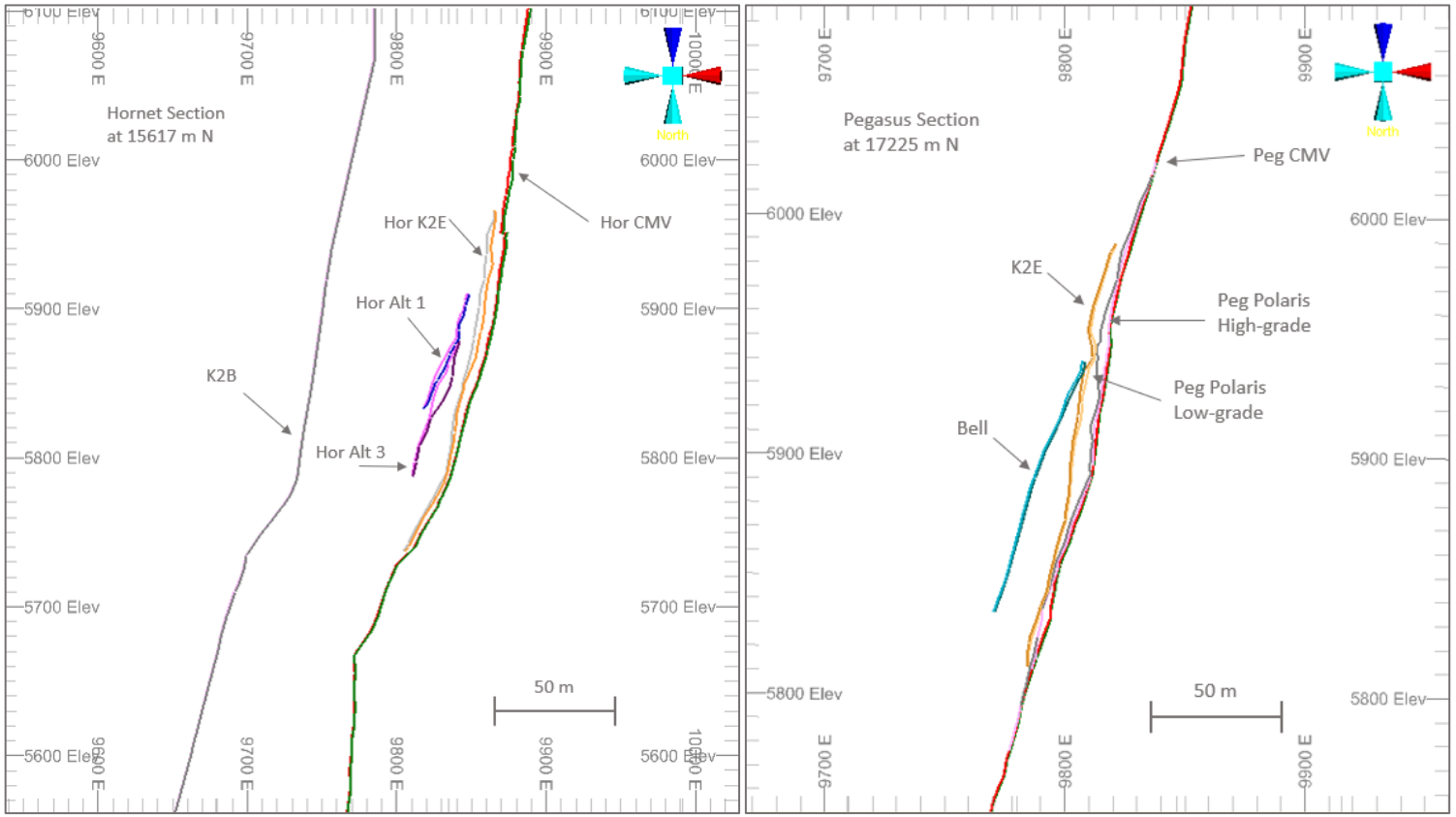

Figure 2. Cross section views of Pegasus and Hornet ore lodes.

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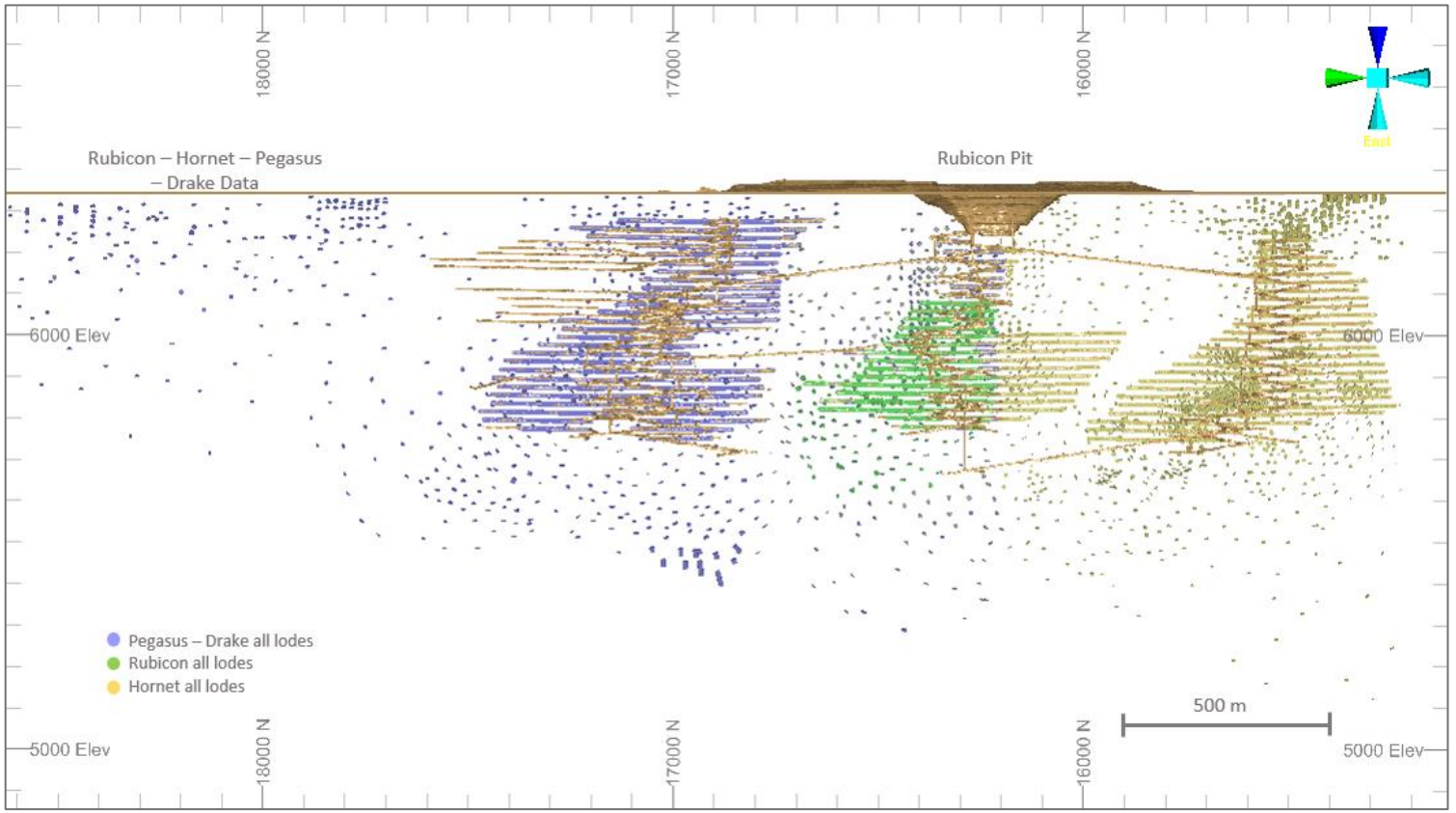

Figure 3. Long section views of Drake, Pegasus, Rubicon and Hornet ore lodes and data used in resource estimations

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 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:

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Criteria	JORC Code explanation	Commentary
		• 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 meter depths recorded by the drillers, 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 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 which is used to assist in classification Or Recent data - minor issues with data 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 used in Resource estimate. • DC 0 = Historic data - no original information or new drilling in proximity to verify. Not 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 estimates, maintained a site presence throughout the process.
	If no site visits have been undertaken indicate why this is the case.	Not applicable
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.	Alternative interpretations are not considered, the mineralisation is well defined and understood from underground exposures.
	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 drillholes. 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 (especially at the southern end of Hornet) although none have a material impact on the Resource model.

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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 ~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 Zuelika shear system extending over 10's 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 ~1,000 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 use 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. 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. Estimation was completed using a soft boundary between the high and low-density domains and between adjacent CMV domains. 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 that was analysed for top cuts and had variography completed separately. It indicates grade continuity with search ranges of 80 m in direction 1 and 40 m in direction 2. Three passes were used. Restrictions by drill hole have been applied. A semi-soft boundary has been apllied between the fresh and weathered domains of the Hornet CMV as boundary analysis suggested neither a completely hard nor completely soft boundary was suitable. **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. 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. Restrictions by drill hole were applied to the both Hornet Polaris domains. No restrictions were applied to Pegasus Polaris domains. **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 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. 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 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 ID^2 estimate using rotation angles obtained from dynamic anisotropy analysis produced a more robust 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. 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 with ranges of 80 m in direction 1 and 40 m in direction 2. Restriction by drill hole was 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. 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. 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.

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Criteria	JORC Code explanation	Commentary
		Bell (Pegasus) – includes one domain which was not top cut and had variography analysis with ranges of 50 m in direction 1 and 40 m in direction 2. 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 variographic analysis therefore ID^2 was used for estimation. Pegasus CMV variography with NNW plunge direction was used for rotation angles in the ID^2 estimate. Three passes were used. Restriction by drill hole was applied. **INTW** (Pegasus) – includes one domain which was top cut. There was insufficient data for variographic analysis therefore ID^2 was used for estimation. Pegasus CMV variography was used for rotation angles in the ID^2 estimate. 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 . Each domain has a search distance of 200 m for direction 1 and 150 m for direction 2. Three passes were used. Estimation was completed using a soft boundary between the high and low-density domains and between adjacent CMV domains. 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 was used. 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 variographic analysis completed. There was insufficient data for variographic analysis of ALT2, therefore ID^2 was used for estimation. All domains used ranges of 40 – 80 m in direction 1 and 20 – 50 m in direction 2. Three passes were used. HORVQ and ALT1 were restricted by drill hole while the other lodes had no restrictions.
	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. MFZ (Hornet) – Faulted and stepped CMV-style mineralisation in the Mary Fault Zone. Laminated quartz-vein present but fractured by late-stage faulting. 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/Nugget3 (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.

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Criteria	JORC Code explanation	Commentary
		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 gpt 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 4 to 250 gpt for individual domains and deposits). The top cut values are applied in several steps, using 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.	Drake and Rubicon comprise only an Underground Resource. This has been reported at a 1.90 gpt cut off within 2.5 m minimum mining width with no dilution MSO's using a $AUD2,250/oz gold price. Hornet and Pegasus have Open Pit and Underground Resources reported. The Open Pit Hornet and Pegasus Resources are reported above a $AUD2,250/oz optimised pit shell within SMUs of 2.5 m x 2.5 m x 2.5 m. Cut-off grade used for Open Pit reporting is 1.13 gpt. The Underground Hornet and Pegasus Resources are reported beneath the $AUD2,250/oz optimised pit shell, at a 1.90 gpt cut off within 2.5 m minimum mining width MSOs (excluding dilution).
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 and current 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 meet or 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. 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 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 2.8t/m^3 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 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 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.

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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.	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 2020MY 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 are 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.	**Underground** 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. **Open Pit** 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.
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).	**Underground** Mineral Resource is converted to Ore Reserve after completing a detailed mine design and associated financial assessment. **Open Pit** 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.	**Underground** Selected mining method deemed appropriate as it has been used at Raleigh since 2005 & Rubicon / Hornet / Pegasus since 2011. **Open Pit** 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 nature of the ore body.

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Criteria	JORC Code explanation	Commentary
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	**Underground** Design parameters include a 20m to 25m level spacing with a stope strike length of 15m for dilution control purposes. This correlates to a Hydraulic Radius of 4.3 to 4.6. **Open Pit** Pit slope design parameters are based on recommendations provided from geotechnical reviews and defined considering 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).	This Table 1 applies to both underground and open pit mining. A detailed interface review was conducted to ensure separation between underground and open pit Reserve material.
	The mining dilution factors used.	**Underground** 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. **Open Pit** 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 75%; that is waste material carried within the mining shape.
	The mining recovery factors used.	For the reporting of Underground Reserve physicals, a mining recovery factor of 98.5% is applied to Pegasus and Hornet, 94% is applied to Rubicon based on historical data. No recovery factors were applied for the reporting of Open pit Reserve physicals. Mining recovery is considered to be 100% of the SMU.
	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 minimum minable selective mining unit (SMU) dimensions for the Open pit Reserve Estimate are 3.5 m Wide x 2.5 m High x 4.0 m Long.
	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. Inferred material has not been included within the Open pit 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.
	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.	EKJV ore is treated at the Kanowna Belle milling facilities or additional ore to toll treatment facilities as required. Kanowna Belle is designed to handle approximately 2.0 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.	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.	**Underground** Rubicon, Hornet, Pegasus operations are currently compliant with all legal and regulatory requirements. All government permits and licenses and statutory approvals are granted.

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Criteria	JORC Code explanation	Commentary
		Open Pit 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.	All current site infrastructure is suitable to the proposed underground operations mining plan. Additional infrastructure is planned for the Hornet Open pit and has been allowed for in the financial model.
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.	Underground overhead costs and operational costs are projected forward on a first principals modelling basis. The estimation of Open pit mine operating costs was based on a contractor mining and maintenance operation using first principles to determine equipment productivities and associated operating hours to generate mine schedules. Provided contract pricing were than applied to the schedule to calculate all unit costs.
	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$1,750/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.	All gold is assumed sold directly to market at the nominated Corporate gold price.
	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. The Open pit 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 capital 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 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 license 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. All Open pit 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.
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.	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
Kundana Area Deposits (Pode): Resources and Reserves – 30 June 2020
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 were used to collect material for analysis; underground and surface diamond drilling (DD), surface Reverse Circulation drilling (RC) and face channel (FC) sampling. Pode | | # of Holes | Total m's | # of Samples | | DD | 830 | 208,559 | 154,522 | | FS | 1,494 | 7,708 | 13,086 | | RC | 15 | 2,521 | 1,726 | | RC_DD | 40 | 16,764 | 10,484 | | Total | 2,379 | 235,553 | 179,818 |
	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. 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.
	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 drillhole diameter and sampling interval selected. 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 FY20, a 40 g charge was selected for fire assay of diamond drillhole samples, and a 40 g charge for face 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 are used to drill the Kundana deposits. Surface diamond drillholes were completed using HQ2 (63.5 mm), whilst underground diamond drillholes were completed using NQ2 (50.5 mm). 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.
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 of 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 Pode 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. 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.

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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. Faces are washed down and photographed before sampling is completed.
	The total length and percentage of the relevant intersections logged.	For all drillholes, 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 is dependent on the type of drilling completed. Half core is utilised for exploration drilling and Resource Definition drilling. Grade Control and rare Resource Definition drill holes are 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 mineralization 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 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 drillholes and a 40 g 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 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 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.
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 at Pode. Re-drilling of some drillholes 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 drillhole 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 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, drillhole 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.	Drillhole spacing varies across the deposit. Exploration drilling at an 80 x 80 m nominal spacing is infilled during Resource Definition drilling 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. Drillholes 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.

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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 Pode deposit is located within the M16/309 and M16/326 mining leases 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.
	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 mineralization 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). Additional mineralisation includes 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 2020 resource report. Drillholes vary in survey dip from +56 to -83 degrees, with hole depths ranging from 7 m to 1,413 m. Average hole depth is 289 m. The assay data acquired from these holes are described in the NSR 2020 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 the drill hole information does not materially detract from the understanding of 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.	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 mineralized 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.
	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.

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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.	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').	Not applicable.
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 2020 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 will continue to define the extents of the Pode-style 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.	Appropriate diagrams accompany this release.

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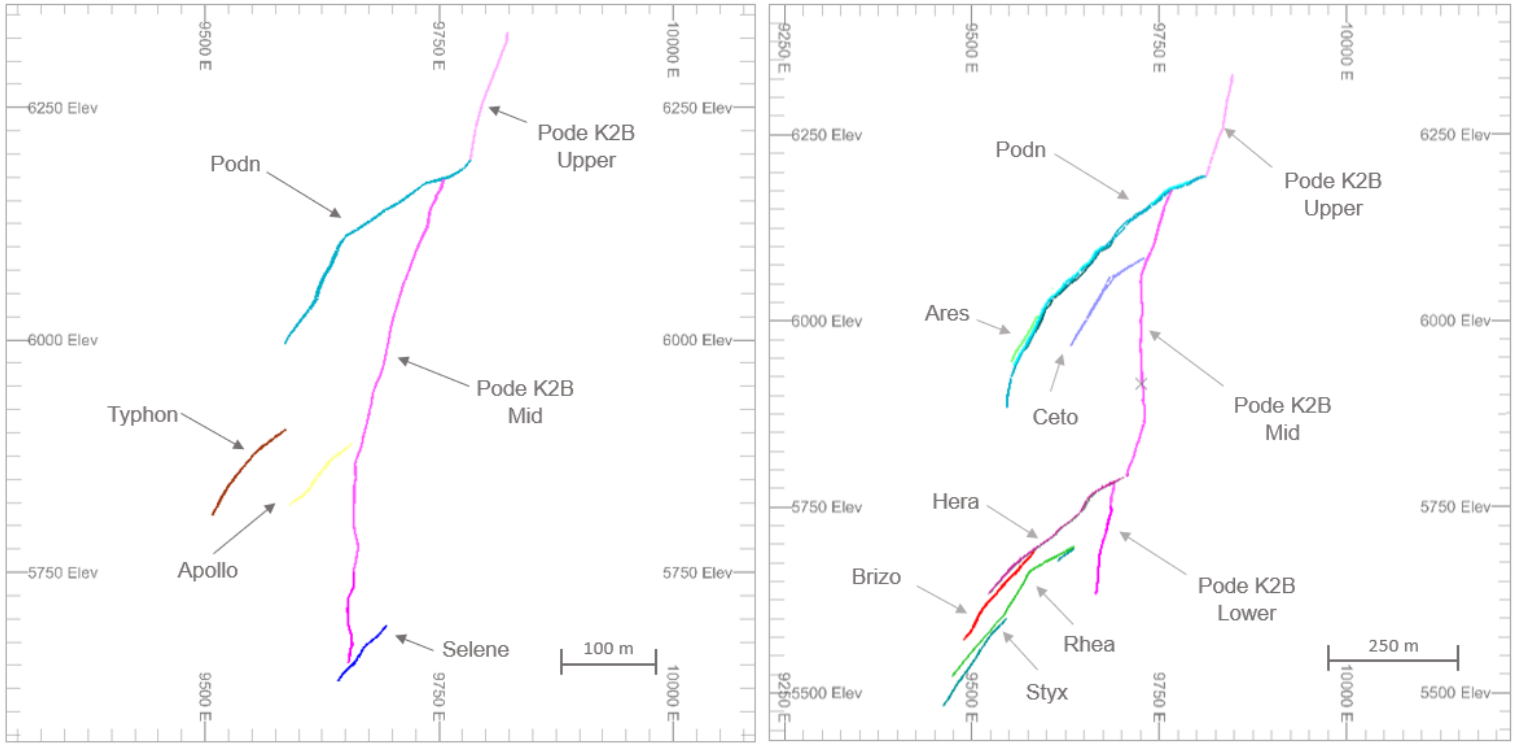

Figure 1. Cross section views of Pode ore lodes

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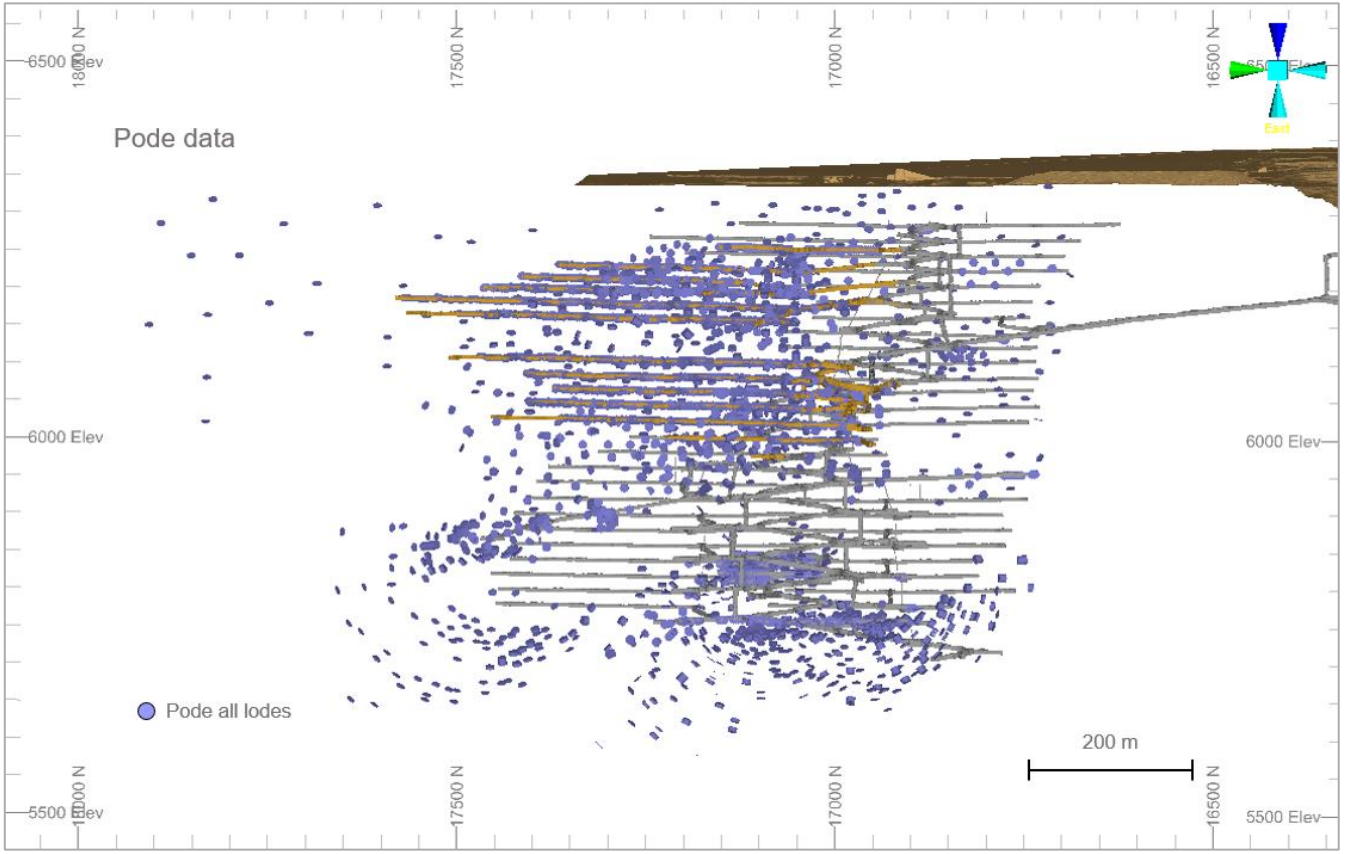

Figure 2. Long section view of Pode ore lodes and data used in resource estimations

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.

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Criteria	JORC Code explanation	Commentary
	Data validation procedures used.	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 2014 and 2016 had erroneous meter depths recorded 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 • 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 used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not 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.	Not applicable
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 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 drillhole 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.	No alternative interpretations have been proposed.
	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 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 (porphyritic) and Bent Tree (fine-grained) basalt 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 ~1,200 m. The individual ore bodies occur in a major regional Zuelika shear system extending over 10's 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 used direct grade estimation by Ordinary Kriging (unless otherwise stated) supported by composited sample data. Composite lengths of 1 m were used for most lodes (except Maia and Athena lodes, which used 0.5m composite lengths), 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 topcut of 400 g/t was used to limit the impact of genuinely anomalous data points. Variography was completed on the composited data file with searches 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 100 m in dir1, 80 m in dir2 and 50 m in dir3 were used. PodH – Divided into two subdomains based on data density. A hard topcut of 25 g/t was used to limit the impact of anomalous data points. Variography was completed on the composited data file with searches 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. PodF – Divided into two subdomains based on data density. A hard topcut of 20 g/t was used to limit the impact of anomalous data points. Variography was completed on the composited data file with 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. Dynamic anisotropy has been used for the estimate, with the plunge component hard coded to 40° based on the variogram-derived search orientation. K2B – Divided into two subdomains based on grade. Top cutting was completed separately on the high-grade and low-grade subdomains (60 g/t and 15 g/t respectively) using the influence limitation approach. Variography was completed on the composited data files separately with searches completed in three passes. For the high-grade estimate, search ranges of 50 m in dir1, 30 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. Hera – Divided into two subdomains based on data density. Data was top cut to 400 g/t for the high-grade subdomain and 50 g/t for the low-grade subdomain using the influence limitation approach. Variography was completed on the composited data file with searches were completed in three passes. For the high data-density estimate, search ranges of 20 m in dir1/dir2 and 15 m in dir3 were used. For the low data-density estimate, search ranges of 35 m in dir1, 25 m in dir2 and 15 m in dir3 were used. Dynamic anisotropy has been used for the estimate, with the plunge component hard coded to 40° based on the variogram-derived search orientation. Hera Footwall Halo – Divided into two subdomains based on data density. Hard top cuts were applied to the data of 50 g/t for the high-grade subdomain and 10 g/t for the low-grade subdomain. All other search parameters identical to Hera lode, excepting the use of dynamic anisotropy (not used for the Halo lode). Hera Hangingwall Halo – Divided into two subdomains based on data density. Hard top cuts were applied to the data of 30 g/t for the high-grade subdomain and 10 g/t for the low-grade subdomain. All other search parameters identical to Hera lode, excepting the use of dynamic anisotropy (not used for the Halo lode). Hera Breccia lode – Estimated as a single domain. A hard top cut of 20 g/t has been applied to the data. Searches were completed in three passes. Search ranges of 30 m in dir1, 15 m in dir2 and 10 m in dir3 were used. 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 with searches completed in three passes. Search ranges of 75 m in dir1, 35 m in dir2 and 15 m in dir3 were used. Dynamic anisotropy has been used for the estimate, with the plunge component hard coded to 40° based on the variogram-derived search orientation. 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 with searches completed in three passes. Search ranges of 60 m in dir1, 40 m in dir2 and 30 m in dir3 were used. 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. 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. 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.

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Criteria	JORC Code explanation	Commentary
		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. Athena – Estimated as a single domain. Data was top cut to 28 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 isotropy. Searches were completed in three passes. Search ranges of 30 m in dir1, 30 m in dir2 and 30 m in dir3 were used. 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. 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. Rhea – Divided into two subdomains based on data density. Data was top cut to 6 g/t for the low-grade subdomain using the influence limitation approach. No top cut was required for the high-grade subdomain. 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 60 m in dir1, 40 m in dir2 and 30 m in dir3 were used. Styx – Estimated as a single domain. Data was top cut to 16 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 60 m in dir1, 40 m in dir2 and 30 m in dir3 were used. 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 allowed has been increased for each subsequent search pass, while the minimum amount has stayed the same. Brizo – Estimated as a single domain. Data was top cut to 6 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 60 m in dir1, 40 m in dir2 and 30 m in dir3 were used. Maia – Estimated as a single domain. No top cutting required. 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 40 m in dir1, 30 m in dir2 and 15 m in dir3 were used. Thalia – Estimated as a single domain. Data was top cut to 5 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 30 m in dir1, 20 m in dir2 and 10 m in dir3 were used. PodS – Estimated as a single domain. No top cutting required. 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 30 m in dir1, 20 m in dir2 and 10 m in dir3 were used. Selene – Estimated as a single domain. Data was top cut to 25 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 60 m in dir1, 40 m in dir2 and 30 m in dir3 were used. Typhon – 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 60 m in dir1, 40 m in dir2 and 30 m in dir3 were used.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	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.
	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 variographic analysis.
	Any assumptions behind modelling of selective mining units.	Selective mining units were not used during the estimation process.

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Criteria	JORC Code explanation	Commentary
	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.	Topcuts 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. Topcuts 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 1.90 g/t cut off within 2.5 m minimum mining width with no dilution MSO's using a $AS2,250/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 existing 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 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 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 2.8t/m^3 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.	Bulk density measurements adequately account for any voids within the measured material.
	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 14,613 bulk density measurements at Pode and RHP. Assumptions were also made based on regional averages, on the default densities applied to oxide (1.80t/m^3) and transitional (2.30t/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 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 reflects 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.
	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 2020MY 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 are 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 to 25m level spacing with a stope strike length of 15m for dilution control purposes. This correlates to a Hydraulic Radius of 4.3 to 4.6
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	Not applicable - this Table 1 applies to underground mining only.
	The mining dilution factors used.	Based on historical mine performance, mining dilution of 5% 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 based on historical data.
	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 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.	EKJV ore is treated at the Kanowna Belle milling facilities or additional ore to toll treatment facilities as required. Kanowna Belle is 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$1,750/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$1,750/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$1,500 to A$2,000 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. 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 Person's 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 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 2020
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 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. Raleigh \# of Holes / Total m's / # of Samples DD: 620 / 110,625 / 42,370 FS: 7,272 / 28,106 / 44,396 RC: 5 / 672 / 396 RC_DD: 33 / 9,800 / 2,387 Total: 7,930 / 149,204 / 89,549
	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. 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.
	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 is either half core or full core sampled. Half core samples were cut using an automated core saw. The mass of material collected was dependent on the drill hole diameter and sampling interval selected. 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 and a 40 g charge for face 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 RC and DD techniques were used to drill the Raleigh deposit. Surface diamond drill holes were completed using HQ2 (63.5 mm) core whilst underground diamond drill holes where completed using both NQ2 (50.5 mm) and NQ3 (43 mm) core. Historically, core was oriented using the Reflex ACT Core orientation system. Currently, core is oriented 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.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	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.
	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.	Sample recovery of the ore 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 minimise core loss. Samples which have logged core loss through the ore zone are excluded. No relationship between sample recovery and grade has been discerned.
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.

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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. Sampling and cutting methodology are dependent on the type of drilling completed. Half core is generally utilised for exploration drilling. Some exploration and all 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 mineralization 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 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 40 g 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 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 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.

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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 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.	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.

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 (51%) 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.

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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.	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 Raleigh 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: 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 information released in this report. The collar locations are presented in plots contained in the NSR 2020 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 2020 resource report. All 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.	No new information released in this report. Excluded information is not thought material to 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 new information released in this report. 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').	Generally estimated true width is reported. Down hole lengths are noted where 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.
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.

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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).	There are no plans for drilling at Raleigh-Sadler in FY20-21, 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.

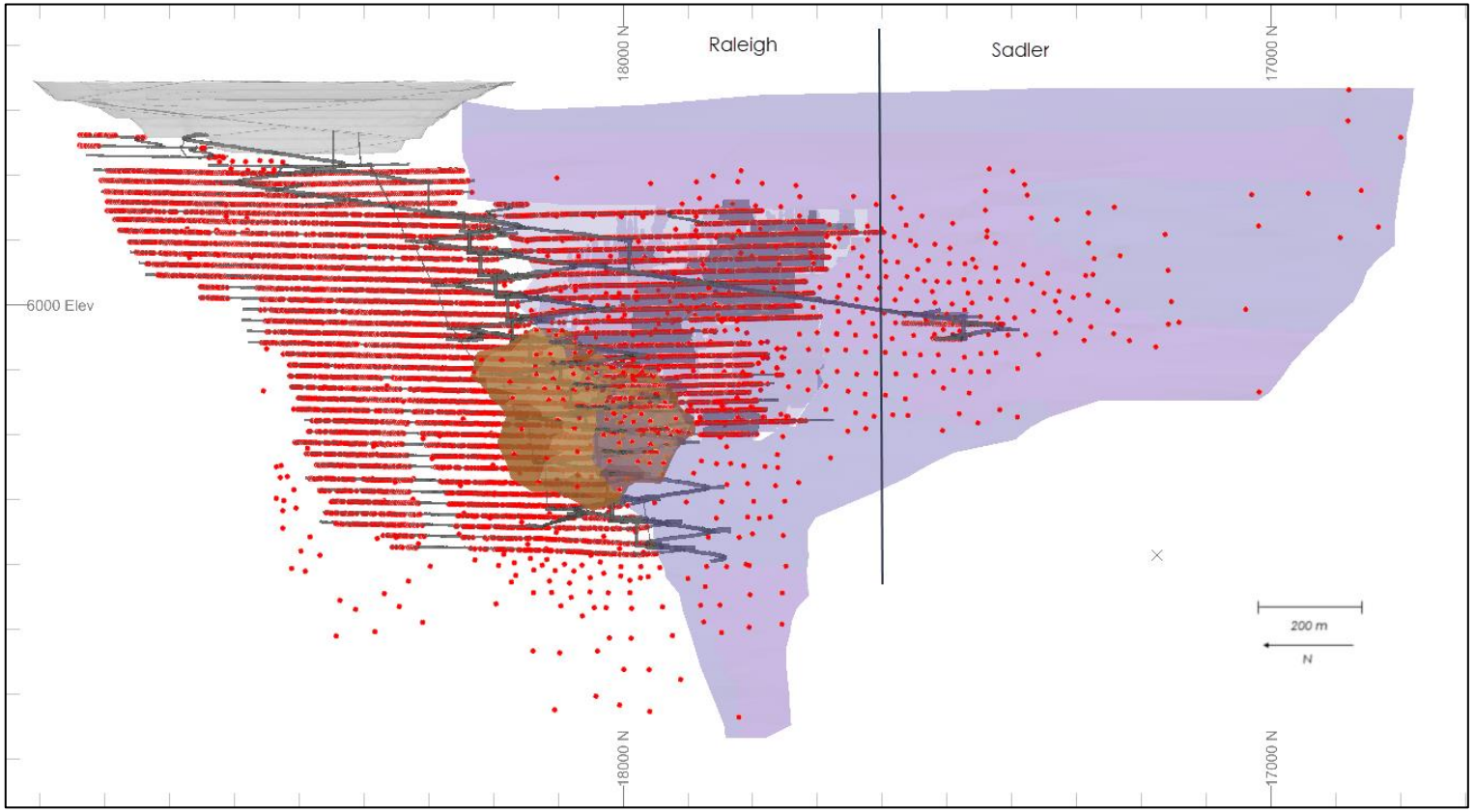

Figure 1. Long section view of the Raleigh and Sadler deposits and data used for estimation

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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 is 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 meter depths recorded 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 OR recent data with minor issues 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.	Site visits undertaken
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.
	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

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Criteria	JORC Code explanation	Commentary
	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. The Raleigh Main Vein (RMV) is based on 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 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 shearing and, on rare occasions, some minor veining can also be present. A halo lode has been used to estimate grade between the RMV and RMS. Skinners Lode (SKV) is in the hanging wall 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 hanging wall 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 much 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 Zuleika shear system extending over 10's 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.	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 1,000 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. 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. Variograms indicate 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. 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. Estimation was completed using a soft boundary between the high and low-density subdomains and between adjacent Raleigh domains (RMV, RMS and RMVS). 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. 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. 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

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Criteria	JORC Code explanation	Commentary
		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. 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. 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 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^3) 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.
	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 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. Top cuts were selected based on a statistical analysis of the data Top cuts vary by domain and range from 10 to 1,000 g/t. The top cut values are applied using 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 2.11 g/t cut off within 2.5 m minimum mining width (no dilution applied) MSO's using a $AUD2,250/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.
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 meet or 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 at Kanowna because of the roaster operation. Kanowna has a management program in place to minimize the impact of SO_2 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 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 t/m^3 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 2,920 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.
	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 2020MY 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.

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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.	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, and then final designs 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 20% rock plus 10% 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 98% 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.
	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.	EKJV ore is treated at the Kanowna Belle milling facilities or additional ore to toll treatment facilities as required. Kanowna Belle is 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.

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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.	Raleigh is 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$ 1,750/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$1,750/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$1,500 to AUD$2,000 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.

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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:	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 Raleigh 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
Mt Martin: Resources and Reserves – 30 June 2020
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 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.

Lode	Total Holes	#DDH	#RC	DD Samples	RC Samples	Total
1010	442	8	434	70	1,787	1,857
1011	58	1	57	4	139	143
1020	224		224		735	735
1030	232		232		580	580
1040	68		68		138	138
1050	306	1	305	2	706	708
1060	40		40		79	79
1070	23		23		43	43
1080	87		87		173	173
1090	68		68		115	115
1100	700	30	670	511	2,787	3,298
1101	4	4		31		31
1110	248	1	247	3	690	693
1111	8		8		50	50
1120	408		408		959	959
1130	6		6		9	9
1140	605	102	503	2,014	4,285	6,299
1141	48	2	46	5	137	142
1150	88	24	64	178	247	425
1160	58	28	30	207	197	404
1170	169	13	156	107	858	965

Lode	Total Holes	DDH	RC	DD Samples	RC Samples	Total
1180	38	21	17	161	109	270
1190	367	11	356	59	1,614	1,673
1200	51	2	49	6	158	164
1210	31	2	29	7	69	76
1211	2	2		17		17
1230	42		42		110	110
1240	24	23	1	145	6	151
1241	1	1		7		7
1250	35		35		82	82
1260	8		8		28	28
1270	36	3	33	36	155	191
1280	11	4	7	14	19	33
1290	7		7		35	35
2010	36	2	34	8	119	127
2011	9		9		29	29
2020	44		44		200	200
2030	25		25		118	118
2031	6		6		12	12
2040	16		16		69	69
2060	22		22		59	59
2070	12		12		50	50

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.

	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	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).
	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 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.
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 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.
	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.

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Criteria	JORC Code explanation	Commentary
Drill sample 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 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.
	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.

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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.
	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

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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 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 1.5gpt 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: 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 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 widths and intercept lengths	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 gpt) between mineralised samples has been permitted in the calculation of these widths. Typically grades over 0.1 gpt 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.
	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 @ ##.##gpt including ##.#m @ ##.##gpt.

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Criteria	JORC Code explanation	Commentary
	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 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 used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not 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
	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.
	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	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

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Criteria	JORC Code explanation	Commentary
Geological interpretation		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.
	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 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.	The Mt Martin chloritic schist is continuous over the length of the deposit which terminates against cross cutting faulting to the north and south.
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 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).
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.	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.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	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.
	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 size was determined by available supporting data and the degree of geological confidence as well as assumed mining methodology. 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.	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

Domain	XMIN	YMIN	ZMIN	XMAX	YMAX	ZMAX	XINC	YINC	ZINC	#X	#Y	#Z
Open Pit	4600	14700	-100	5500	16200	400	5	5	5	180	300	100
Underground	4600	14700	-100	5500	16200	400	10	20	10	90	75	50

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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 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 gpt cut off within a 1.0 m minimum mining width including +/- 0.5 m dilution MSO's using a $AUD2,250/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.	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.

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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 weathering horizons logged at Mt Martin. Oxide clays were assigned a bulk density of 1.8t/m^3 with the transitional zones assigned 2.2t/m^3 and fresh rock 2.75t/m^3.
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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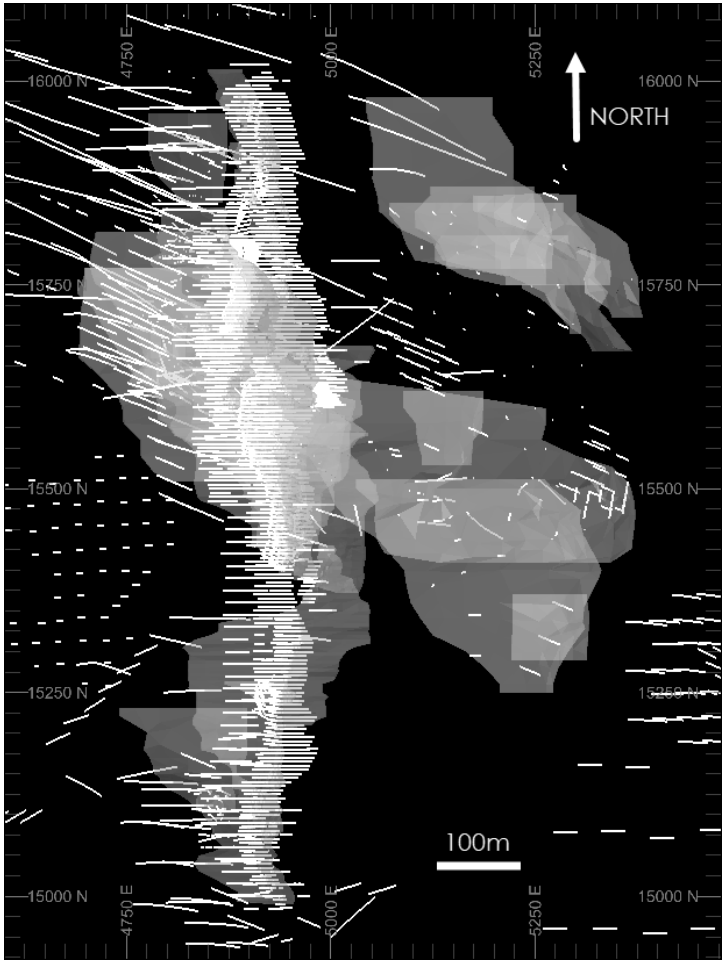

Figure 1. Plan view of the Mt Martin project and the data used in each resource estimate

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JORC Code, 2012 Edition – Table 1 Report
HBJ (Hampton Boulder Jubilee): Resources and Reserves – 30 June 2020
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), face channel (FC) and sludge (SL) sampling.
<table>
<tr><th>Type</th><th># Holes</th><th>Total Meters</th><th># Samples</th></tr>
<tr><td>Diamond drilling</td><td>1,820</td><td>346,110</td><td>254,152</td></tr>
<tr><td>RC drilling</td><td>3,004</td><td>152,350</td><td>139,052</td></tr>
<tr><td>Face Sample</td><td>6,144</td><td>27,582</td><td>32,150</td></tr>
<tr><td>Sludge Sample</td><td>4,092</td><td>18,285</td><td>18,027</td></tr>
<tr><td>Total</td><td>15,060</td><td>544,327</td><td>443,381</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>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.

RC sampling is from a 5½" face sampling hammer , 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 bags which are retained until required for re-split analysis (samples returning Au >0.2ppm) or eventual disposal. Historical RC drilling is assumed to employ similar practices.</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>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. Face sample intervals are determined by alteration and or lithological contacts or in all other cases, a standard interval of 1m (minimum sample length of 0.2 m to maximum sample length of 1.0 m). Sludge sampling (SL) is done routinely during underground development for grade control and ore direction purposes. Samples are collected at 1m intervals from jumbo and production drill rig fines. Exploration DD core is sawn half-core with one half sent for analysis and the other half retained. Grade Control DD core is whole core sampled and sent 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>DD 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. Most 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/deviflex 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 rowspan="3">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>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>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 oriented 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 in 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 unsampled 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. 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.	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.	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 mineralization 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.	Only nationally accredited laboratories are used for the analysis of the samples collected at HBJ. 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 catch 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
	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 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 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. 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. There is limited information available on historic QA/QC procedures, the available data is generally accepted 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.
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.	No specific twinned holes were drilled at HBJ. Re-drilling of some drillholes 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.	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 Axis down-hole north seeking Gyro-inclinometer and a full hole continuous survey competed at the end of the hole by Gyro-Inclinometer at 1-10m intervals. Historical 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. Historical down-hole surveys for underground diamond drill-holes were taken at 15 – 30m intervals by Reflex single-shot cameras. Recent and current practice for down-hole surveys in underground diamond drilling utilises a Devi flex survey tool. A true north seeking gyroscopic tool has been used to line up the rig and record a zero-meter survey. Completed collars are picked up by the mine survey department for location and to confirm starting bearing and inclination. QAQC is performed on the speed of running and 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
	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.

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Criteria	JORC Code explanation	Commentary
	Whether the data spacing, and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.	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. Drillholes 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 drillholes 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. Labs utilised by HBJ were audited by external party in August 2019 with no material issues noted.

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 mining tenements but not to the 16 freehold titles (Location land) which host the majority of SKO's Resource inventory. There are several minor agreements attached to a specific 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 1.75% NSR royalty is payable on 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.

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Criteria	JORC Code explanation	Commentary
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 Moz 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 comprises (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.
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 information is presented in this release. The collar locations are presented in plots contained in the NSR 2020 resource report. Drillholes 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 2020 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 new information is presented in this release. Any 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 mineralized 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').	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.
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.

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 exists 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/mineralization logging does not have overlaps and/or gaps. • Samples/Assay import checks – total sample meters 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

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Criteria	JORC Code explanation	Commentary
		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 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 used in Resource estimate. • DC 0 = Historic data; no original information or new drilling in proximity to verify. Not 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 data point 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 Competent Person has visited site regularly
	If no site visits have been undertaken indicate why this is the case.	The Competent Person 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 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.
	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 meters wide.
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 60 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 variographic 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.

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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 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 drillhole 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 depending upon the domain. 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.
	Discussion of basis for using or not using grade cutting or capping.	The influence of high 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 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 was 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 44 domains in total. Hard top cuts were also applied to 18 domains, 13 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, Inverse Distance Squared and Nearest Neighbour 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.

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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.	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 1.51 g/t cut off within a 2.5 m minimum mining width (no dilution) MSO's using a $AU2,250/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. The current metallurgical recovery achieved from the processing of HBJ ores is used in the calculation of the cut-off Grade for Resource purposes.
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 2.8t/m^3 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 (1.95t/m^3) and transition (2.29t/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.	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.

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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.	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.

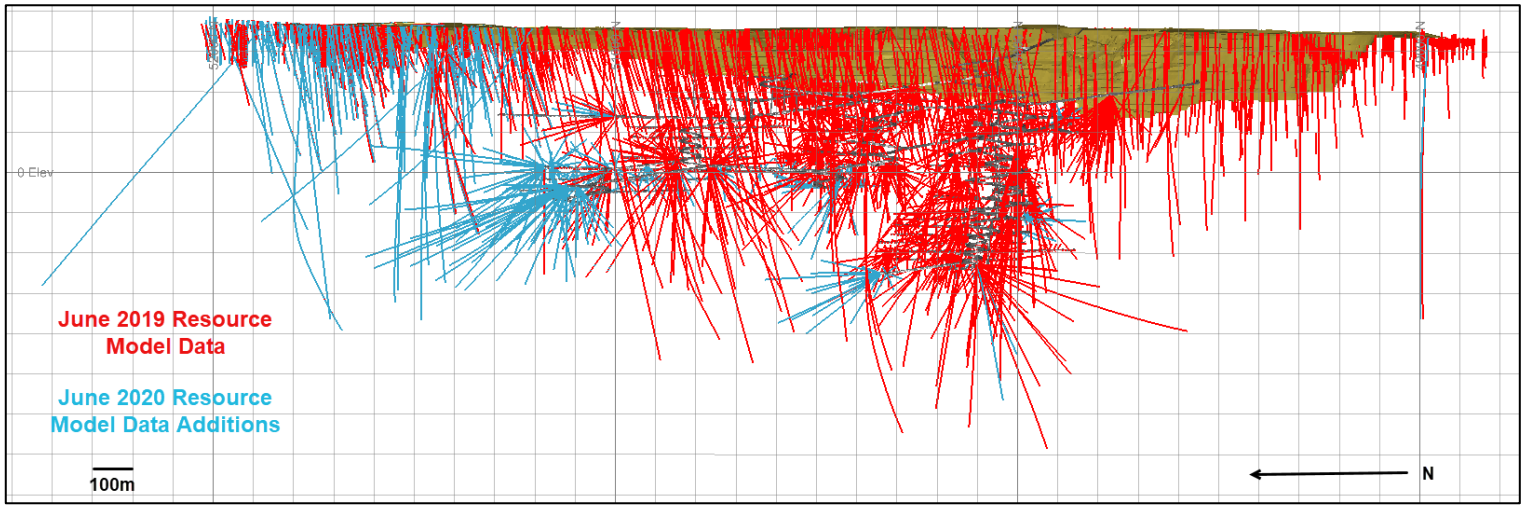

Figure 1. Long section view looking west of the drilling used in the Resource Model of the HBJ deposit, coloured by year

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 MY2020 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.

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Criteria	JORC Code explanation	Commentary
	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.	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. Cut Off Grade are calculated at a $AUD1,750/oz Gold Price as per corporate guidelines. 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 techniques currently in operation at SKO comprising of top down long hole open stopes. Stope shape parameters have been based on historical data or expected stable hydraulic radius dimensions (6-9 HR).
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	Each mining area is assessed individually 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 5.0m 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 2020 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, South Jubilee and Jubilee, 50% Rock dilution in the stopes in the Eastern lodes of the NOZ, SOZ, COZ and South Jubilee and 20% 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. Stope designs with less than 50% Inferred material are included within the Reserve and make up 1.8% of the declared ounces.
	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.	Over 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$ 1,750/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.	All gold is assumed sold directly to market at the nominated Corporate gold price.
	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.	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. 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
Paradigm: Resources and Reserves – 30 June 2020
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 (DD) drilling. <table><tr><th></th><th colspan="3">Paradigm</th></tr><tr><th></th><th># of Holes</th><th>Total m's</th><th># of Samples</th></tr><tr><td>DD</td><td>179</td><td>43,932</td><td>44,337</td></tr><tr><td>FS</td><td>-</td><td>-</td><td>-</td></tr><tr><td>RC</td><td>262</td><td>36,258</td><td>33,249</td></tr><tr><td>RC_DD</td><td>5</td><td>1,497</td><td>1,550</td></tr><tr><td>Total</td><td>446</td><td>81,687</td><td>79,136</td></tr></table>
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	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 20cm (HQ) or 30cm (NQ2).
	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 3 kg. DD drill core was cut in half using an automated core saw, the mass of material collected will varies on the hole diameter and sampling 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 50g charge was selected for fire assay
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 Paradigm project Diamond drill holes completed pre-2014 were predominantly NQ2 (50.5mm). All resource definition holes completed post 2014 up to 2016 were drilled using HQ (63.5mm) diameter core. Post-2017 drill holes have been predominately HQ from surface with NQ tails. 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 to 180m or less if approaching known mineralization
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	Moisture content and sample recovery is recorded for each RC sample.
	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. No recovery issues were identified during 2014-2017 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.
	Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	No relationship or bias has been identified between grade and sample 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 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.
	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.

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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. In most cases, half the core is taken for sampling with the remaining half being stored for later reference.
	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. All samples were intended and assumed to be dry, 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 Minanalytical preparation facilities, 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 pulverized 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. 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 process within the laboratory. Grind checks are performed at both the crushing stage (3mm) 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.	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 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 50gm 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 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 0.2gpt 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 for all RC samples 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. No bias has been established through the use of these procedures.
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.

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Criteria	JORC Code explanation	Commentary
	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 Arvista in 2015
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Drill hole spacing across the area varies from approximately 20m to 100m 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.	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.	Sample data is composited before grade estimation is undertaken.
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 is well known and suggests drilling direction is perpendicular to the orientation of mineralisation. The unexploited ore body has been extensively drilled, confirming a perpendicular drill direction.
	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 have been undertaken for the drill holes 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 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.	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 Paradigm area is considered to be northern extension of the regionally significant Zuleika Shear Zone. The tenements are located in the Norseman-Wiluna Archaean greenstone belt in the Eastern Goldfields province of the Yilgarn Craton, Western Australia. Lithologies at Paradigm consist of a series of feldspathic volcanoclastic wackes intercalated with shales, siltstones and conglomerates and form part of the Black Flag Group. 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 and adjacent fine-grained stratigraphic horizons
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	A summary of the data present in the Paradigm deposit can be found above. The collar locations are presented in plots contained in the NSR 2020 resource report.

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Criteria	JORC Code explanation	Commentary
	o dip and azimuth of the hole o down hole length and interception depth o hole length.	Drillholes vary in survey dip from -8 to -90 degrees, with hole depths ranging from 44 m to 727 m, with an average depth of 168 m. The assay data acquired from these holes are described in the NSR 2020 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.	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 mineralized samples has been permitted in the calculation of these widths. Typically grades over 1.0gpt 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').	Not applicable
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 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 drillhole 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.
	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.	Northern Star personnel have validated the database during the interpretation of the mineralisation with any drillholes containing dubious data excluded from the MRE.
	Data validation procedures used.	Data validation processes are in place and run upon import into the database.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The model was completed externally and handed over to NSR to be reviewed by the Competent Person. The Competent Person has been involved all steps and familiar with the deposit.
	If no site visits have been undertaken indicate why this is the case.	Not applicable
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 interpretation was completed using Leapfrog Software.
	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.	The Arina lodes have undergone significant reinterpretation following the observation that a high-grade quartz vein core is present that comprises a separate grade population to the remainder of the Arina lode. This has resulted in the Arina_01 lode from the MY2019 release being separated into the Arina core (a01c) and Arina Halo (a01h) for the MY2020 release. The Arina core comprises a discrete, high-grade vein while the Arina halo lode comprises flank-style veining, silica alteration and disseminated sulphides. The high-grade core is consistently seen with the highest grades occurring where laminations or slivers of silica-altered wallrock are present. A high-grade section is often present in RC samples with logging suggesting the presence of high percentages of quartz. Presence of quartz veining, alteration intensity and grade have been considered when wireframing the Arina halo lode, which forms a mineralised envelope around the Arina core lode. The previously sigmoidal Arina wireframe has been further divided with an additional splay (Arina East Splay) interpreted. The Arina East Splay comprises a narrow, laminated vein and is positioned in the area where the Arina halo lode 'rolled over'. Two new lodes have been interpreted in the hangingwall of the Arina lodes (Arina West Splays 1 and 2). Diamond drilling through these lodes have provided updated structural information, adding confidence to the interpretations of these lodes.
	The use of geology in guiding and controlling Mineral Resource estimation.	The mineralisation interpretation is based on a combination of logged quartz percentage, 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 the interpretation. Grade continuity is not as consistent, hence 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 extends 800m along strike and 600m down-dip. Paradigm consists of a supergene lode, Arina, Natasha and Mishka lodes.
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 Datamine Studio RM software. Geostatistical analysis and variography were completed using Snowden's Supervisor v9 software. Each ore lode interpretation is considered as being a separate estimation domain. All estimations use hard domain boundaries. Grade estimations for gold used Ordinary Kriging, unless otherwise stated. Estimations use 1m composites with grade capping applied to gold 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. A multiple-pass estimation strategy was applied for estimations. The search distance for each lode is calculated at ~80% of the total semivariance from the variogram. Minimum and maximum samples are generally 8 and 14, however each ore lode is optimised individually which may result in a different minimum and maximum selected.
	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.
	The assumptions made regarding recovery of by-products.	No assumptions have been made regarding recovery of any 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).	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.	Block size varied depending on the sample density. For fresh ore lodes, a 10 m x 10 m x 10 m parent block size was used. For the supergene, varying block sizes were used for different portions – 20 m x 20 m x 10 m for the big blocks, and 10 m x 10 m x 10 m for the small blocks.
	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 ore wireframes were created using Leapfrog Software. Tag strings and additional interpretation points were used to control ore body volume and orientation. Data to be used in the estimate was provided as an intersection table, from which the intervals to be used were copied into the Datamine estimation macro. Intersections used in the estimate have been validated to ensure they agree spatially with the interpretation and encompass all the drillholes to be used in the estimate.
	Discussion of basis for using or not using grade cutting or capping.	Top-cuts were applied to the composited sample data. Top cuts were selected based on a statistical analysis of the data to not impact the mean by more than 5% and reduce the coefficient of variation to around 1.2 and vary by domain. The top cut values are applied in several steps using 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 topcut 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.	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.	Paradigm has Open Pit and Underground Resources reported. The Open Pit Resource is reported above a $AUD2,250/oz optimised pit shell. A cut off grade of 0.70 g/t has been used for Open Pit reporting. No mining constraints have been applied. The Underground Paradigm Resource is reported below the $AUD2,250/oz optimised pit shell at a 1.64 g/t cut off within 2.5 m minimum mining width (excluding dilution) MSOs.
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	No minimum mining assumptions have been made during the resource wireframing or estimation process.

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Criteria	JORC Code explanation	Commentary
	not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	
Metallurgical factors or assumptions	The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	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.	A thorough investigation into average density values for the various lithological units at Paradigm 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 2.8t/m^3 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 (1.8 t/m3) and transitional (2.1 t/m3) 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 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.	Classification is based on a series of factors including: • 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 • DataClass of the drillholes
	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 resource model methodology is appropriate and reflects 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.	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.

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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.	Historic production records are incomplete, so no comparison or reconciliation has been made.

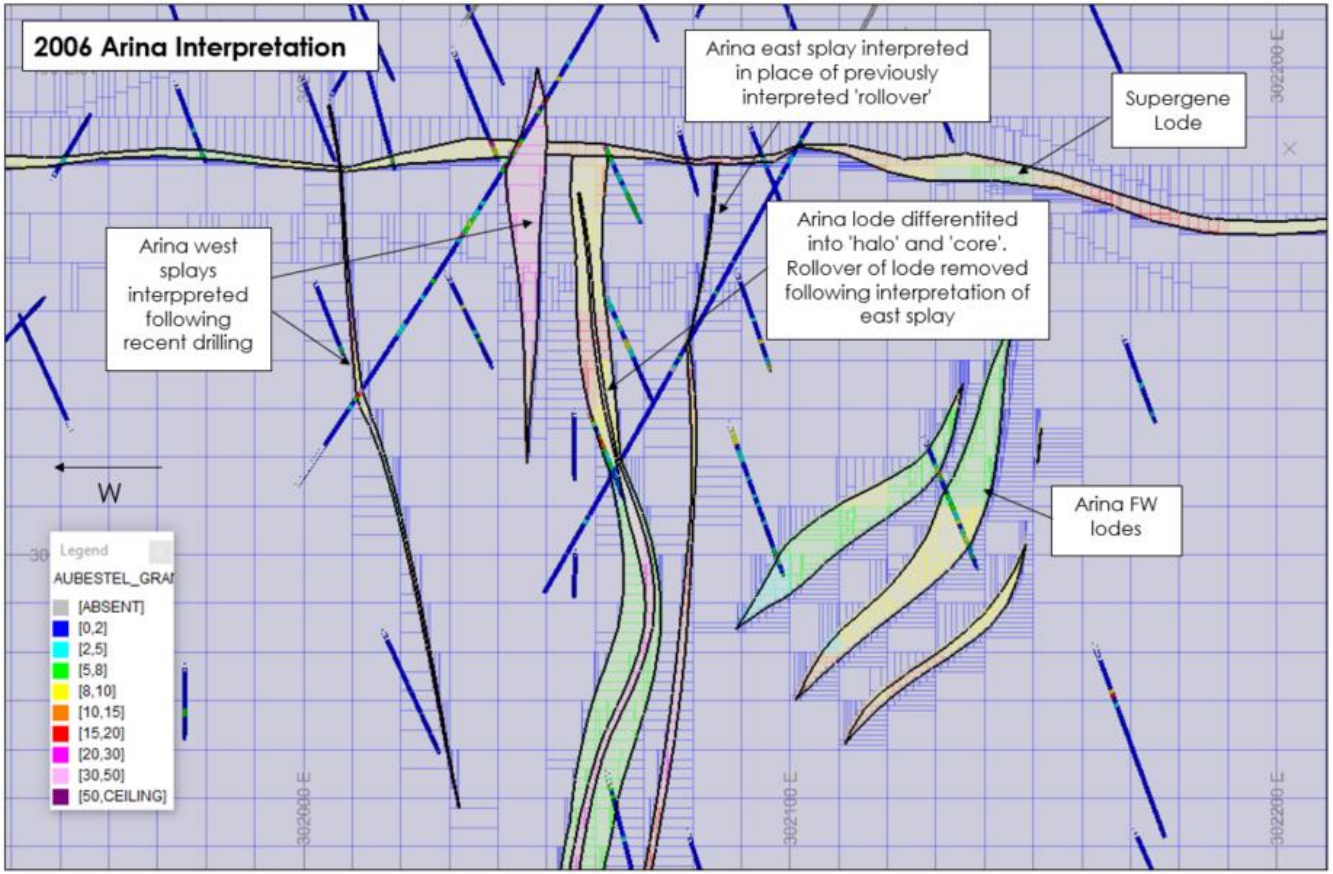

Figure 1. Cross-section view at 6,627,090 mN showing the updated Arina core, halo and splay interpretations

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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 2020MY 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 have been calculated by generating detailed mining shapes for the proposed Paradigm open pit 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.	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. 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 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.	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 12%; that is waste material carried within the mining shape.
	The mining recovery factors used.	No recovery factors were applied for the reporting of Open pit Reserve physicals. Mining recovery is considered to be 100% of the SMU.
	Any minimum mining widths used.	The minimum minable selective mining unit (SMU) dimensions for the Open pit Reserve Estimate are 3.5 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.

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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.	Inferred material has not been included within the Open pit 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.
	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, dewatering pipeline, Waste Rock Storage 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 Kanowna Belle 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 Kanowna Belle 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 Kanowna Belle 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". 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.

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Criteria	JORC Code explanation	Commentary
		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.
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.	The estimation of Open pit mine operating costs was based on a contractor mining and maintenance operation using first principles to determine equipment productivities and associated operating hours to generate mine schedules. Provided contract pricing were than applied to the schedule to calculate all unit costs.
	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 gold price of AUD $1,750 per ounce as per corporate guidance.
	The source of exchange rates used in the study.	Corporate guidance.
	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.
	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 $1,750 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.	It is assumed all gold is sold directly to market at the Corporate gold price guidance of AUD$1,750/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.	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$1,750 ± $250 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.

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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.	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 the mineral Resource classifications within the underlying Resource model.
	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.
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
Carbine-Phantom - 30 June 2020
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), 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: Carbine # of Holes / Total m's / # of Samples DD: 12 / 3,516 / 3,372 RC: 184 / 25,347 / 19,319 RC_DD: 5 / 1,649 / 1,941 Total: 201 / 30,512 / 24,632
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	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).
	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 3 kg. DD drill core was cut in half using an automated core saw, the mass of material collected varies 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.
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 Carbine-Phantom project. Diamond drill holes completed pre-2014 were predominantly NQ2 (50.5 mm). All resource definition holes completed post 2014 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 mineralization.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	Moisture content and sample recovery is recorded for each RC sample. Sample recovery is recorded for DD sampling.
	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 - 2020 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.
	Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	No relationship 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.

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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 commenced 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.

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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 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 gpt 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. 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 will 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.	4 m or 2 m RC composites have been used for initial Resource targeting 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 1 m resplits were assayed at the time, and the resplit 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	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 was perpendicular to the orientation of mineralisation for the Carbine-Phantom Main Lodes.

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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.	No sampling bias is considered to have been introduced by the drilling orientation. Drillholes 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 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-Phantom model 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-Phantom 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. 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-Phantom 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-Phantom Main 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: 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 2020 resource report. Drillholes 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 2020 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-Phantom resource is based predominantly on historic validated drilling with the addition of recent drilling to validate, infill and extend. The Carbine-Phantom resource contains 86% historic drilling pre-2000's (1992-1999), 2% historic drilling (2000-2012) and 11% recent NSR drilling (2014-2020).
	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.

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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.	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 mineralized 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 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 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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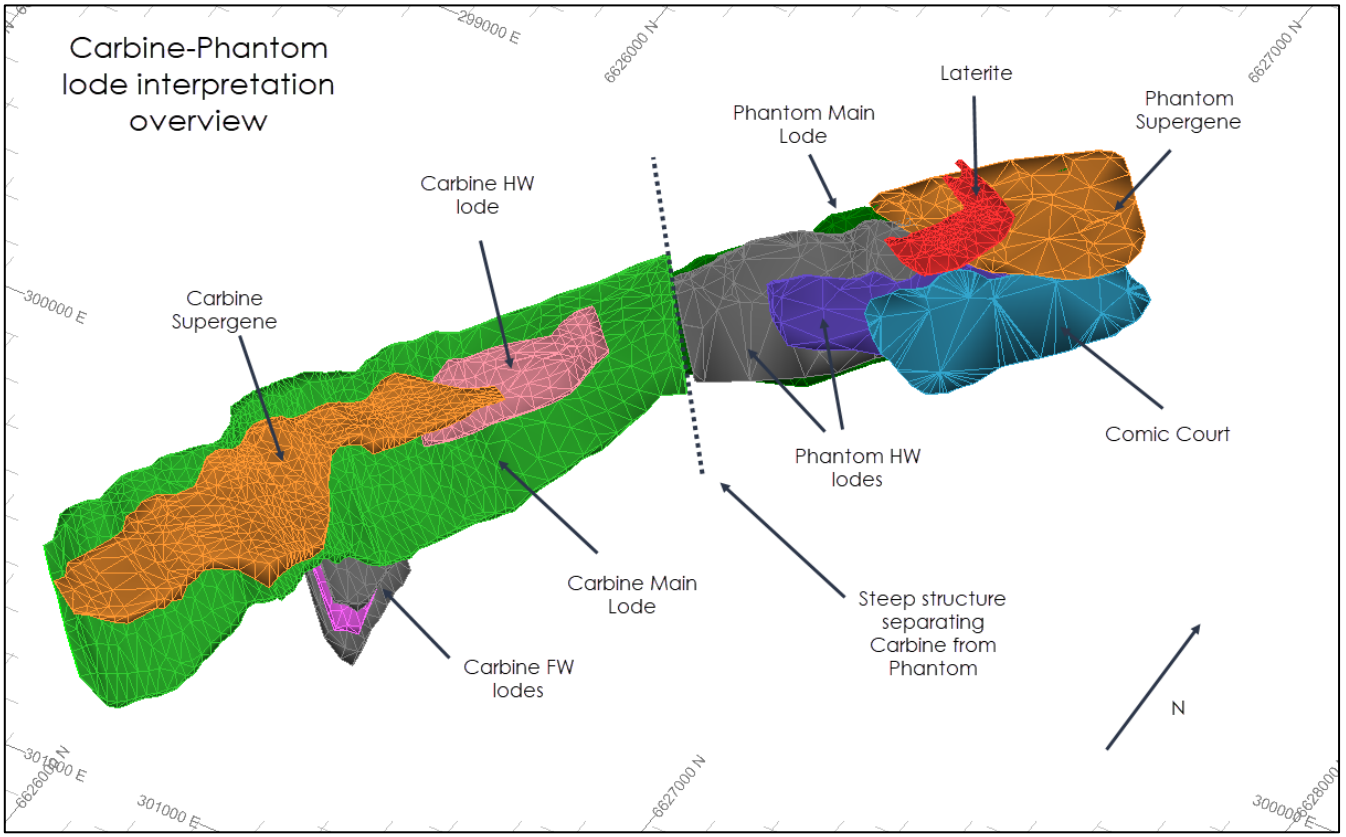

Figure 1. Overview of Carbine-Phantom interpreted ore lodes

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 drillholes containing unvalidated data excluded from the MRE.

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Criteria	JORC Code explanation	Commentary
	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 dataclass in AcQuire. This resource used a dataclass system to indicate the confidence in the historic data, rather than a straight "Res_Flag" Yes or No. • Dataclass 3 drill holes passed audits of original data (recent drilling). • Dataclass 2 holes passed spatial validation, were within 100m of recent drilling, and could not be completely verified by original data. Dataclass 1 holes passed spatial validation, were >100m away from recent drilling, and could not be verified by original data. • Dataclass 1 drill holes (usually "Res_Flag" No) were included due to the amount of historic drilling with no recent drilling proximal to upgrade the dataclass. • Dataclass 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 Dataclass 0 have been excluded from the data using exclude tables. All historical RC, RCD and DD data has been assigned a Dataclass 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 Competent Person has not visited this site.
	If no site visits have been undertaken indicate why this is the case.	Carbine Project has been lower 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 consistently resulting in confidence in the modelled contact. This determined the type of estimation completed and the Resource Classifications applied. There are several known structural offsets in the Carbine ore body, however, detailed information on the localised impact of the structural controls is not fully understood. 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 NSR geologists and subsequently led to interpretation of ore domains. The Carbine and Phantom Main Lodes are located proximal to the Carbine Thrust and exhibit 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 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 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, 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 are interpreted as shallow dipping stacked lodes from limited historic deep diamond drilling datawhich indicated multiple vein orientations. This assumption was tested using linear estimation and proven to be weak. The footwall lodes are hosted primarily in the sediments and are named based on the relative position of the Main Carbine and Phantom Lodes.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Data validation highlighted the limited 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 unverified 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 guided the ore domains as well as subdomaining 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 is 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 which coincide with high grade shoots. Grade tenor tends to decrease in areas were the ultramafic footwall steepens.

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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 Carbine-Phantom 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-Phantom Main Lodes (CML and PML) appears to extend for approximately 2,200m along strike, 300m down-dip with a width ranging from 1.0 m to 4.0 m. The Carbine supergene extends above the Carbine Main Lode lode within the transition and oxide zones. It 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. The Phantom supergene covers the Phantom Pit area, extending approximately 450 m along strike, 350 m down dip and ranging in thickness from 1 m to 10 m. A narrow laterite body has also been interpreted in the Phantom model area, although this has been largely depleted by previous mining activity. The hanging wall lodes are parallel to the Carbine and Phantom Main Lodes and are generally hosted in the sediments. Strike lengths range from 400 m to 700 m, with down dip extents between 100 m and 400 m. One hanging wall lode has been modelled in the Carbine model area and three in the Phantom model area. The Carbine footwall lodes are interpreted as shallow dipping (~45°) 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).
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. The Carbine Main Lode used Categorical Indicator Kriging. All estimation was completed using Datamine RM software. The Carbine Main lode 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 topcuts across the grade subdomains (except for a hard only topcut in the Waste subdomain). The second most populated domain (2) used hard topcuts in the waste, soft and hard in the low grade and soft topcut in the high grade subdomain. The least populated domain (3) used only hard topcuts 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 ID^2 and the high grade subdomain used ID^3. In domain 2 and 3 the high grade subdomains used ID^3. Of the three Carbine FW lodes, lodes 1 and 2 used both hard and soft topcuts while lode 3 used only soft topcuts. 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 drillhole). FW2 and 3 both used Inverse Distance Squared estimation. The CFW lodes used Ordinary Kriging. The Carbine HW lode used both hard and soft topcuts. Variography was possible for the lode and search rotations and ranges are based on the variography. A minimum of 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 (min 2 samples per drillhole). The CHW lode used Ordinary Kriging. For the Carbine supergene lode, both hard and soft topcuts were used. Variography was possible 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. A declustering technique was used (min 3 samples per drill hole). The Carbine supergene lode used Ordinary Kriging. The Phantom Main lode had no top cut applied as no genuinely anomalous data points exist in the set. Variography was completed on the composited data file and search rotations and ranges are based on this. A minimum of 8 samples and max of 24 were used in the first pass and three passes were used in total. A declustering technique was used for all three lodes (min 4 samples per drillhole). The Phantom Main Lode used Ordinary Kriging. For the Phantom supergene lode, a hard topcut was used. Variography was possible and search rotations and ranges are based on the variography. A minimum of 10 samples and max of 24 were used in the first pass, three passes were used in total. A declustering technique was used (min 4 samples per drillhole). The Phantom supergene used Ordinary Kriging. The Phantom HWs lodes used hard topcuts. Variography was only possible for PHW1. The lodes and search rotations and ranges for all the Phantom HW lodes are based on the variography from PHW1. A minimum of 8 samples and max of 24 were used in the first pass, three passes were used in total for all three lodes. A declustering technique was used (min 2 - 4 samples per drillhole, depending on the lode). PHW1 used Ordinary Kriging, while PHW2 and CMCR used ID2. The Phantom laterite had no top cut applied as no genuinely anomalous data points exist in the set. Variography was completed on the composited data file and search rotations and ranges are based on this. A minimum of 10 samples and max of 20 were used in the first pass and three passes were used in total. A declustering technique was used for all three lodes (min 4 samples per drillhole). The Phantom laterite used Ordinary Kriging.
	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.

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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 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.	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). 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.	Ore wireframes were created as solids in Maptek Vulcan v9.1 and Datamine Version 1.6 software packages. 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 which has resulted in confidence in the geological interpretation .
	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 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 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. 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.
	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 1.64 g/t cut off within 2.5 m minimum mining width (excluding dilution) MSO’s using a $AUD2,250/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.	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 2.1t/m^3 and 2.4t/m^3 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 2.55t/m^3 was used rather than 2.7t/m^3. 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 2.8t/m^3 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.
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 2020
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 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 used ~5.25" face sampling bit. Surface DD core used 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 (105^0C), 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.
	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.

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Criteria	JORC Code explanation	Commentary
		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 Resources NL 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 Resources NL 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 and has inbuilt validations. Taipan Resources NL holes of the 2006 database collated and extensively verified by third party consultancy.
	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 airborne 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 airborne photogrammetric survey.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	Exploration results are based on the drill traces as attached.
	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.

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Criteria	JORC Code explanation	Commentary
	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 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. Paulsens Gold Mine is currently on care and maintenance.
	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.
	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.

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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.	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.
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.

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Criteria	JORC Code explanation	Commentary
	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.	ID^2 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 a mineralised 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 elevations, 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.
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	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.

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Criteria	JORC Code explanation	Commentary
	not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	
Metallurgical factors or assumptions	The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	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. 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 Resource classifications.
	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 Resources NL 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 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 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.	The global assessment is more of a reflection of the average tonnes and grade estimate. Local variations are anticipated.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	There is no production data available.

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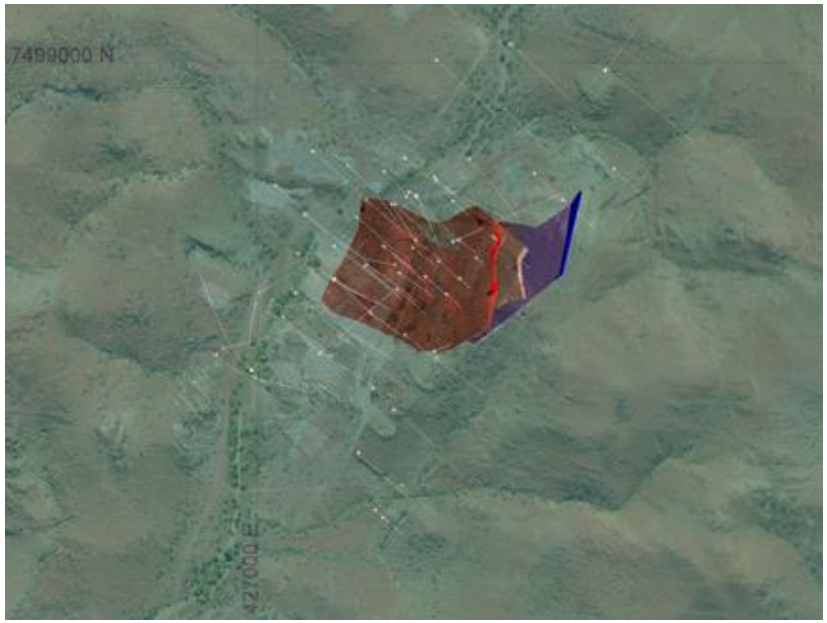
PLAN VIEW OF THE BELVEDERE DEPOSIT



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JORC Code, 2012 Edition – Table 1 Report
Paulsens Underground (Voyager, Titan, Upper Paulsens & Galileo) - 30 June 2020
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 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 : Surface RC drilling, 332 holes (face sampling hammer, ~5 1/4" bit size), Surface drill core, 140 holes, (NQ2 sized, standard tube), 999 Underground DD, 3,494 faces used to generate sample composite. Titan : Surface diamond drill holes 2, 565 Underground drill holes, 560 faces/rises used to generate sample composite. Voyager : 3,287 Underground drill holes and 7935 faces/rises used to generate the sample composite. Galileo I: 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 0.3m to 1.2m in length. Total weight of each sample generally does not exceed 5kg. All samples are oven-dried overnight, 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. 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 to 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 crusher 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. 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.

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Criteria	JORC Code explanation	Commentary
		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 drilled. 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, airborne 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 are initially taken as 4m composites to be replaced by 1 m samples in ores zones above assumed threshold.
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 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.
	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.

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Criteria	JORC Code explanation	Commentary
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: 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 drill hole information in this report. Too many (>9000) holes to practically summarise all information for all drill holes and faces used in the Resources.
	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.
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 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.
	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:	

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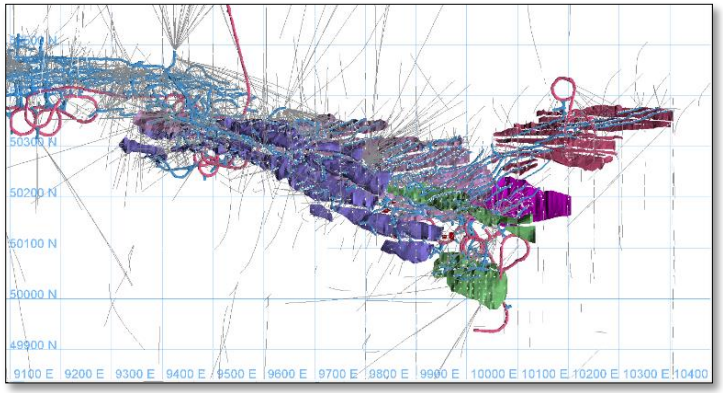
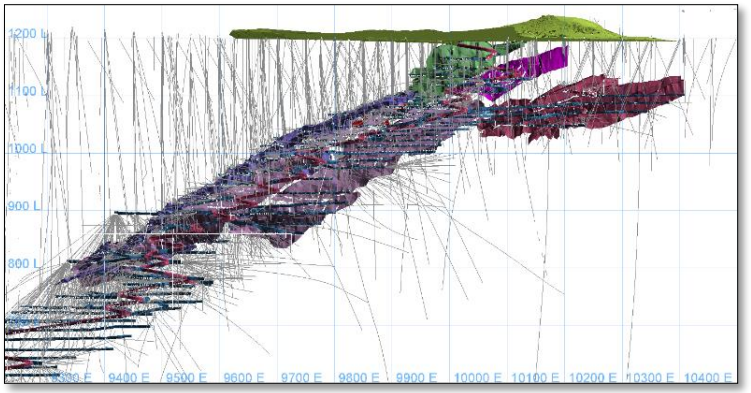
Criteria	JORC Code explanation	Commentary
Relationship between mineralisation widths and intercept lengths	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Due to complex mineralisation geometry and varying intercept angles the true thickness 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 new 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 new 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. In early 2020, a series of 83 underground diamond drill holes were completed to test and extend the best remnants around the existing workings. Results have been received, built into a new model and are currently being assessed.
	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 attached.

PAULSENS UNDERGROUND - REPRESENTATIVE PLAN & LONG SECTION

Plan View – Paulsens upper Levels



Long Section View – Paulsens upper levels looking north.



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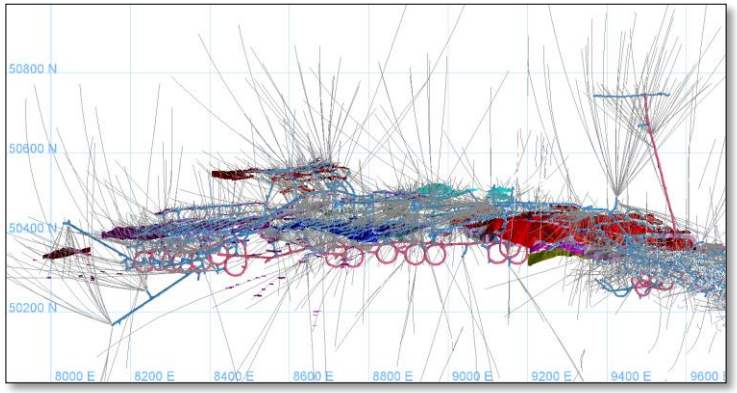
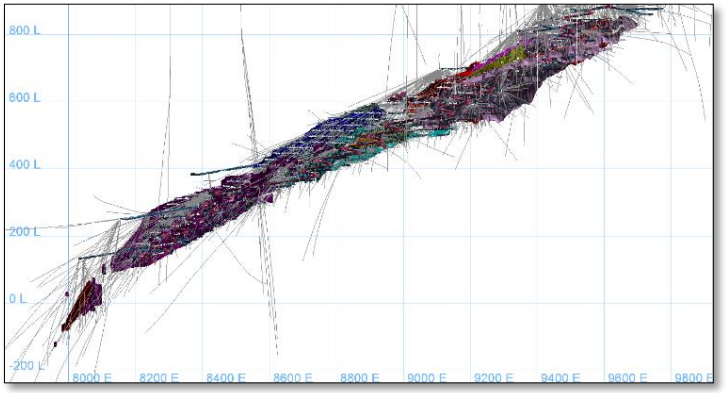
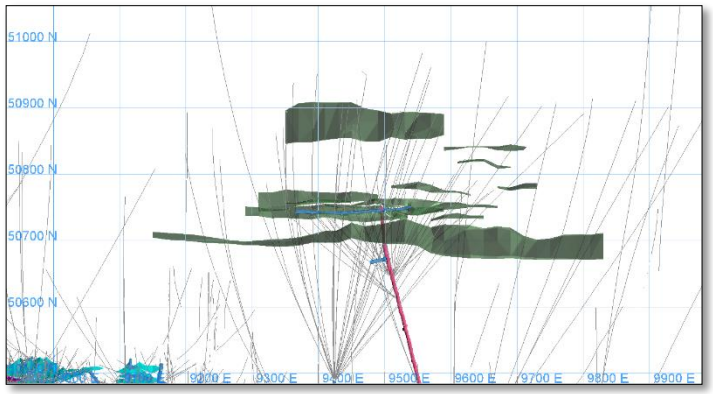
Plan View – Paulsens Voyager & Titan deposits



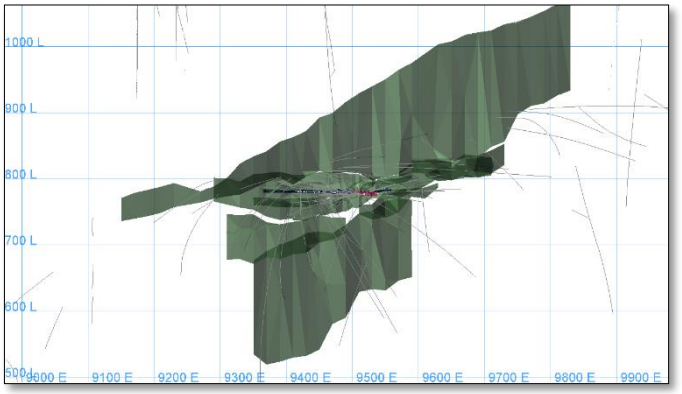
Long Section View – Paulsens Voyager & Titan deposits looking north



Plan View – Paulsens Galileo deposit



Long Section View – Paulsens Galileo deposit looking North



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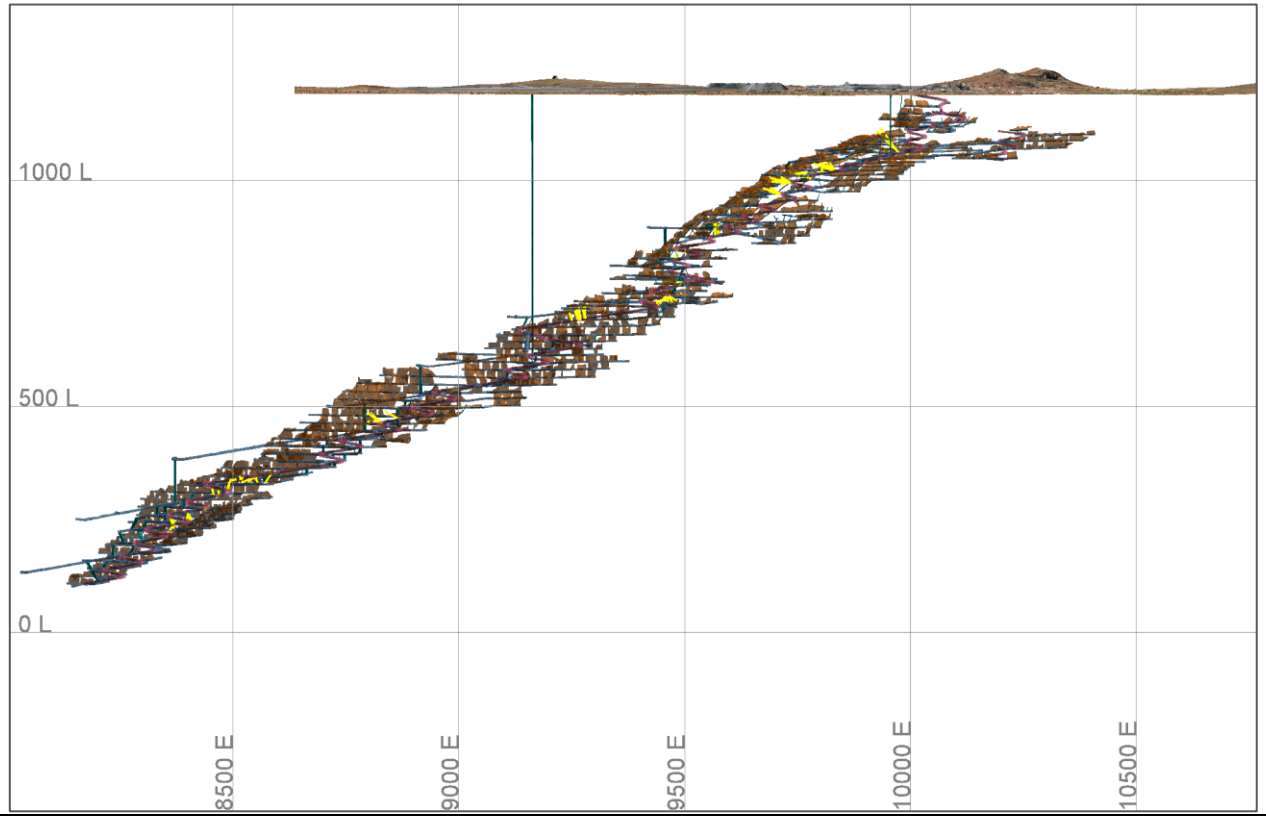
Long section view of Paulsens looking North (mine grid), highlighting the 2020 infill drilling in yellow



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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 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.	Most of the 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.
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 (ID^2) was used to estimate this Resource, using Vulcan 11. Mineralisation domains (combined into one model) 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.

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Criteria	JORC Code explanation	Commentary
	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 most 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 %).
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) at a grade of 3.1gpt based on a gold price of $2,250 and mine restart costs 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. Mine Stope Optimiser (MSO) was run at 10m by 10m blocks to identify potentially economic material. This is coarser than the manually created reserve shapes. Small reserve shapes, not picked up by the Resource MOS process, were added to the overall resource.
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 in isolation. 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 are 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 multiple times by both independent and contracted consultants with the overall finding 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 319 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.

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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.	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 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.
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 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.z	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 2020 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 a site visit, as well as consulted on a range of operating elements.
	If no site visits have been undertaken indicate why this is the case.	Site visit 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.

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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.	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.
	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 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.
	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.	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.

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Criteria	JORC Code explanation	Commentary
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$1,750 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.
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 $1,750 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 2020. 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.

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Criteria	JORC Code explanation	Commentary
Classification	The basis for the classification of the Ore Reserves into varying confidence categories.	All Ore Reserves include Proved (if any) and Probable classifications based off the underlying Resource model classifications whereby Measured Resource may convert to Proved or Probable and Indicated material convert to Probable Reserve.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The results accurately reflect the Competent Person's 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.
	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 2020 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
Central Tanami JV – 30 June 2020
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 drill (DD) 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 geologically determined intervals (min 0.3 metres).
	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 cut 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 mineralized 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 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 ranges 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.
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	No environmental, permitting, legal, taxation, socio-economic, marketing or other relevant issues are known, that may affect the estimate.

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Criteria	JORC Code explanation	Commentary
	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.	
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. Several 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), 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.