ASX AND MEDIA RELEASE
31 January 2019

HIGH GRADE MAIDEN MINERAL RESOURCE AT NIGHT TRAIN

HIGHLIGHTS

- Maiden Inferred Mineral Resource[1] of 130Mt @ 3.3% HM, containing 3.6Mt of VHM
- Includes coherent high-grade[2] component of 50Mt @ 5.9% HM, containing 2.6Mt of VHM
- Exceptional in-situ grades of 0.82% zircon, 0.33% HiTi leucoxene and rutile, 2.9% leucoxene, 1.06% ilmenite within the high-grade[2] Inferred Resource comprising a total of 87% VHM
- Outstanding new discovery confirmed by high HM grade and high mineral assemblage value
- Additional large Exploration Target[3] of 80 to 100Mt at 3.0 to 4.0% HM estimated at Night Train

Sheffield Resources Limited ("Sheffield", "the Company") (ASX: SFX) today announced a maiden Inferred Mineral Resource of 130 million tonnes (Mt) @ 3.3% heavy mineral (HM), above a 1.2% HM cut-off at its 100% owned Night Train Mineral Sands deposit, on the Dampier Project near Derby in northern Western Australia. This includes a high grade component of 50Mt @ 5.9% HM, above a 2.0% HM cut-off. The deposit is located just 20km south of the world class Thunderbird Mineral Sands deposit and 2km from the recently constructed Thunderbird mine access road. Appendices 1 and 2 and Tables 1, 3 and 4 to this announcement include important information with regard to this Mineral Resource estimate, as required under the JORC Code (2012).

In addition, a large Exploration Target of between 80Mt to 100Mt at 3.0% to 4.0% HM has been estimated for the region along strike to the north and south, as well as down-dip to the west of the Inferred Mineral Resource boundaries (Figure 4). The potential quantity and grade of the Exploration Target is conceptual in nature, as there has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource.

Mineralisation at Night Train is zircon and leucoxene rich, clean and free of coatings, has a high valuable heavy mineral (VHM) component and contains low levels of trash minerals, oversize and slimes.

Sheffield's Managing Director Bruce McFadzean commented, "The delivery of the maiden Night Train Mineral Resource, just 20km from Thunderbird, is further confirmation of the strategic value of our extensive tenement holding in this emerging world class mineral sand province.

"We look forward to growing the Company's Resource Inventory around Thunderbird and building on our recently announced zircon-rich exploration discoveries. Further discoveries have the potential to extend the already substantial 42-year life of the Thunderbird Operations and will provide greater flexibility for future development"

SHEFFIELD MINERAL RESOURCE FOR NIGHT TRAIN

Summary of Mineral Resource[4]					In-situ Assemblage [5]					
Deposit	Mineral Resource Category	Cut off (THM%)	Material Tonnes Millions (Mt)	THM (%)	Zircon (%)	HiTi Leuc-Rt (%)	Leuco-xene (%)	Ilmenite (%)	Oversize (%)	Slimes (%)
Night Train	Inferred	1.2	130	3.3	0.45	0.18	1.5	0.71	2.2	8.7
	Inferred	2.0	50	5.9	0.82	0.33	2.9	1.06	2.2	10.2

[1]Low-grade cut-off above 1.2% HM, HM – heavy mineral, VHM – valuable heavy mineral, THM – total heavy mineral (same as HM).
[2]high-grade cut-off above 2.0% HM
[3]The potential quantity and grade of the Exploration Target is conceptual in nature, as there has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource.
[4]Data is sourced from Appendix 1 and 2, and also presented, in Tables 1, 3 & 4 (below). Refer in particular to Appendix 1 & 2 for further information. The Mineral Resource estimate was prepared by Optiro Pty Ltd and disclosed under the JORC Code (2012)
[5]in-situ assemblage grade is determined by multiplying the percentage of HM by the percentage of each valuable heavy mineral within the heavy mineral assemblage at the resource block model scale. Rt – rutile, Leuc - leucoxene

The maiden Mineral Resource at Night Train underscores Sheffield's strategy of growing the Dampier Project Mineral Resource Inventory by targeting additional large, zircon rich deposits containing premium ceramic grade zircon with the potential to be processed at the proposed Thunderbird Dry Mineral Separation Plant.

Night Train Mineral Resource

The Night Train deposit is located on the Dampier Peninsular in the northern Canning Basin, 20 km south of the world class Thunderbird Mineral Sands deposit and approximately halfway between the ports of Derby and Broome (Figure 2).

The maiden JORC Code (2012) Inferred Mineral Resource at Night Train incorporates results from 44 air core drill holes for a total of 1,882 metres drilled by Sheffield during 2014, 2015 and 2018. This includes 24 new holes drilled during the 2018 Dampier drilling campaign (see ASX announcement 09 October 2018).

The Inferred Mineral Resource estimate was completed by Optiro Pty Ltd and consists of **130Mt @ 3.3% HM** containing **3.6Mt of VHM** (above a 1.2% cut-off) including, **50Mt @ 5.9% HM** containing **2.6Mt of VHM** (above a 2.0% cut-off) – high-grade component.

The high-grade component of the Inferred Resource contains high in-situ grades of 0.82% zircon, 0.33% HiTi leucoxene and rutile, 2.9% leucoxene, 1.06% ilmenite for a total of 5.11% VHM.

The Night Train Mineral Resource has similar high in-situ zircon and titanium mineral grades to those of the nearby world class Thunderbird deposit. When ranked against published Mineral Resources of current mineral sands operations and projects under investigation globally, the Night Train Inferred Mineral Resource (above a 2.0% HM cut-off) stands out because of the high HM grade and high value, zircon-rich mineral assemblage (Figure 1). Further key attributes of the Night Train deposit include the high VHM content and low trash levels of the mineral assemblage, and the high proportion of premium quality zircon.

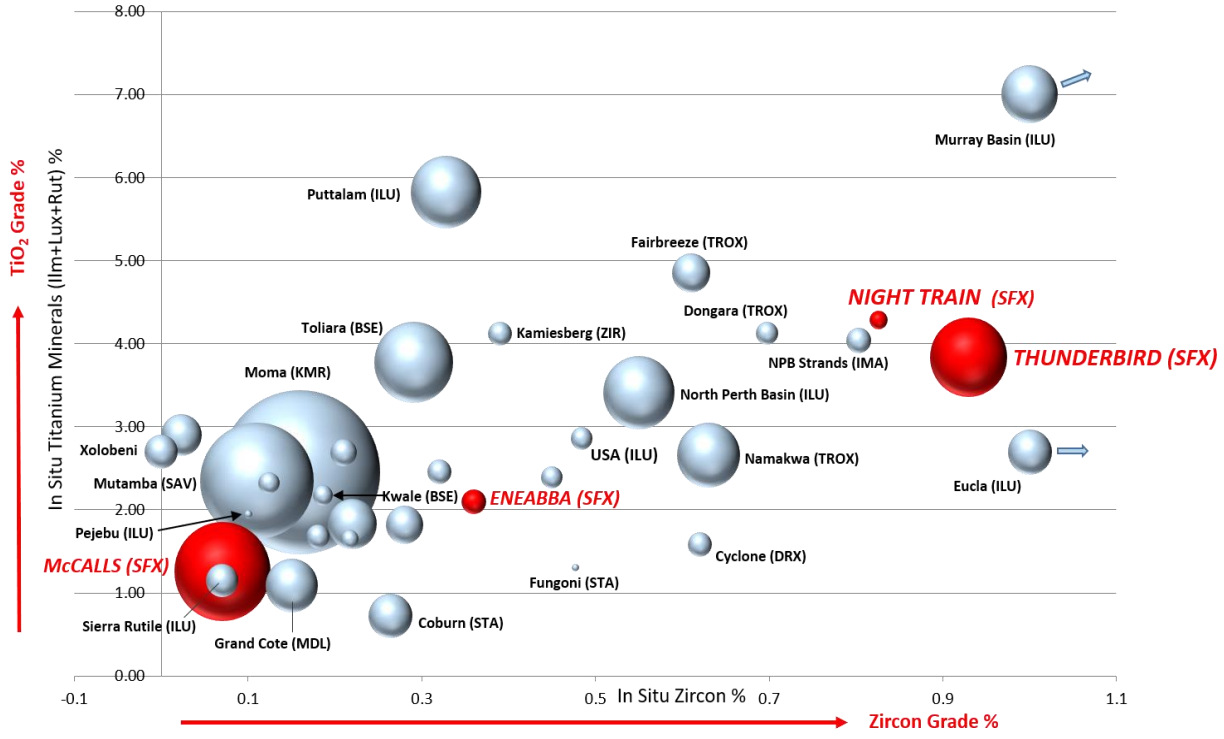

Figure 1: Night Train Inferred Mineral Resource (above a 2.0% HM cut-off) and other Sheffield Mineral Resources[1] ranked against published Mineral Resources of current mineral sands operations and projects under investigation globally

[1]Sheffield's other Mineral Resources are published in the 2018 Ore Reserve and Mineral Resource Statement. Sheffield Mineral Resource ranked against Mineral Resources of current mineral sands operations and projects under investigation globally. Red bubbles are Sheffield's Mineral Resources. Bubble size proportional to tonnes of contained VHM. Data compiled by Sheffield from public sources. This analysis does not illustrate the variance in product value between rutile, leucoxene and ilmenite. Some Mineral Resources are excluded due to lack of JORC compliant or detailed reporting.

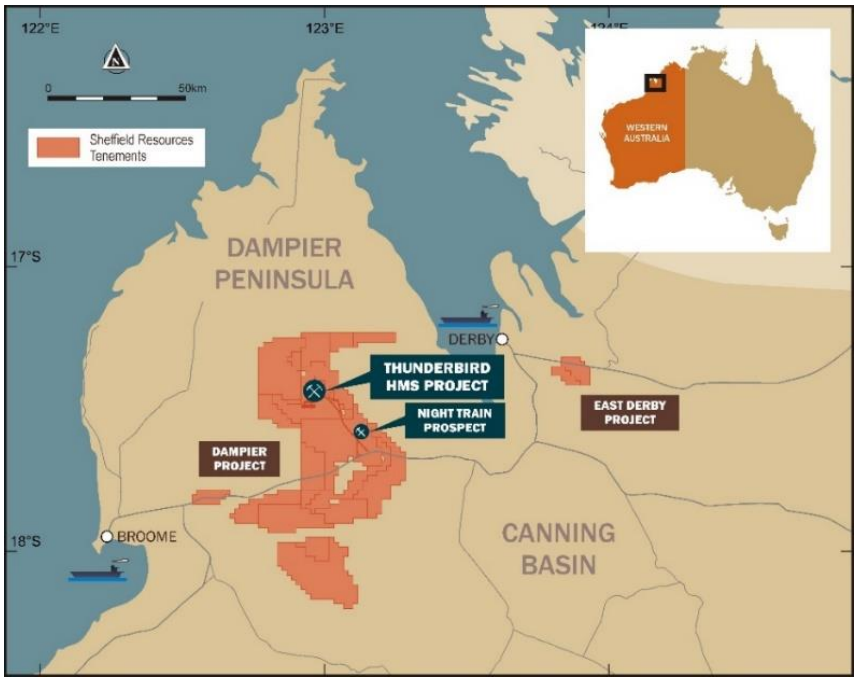

Figure 2: Location of Thunderbird Mineral Sands Project and Night Train deposit

At Night Train the Inferred Mineral Resource at a 1.2% HM cut-off, defines an area approximately 4.0km long by 0.8km to 1.6km wide and remains open to the north, south and down dip to the west. The mineralisation occurs as a thick, broad sheet-like body striking northwest. The average depth to the top of main body of mineralisation is 26m, and ranges from 2m to 53m. Mineralised thickness ranges from 1.5m to 34m and averages 11m. The deposit is very flat-lying with a gentle dip of between 2° to 5° to the southwest (Figures 3 - 8).

At a 2.0% HM cut-off the Inferred Mineral Resource covers an area approximately 4.0km long by 0.4km to 1.6km wide and remains open to the north, south and down dip to the west. This higher grade mineralisation is enclosed within the 1.2% cut-off Inferred Mineral Resource envelope and has a north-northwest trending long axis orientation which is sub-parallel to the regional strike. The higher grade mineralisation ranges in thickness from 1.5m to 22.5m, with an average thickness of 6m. The depth to the top of the high-grade mineralisation ranges from 1.5m to 55m with an average depth of 28.5m (Figures 3 - 8).

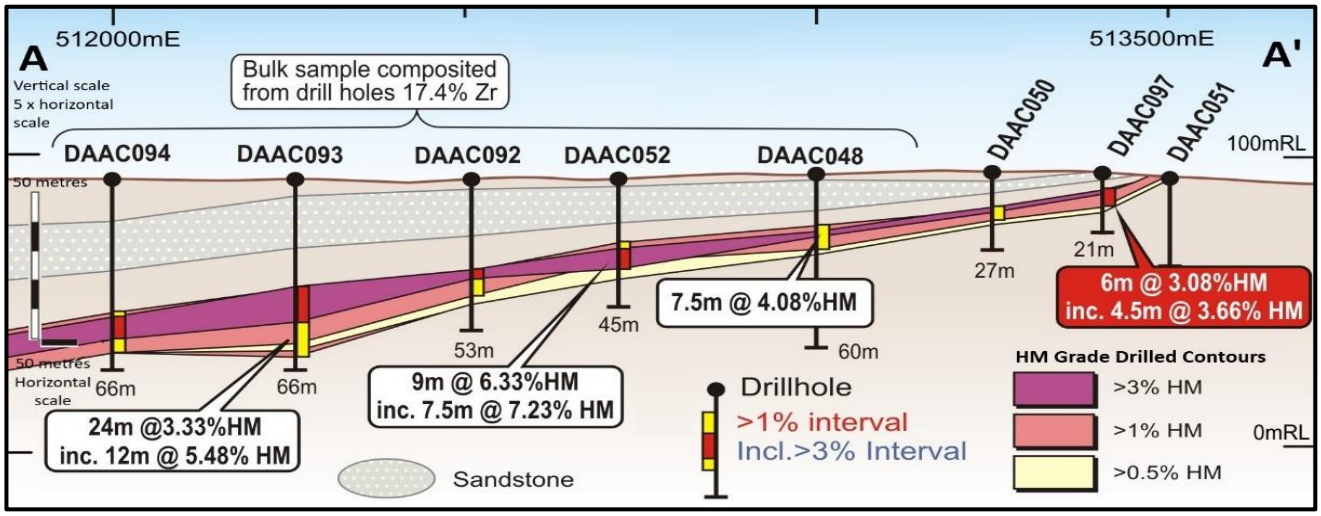

Figure 3: Section A-A' through the Night Train deposit showing drill results

Night Train Exploration Target

In addition to the Inferred Mineral Resource at Night Train, an **Exploration Target** of **80 to 100** million tonnes at **3.0 to 4.0%** HM has been estimated at Night Train. This Exploration Target comprises interpreted extensions to the mineralisation along strike to the north and south, as well as down-dip to the west of the Inferred Mineral Resource (Figure 4). The potential quantity and grade of the Exploration Target is conceptual in nature, as there has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource.

The Night Train Inferred Mineral Resource and the additional Exploration Target outline a mineralised zone with a strike length of over 5km and a width which varies between 1km and 2km (Figure 4). The mineralisation dips at between 2° and 5° to the west, with depths to the top of the mineralisation ranging from 0.5m to 71m.

The Exploration Target is open along strike to the north, south and down-dip to the west (Figure 4). Some of the thickest and highest grade intersections, e.g. **27m @ 5.29% HM** from 49.5m (DAAC114), including **22.5m @ 6.17% HM** from 52.5m (refer to ASX announcement 09 October 2018), occur at the western and southern extremities of the drilled portion of deposit, indicating potential for further exploration success.

The Inferred Mineral Resource and Exploration Target estimates at Night Train were prepared by Optiro Pty Ltd and disclosed under the JORC Code (2012). Further information relating to the Mineral Resource and Exploration Target estimates are included in Tables 1, 3 and 4 and Appendices 1 and 2 of this announcement.

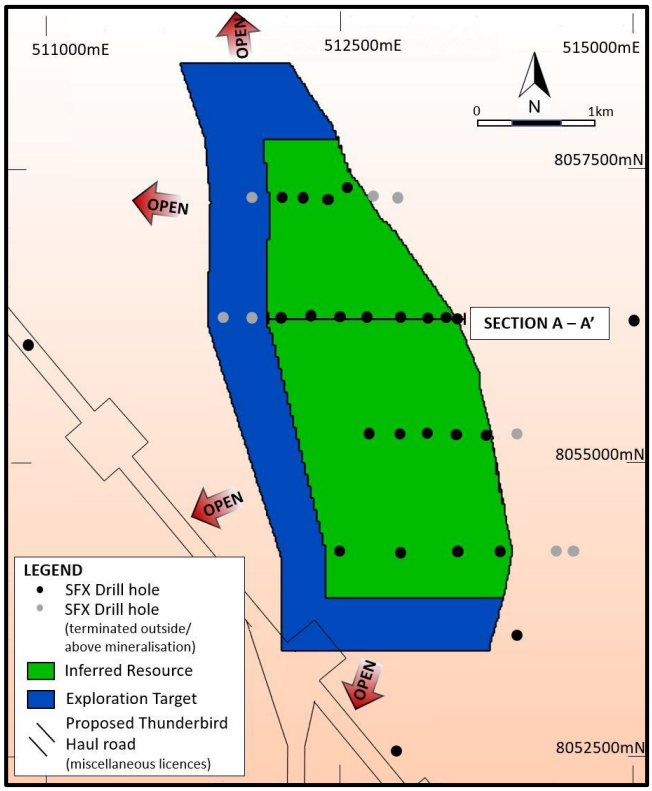

Figure 4: Night Train plan showing Resource Category and Exploration Target with drill hole locations

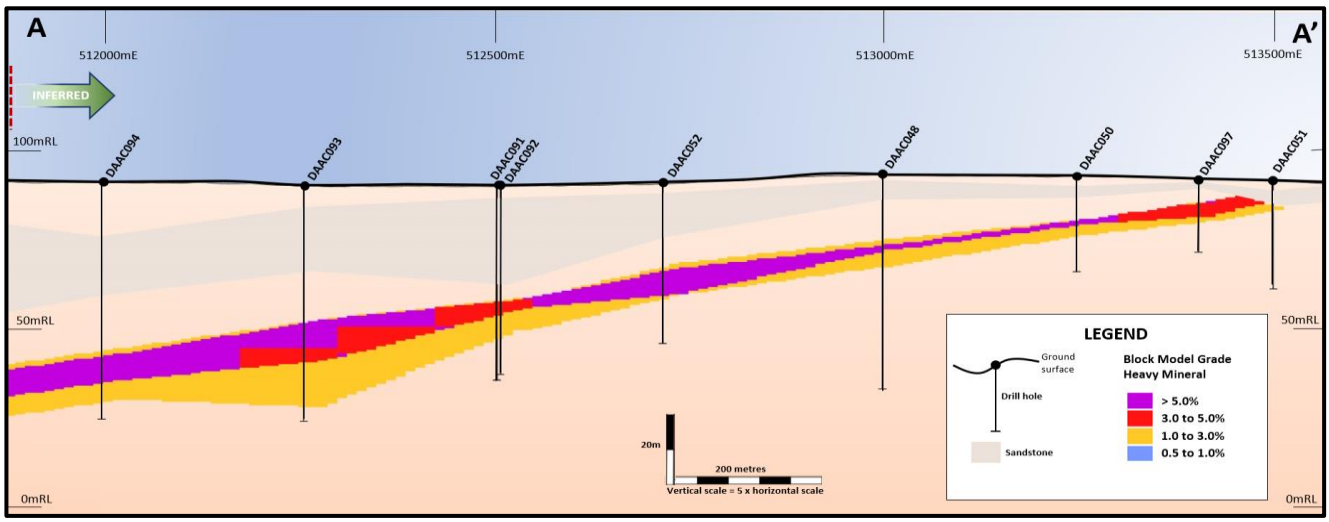

Figure 5: Section A-A': Night Train resource block model showing HM grade

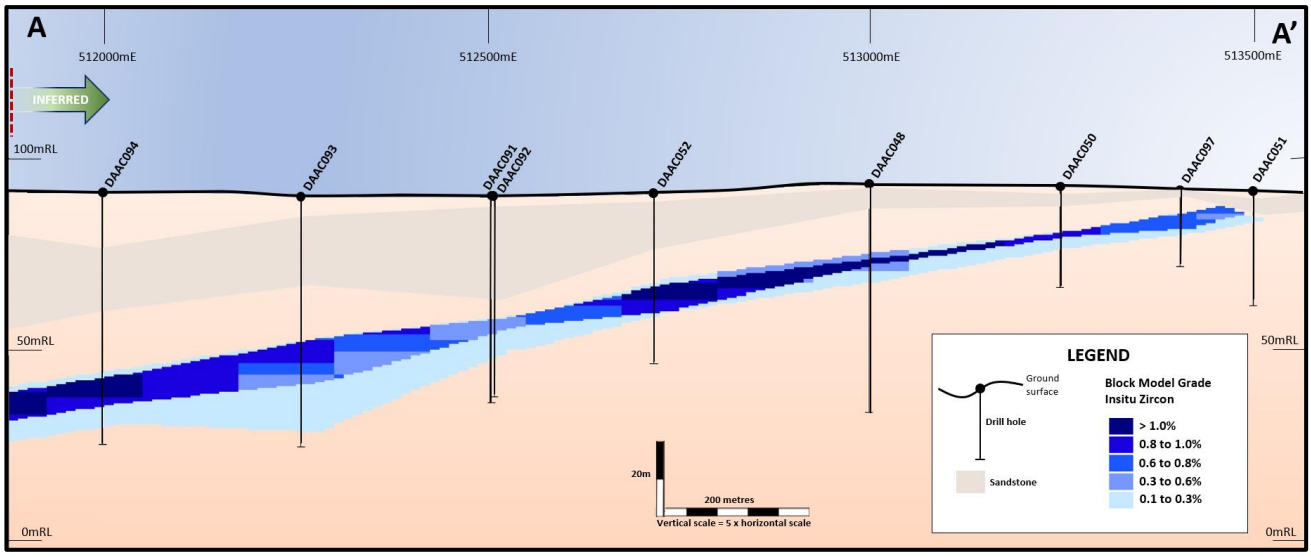

Figure 6: Section A-A': Night Train resource block model showing the in-situ zircon grade

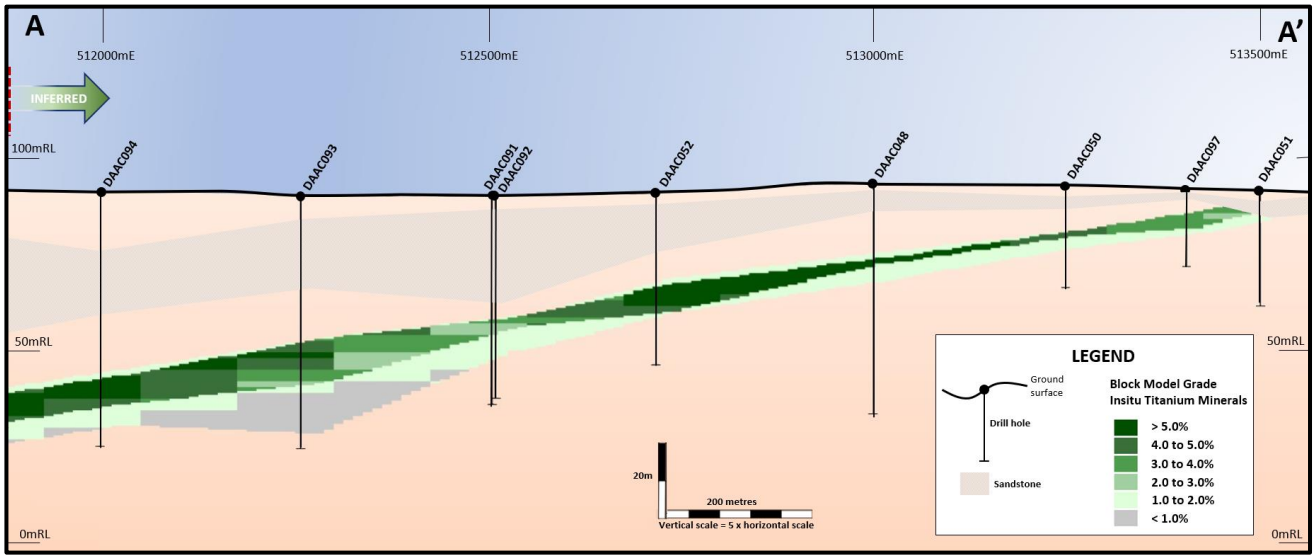

Figure 7: Section A-A': Night Train resource block model showing the in-situ combined titanium mineral grade

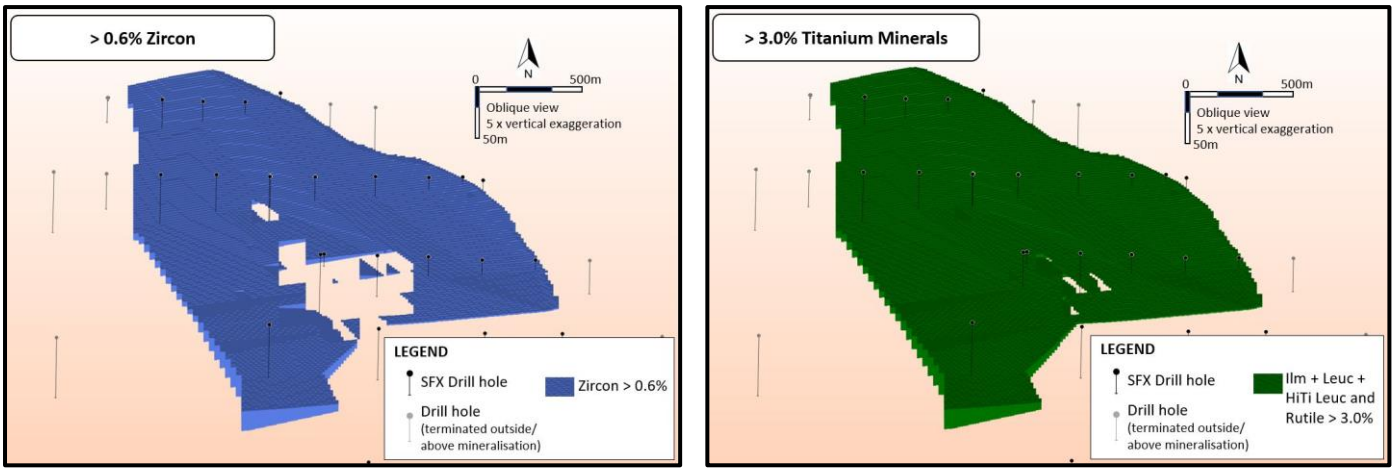

Figure 8: Night Train resource block model > 0.6% in-situ zircon grade (left), > 3.0% combined in-situ titanium mineral grade (right)

Table 1: Night Train Mineral Resource Summary (as at 31 January 2019)

SHEFFIELD MINERAL RESOURCE FOR NIGHT TRAIN[4] (in-situ assemblage)

Summary of Mineral Resource[4]					In-situ Assemblage[5]					
Deposit	Mineral Resource Category	Cut off (THM%)	Material Tonnes Millions (Mt)	THM (%)	Zircon (%)	HiTi Leuc Rutile (%)	Leuco-xene (%)	Ilmenite (%)	Oversize (%)	Slimes (%)
Night Train	Inferred	1.2	130	3.3	0.45	0.18	1.5	0.71	2.2	8.7
	Inferred	2.0	50	5.9	0.82	0.33	2.9	1.06	2.2	10.2

SHEFFIELD MINERAL RESOURCE FOR NIGHT TRAIN[4] (HM assemblage)

Summary of Mineral Resource[4]					HM Assemblage[6]					
Deposit	Mineral Resource Category	Cut off (THM%)	Material Tonnes Millions (Mt)	THM (%)	Zircon (%)	HiTi Leuc Rutile (%)	Leuco-xene (%)	Ilmenite (%)	Oversize (%)	Slimes (%)
Night Train	Inferred	1.2	130	3.3	14	5.4	46	22	2.2	8.7
	Inferred	2.0	50	5.9	14	5.6	49	18	2.2	10.2

SHEFFIELD MINERAL RESOURCE FOR NIGHT TRAIN (in-situ tonnes)

Summary of Mineral Resource[4]			In-situ Tonnes[7]					
Deposit	Mineral Resource Category	Cut off (THM%)	THM Tonnes Millions (Mt)	Zircon (kt)	HiTi Leuc and Rutile (kt)	Leuco-xene (kt)	Ilmenite (kt)	Total VHM (kt)
Night Train	Inferred	1.2	4.2	560	220	1,900	900	3,590
	Inferred	2.0	3.0	420	170	1,500	540	2,600

Notes:

[4]Refer to Tables 1, 3 & 4 and Appendices 1 & 2 for further information. The Mineral Resource estimate was prepared by Optiro Pty Ltd and disclosed under the JORC Code (2012). THM is within the 38µm to 1mm size fraction and reported as a percentage of the total material, slimes is the -38µm fraction and oversize is the +1mm fraction. Tonnes and grades have been rounded to reflect the relative accuracy and confidence level of the estimate, thus the sum of columns may not equal.

[5]in-situ assemblage grade is determined by multiplying the percentage of THM by the percentage of each valuable heavy mineral within the heavy mineral assemblage at the resource block model scale.

[6]Estimates of Mineral Assemblage are presented as percentages of the Total Heavy Mineral (THM) component of the deposit, as determined by magnetic separation, QEMSCAN™ and XRF for one of 12 composite samples. Magnetic fractions were analysed by QEMSCAN™ for mineral determination as follows: Ilmenite: 40-70% TiO_2 >90% liberation; Leucoxene: 70-90% TiO_2 >90% liberation; High Titanium Leucoxene (HiTi Leucoxene) and Rutile combined > 90% TiO_2 liberation, and Zircon: 66.7% ZrO_2+HfO_2 >90% Liberation. The non-magnetic fraction was submitted for XRF analysis and minerals determined as follows: Zircon: ZrO_2+HfO_2/0.667 and High Titanium Leucoxene (HiTi Leucoxene): TiO_2/0.94. HM assemblage determination was by the QEMSCAN™ process for 11 of 12 composite samples which uses observed mass and chemistry to classify particles according to their average chemistry, and then report mineral abundance by dominant % mass in particle. For the TiO_2 minerals the following breakpoints were used to distinguish between ilmenite 40% to 70% TiO_2, leucoxene 70% to 90% TiO_2, high TiO_2 leucoxene and rutile > 90%,

[7]The contained in-situ tonnes for the valuable heavy minerals were derived from information from the in-situ grades and tonnes of the Mineral Resource

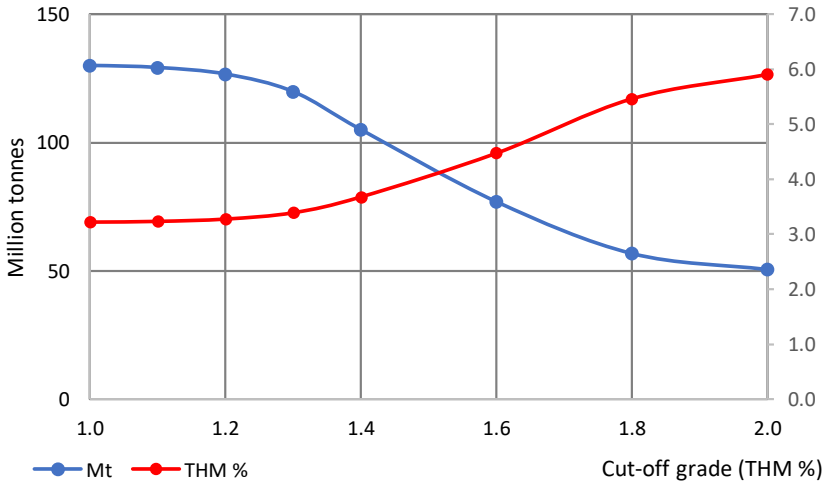

Figure 9: Night Train Mineral Resource grade-tonnage curve

The Night Train mineralisation is hosted by a deeply weathered sandstone unit located near the base of the Cretaceous Broome Sandstone. The host sands are clean, fine to medium grained, well-sorted and comprise predominantly quartz sand (Figure 10). The host sands are compacted and soft and contain low levels of slimes (8.7%) and oversize (2.2%). Some isolated bands of coarser sand and grit are present within the mineralised horizon. The mineralisation occurs stratigraphically below the Melligo Formation which consists of a stacked sequence ranging from highly weathered, to partially indurated, to indurated sandstones (Figure 4). The indurated component is situated above the mineralised horizon and varies from 0m to 25m in thickness and averages approximately 12m.

Figure 10: Panned HM from Night Train drill hole DAAC093

The Mineral Resource includes results of twelve composite samples which were analysed to determine the HM assemblage at Night Train (Table 3). These were composed of 134 samples, for 201 metres drilled, from nineteen drill holes representing 10.7% of total metres drilled. One composite sample, obtained in 2015, was analysed by screening, magnetic separation, QEMSCAN™ and XRF. The remaining eleven composite samples were taken from samples drilled in 2015 and 2018 and analysed by QEMSCAN™ and XRF (refer to section 1, Appendix 1).

The mineralogical character and stratigraphic setting of Night Train is very encouraging. The heavy mineral is dominated by VHM, has very low trash levels, is free from coatings and has a very high zircon and leucoxene content with little weathering overprint (Figure 11).

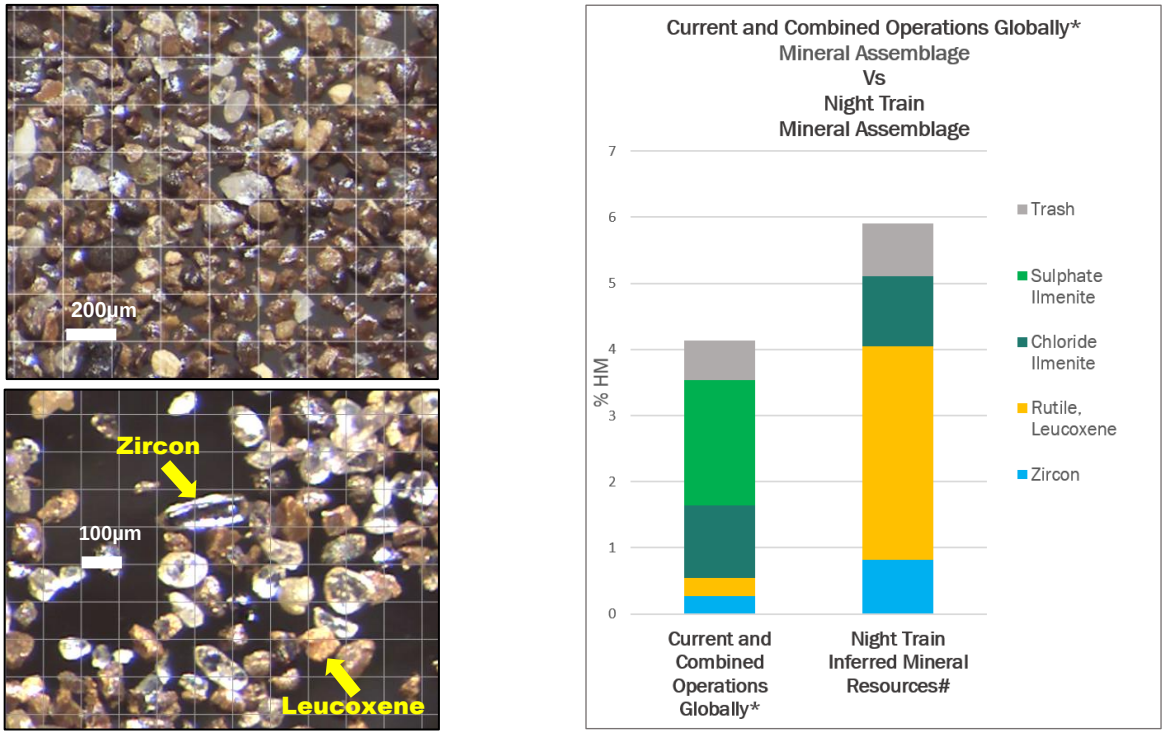

Figure 11: Photomicrographs of HM concentrate from Night Train drill hole DAAC093 (40.5-42m) (left), *Current and combined operations globally - mineral assemblage in comparison to Night Train mineral assemblage (right)

*Source: Company Reports 2016 (Industry Minerals Conference, Barcelona; June 2018 – www.iluka.com),

Night Train Inferred Mineral Resource (above 2.0% HM cut-off)

At a 1.2% HM cut-off, the HM assemblage of the Mineral Resource consists of 14% zircon, 5.4% high-titanium leucoxene and rutile, 46% leucoxene and 22% ilmenite for a total VHM component of 87.4%. At a 2.0% HM cut-off, the HM assemblage of the Mineral Resource comprises 14% zircon, 5.6% high-titanium leucoxene and rutile, 49% leucoxene and 18% ilmenite for a total VHM component of 86.6%.

Initial scoping metallurgical test work completed in 2016 on a 100kg drill sample composite from the mineralised zone at Night Train showed that high quality zircon which meets ceramic grade specifications can be produced (Table 2 and refer to ASX announcement of 14 April 2016 for further details). Both the primary and secondary zircon products contained low levels of Fe_2O_3 and were produced without a leaching stage.

The primary zircon product is premium ceramic grade zircon and comprised a very high 78% of the total zircon produced. Significantly, the secondary zircon product has a high ZrO_2 grade and contains relatively low levels of contaminants. The composite metallurgical sample averaged 4.7% HM and contained a high proportion of zircon (17.4%) in the heavy mineral assemblage.

Table 2: Zircon Products – Summary Assay Results

Product	ZrO_2+HfO_2	SiO_2	TiO_2	Fe_2O_3	Al_2O_3	U+Th
Primary zircon	**65.9%**	32.9%	0.15%	0.05%	0.37%	481ppm
Secondary zircon	**65.5%**	33.3%	0.36%	0.05%	0.20%	542ppm

The scoping metallurgical test work also showed that the zircon and HiTi products are fine to medium grained with a D_{50} of 79 microns, which is coarser grained than Thunderbird (zircon D_{50} of 57 microns, Hi-Ti88 D_{50} of 67 microns, see ASX announcement of 14 April 2016). Recent QEMSCAN™ results supports the coarser zircon grain size observed at Night Train with the D_{50} ranging between 70 and 90 microns (Figure 12).

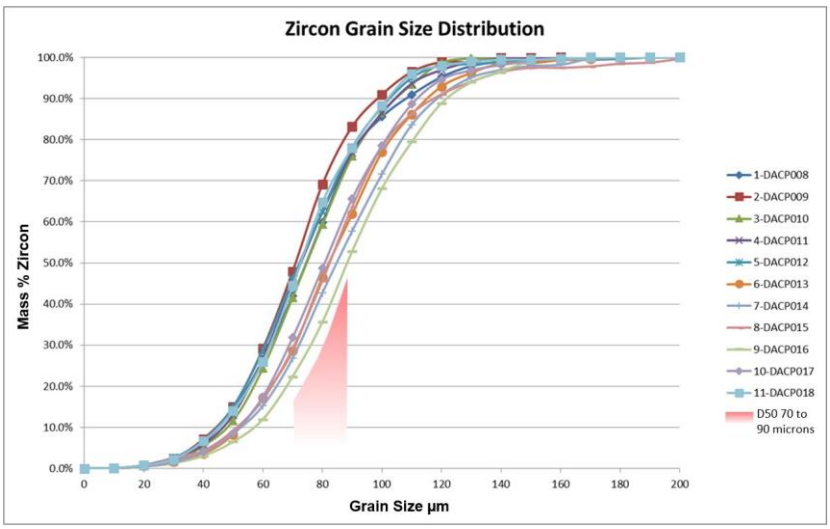

Figure 12: Zircon grain size distribution of QEMSCAN™ composites

The grain size characteristics are interpreted to support an offshore depositional setting similar to that of Thunderbird but positioned at a slightly higher stratigraphic level and deposited in a higher energy environment, closer to the shoreline position. The high VHM mineral assemblage, low slimes and oversize support a different heavy mineral provenance, depositional and regolith environment to that of Thunderbird. This interpretation suggests Thunderbird and Night Train may be one of a number of stacked mineralised sequences in the region with potential for a variety of mineralisation styles. The high quality, coarser grained mineral assemblage at Night Train containing a high proportion of premium ceramic grade zircon confirms the Canning Basin as an emerging zircon-rich mineral sands province with immense exploration potential.

Exploration Potential

Exploration has now delineated fourteen zones of significant mineralisation (see ASX announcement 13 November 2018) which have been outlined along a 160km long highly mineralised trend which extends from Seagull in the north to Runaway in the south (Figure 13). This includes the world class Thunderbird deposit which has a Mineral Resource of **3.23 billion tonnes @ 6.9% HM** above a 3.0% HM cut-off (Measured, Indicated and Inferred), including a high-grade component of **1.05 billion tonnes @ 12.2% HM** above 7.5% HM cut-off (Measured, Indicated and Inferred) (see ASX announcement 5 July 2016, Table 4).

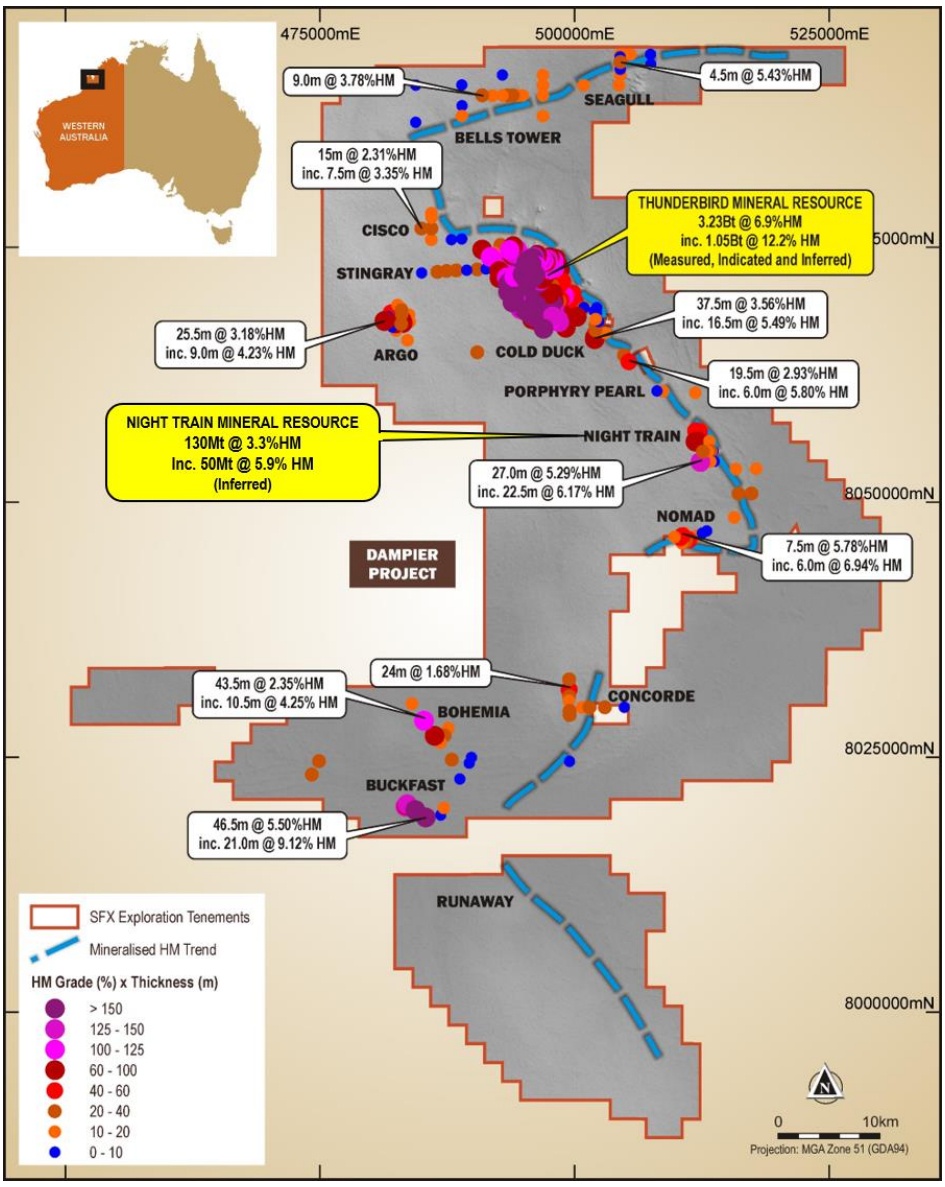

Figure 13: Regional drilling compilation showing grade times thickness[1] and prospect locations

[1]HM grade times thickness for intervals. All intervals calculated using 1% HM lower cut, 3m minimum width, maximum 3m internal waste, if multiple intersections per hole the maximum interval is used. Includes Sheffield drill holes, Rio Tinto and Iluka historic drill holes (refer to ASX announcement 13 November 2018). Background HM grade in holes at Thunderbird and Cold Duck has been halved to account for dilution by iron oxides.

Sheffield's exploration strategy is focused on the discovery of large zircon-rich deposits with high in-situ zircon grades containing a high proportion of ceramic grade zircon.

From its limited regional exploration efforts to date, the Company has discovered mineralisation at a variety of stratigraphic levels, including the Argo and Bohemia prospects which occur above the extensively mineralised Thunderbird stratigraphic position. The different mineralised levels are thought to represent potential stacked shoreline facies that accumulated during marine transgressions in the Cretaceous. This opens up the potential for multiple target horizons on which to focus future exploration programs. The high

value zircon and leucoxene rich mineral assemblage observed at many of the new discoveries (i.e. Night Train, Cisco, Concorde, Bohemia etc) provides for very attractive exploration targets and confirms the immense potential of this emerging mineral sands district.

Further work

Sheffield will undertake additional metallurgical and process flow test work for the Night Train deposit. A bulk sample will be composited from the 2018 drilling during Q3 2019. The metallurgical test work is currently planned for H2 2019.

Infill drilling is required to increase confidence at the Night Train Inferred Mineral Resource and additional drilling is required to test the Exploration Target along strike to the north and south and down dip to the west. The drilling is currently planned to commence during H2 2019.

Sheffield's annual Statement of Mineral Resources and Ore Reserves will be updated during H2 2019 to incorporate the current Night Train Inferred Mineral Resource.

Table 3: Night Train Mineral Assemblage composites samples

				Composite			Mineral Assemblage			
Composite	Hole ID	Depth From (m)	Depth To (m)	HM (wt%)	SL (wt%)	OS (wt%)	Zircon (%)	HiTi Leuc & Rutile (%)	Leucoxene (%)	Ilmenite (%)
DACP005^	DAAC048	18	25.5	7.4	10.1	1.2	15	7.8	53	16
	DAAC052	22.5	31.5							
DACP008*#	DAAC091	33	42	5.0	14.8	1.1	13	7.1	48	16
	DAAC092	31.5	40.5							
	DAAC093	37.5	61.5							
DACP009*#	DAAC094	46.5	60	9.0	15.8	1.1	15	6.3	49	17
DACP010*	DAAC099	7.5	16.5	6.2	17.3	11.5	14	4.8	47	14
DACP011*	DAAC101	12	18	11.4	20.0	1.1	14	5.7	53	11
DACP012*	DAAC102	18	30	6.7	15.2	7.8	16	7.2	53	12
DACP013*	DAAC106	9	12	6.1	11.8	8.8	13	4.4	53	18
	DAAC107	12	18							
DACP014*	DAAC108	19.5	27	3.0	8.2	0.6	12	4.2	43	24
	DAAC115	25.5	31.5							
DACP015*	DACP161	34.5	70.5	3.1	4.0	1.0	12	4.3	30	41
DACP016*	DAAC111	12	18	1.7	8.3	4.4	13	3.1	24	46
	DAAC112	21	30							
	DAAC113	36	42							
DACP017*	DAAC114	49.5	75	6.5	4.0	0.7	14	4.3	53	17
DACP018*	DAAC147	27	34.5	10.1	16.1	0.9	15	6.1	55	11

^ Heavy Mineral Composite (HMC) 2015 magnetically separated into magnetic separation (H/S) magnetic 1, magnetic 2 and non-magnetic fractions, with each fraction weighed. The magnetic 1 and 2 fractions were combined and analysed by QEMSCAN™ for mineral determination applying breakpoints ilmenite 40% to 70% TiO_2, leucoxene 70% to 90% TiO_2, Rutile and high TiO_2 leucoxene > 90%, Zr 66.7% ZrO_2 + HfO_2 all 90% liberation, and nonmagnetic fraction submitted for XRF and minerals determined by zircon ZrO_2 + HfO_2/0.667 and high TiO_2 leucoxene and rutile TiO_2/0.90

* Eleven samples analysed in 2018, the HMC from individual samples was combined according to THM grade and weight into (nominal) >20 g composite samples for mineral assemblage determination. The HM assemblage determination was by the QEMSCAN™ process which uses observed mass and chemistry to classify particles according to their average chemistry, and then report mineral abundance by dominant % mass in particle. For the TiO_2 minerals the following breakpoints were used to distinguish between ilmenite 40% to 70% TiO_2, leucoxene 70% to 90% TiO_2, high TiO_2 leucoxene and rutile > 90% TiO_2

drilled in 2015 analysed in 2018

Table 4: Dampier Project Mineral Resource Summary (as at 31 January 2019)

SHEFFIELD MINERAL RESOURCE FOR DAMPIER PROJECT (in-situ assemblage)

Summary of Mineral Resource[1,2,3]					In-situ Assemblage[5]					
Deposit	Mineral Resource Category	Cut off (THM%)	Material Tonnes Millions (Mt)	THM (%)	Zircon (%)	HiTi Leuc (%)	Leuco-xene (%)	Ilmenite (%)	Oversize (%)	Slimes (%)
Thunderbird	Measured	3.0	510	8.9	0.71	0.20	0.19	2.4	12	18
	Indicated	3.0	2,120	6.6	0.55	0.18	0.20	1.8	9	16
	Inferred	3.0	600	6.3	0.53	0.17	0.20	1.7	8	15
	Total	3.0	3,230	6.9	0.57	0.18	0.20	1.9	9	16
Thunderbird	Measured	7.5	220	14.5	1.07	0.31	0.27	3.9	15	16
	Indicated	7.5	640	11.8	0.90	0.28	0.25	3.3	11	14
	Inferred	7.5	180	10.8	0.87	0.27	0.26	3.0	9	13
	Total	7.5	1,050	12.2	0.93	0.28	0.26	3.3	11	15
Night Train	Inferred	1.2	130	3.3	0.45	0.18	1.5	0.71	2.2	8.7
	Total	1.2	130	3.3	0.45	0.18	1.5	0.71	2.2	8.7
Night Train	Inferred	2.0	50	5.9	0.82	0.33	2.9	1.06	2.2	10.2
	Total	2.0	50	5.9	0.82	0.33	2.9	1.06	2.2	10.2

Notes:

[1] Night Train: Refer to Tables 1, 3 & 4 and Appendices 1 & 2 for further information. The Night Train Mineral Resource estimate was prepared by Optiro Pty Ltd and disclosed under the JORC Code (2012). The Mineral Resource reported above 1.2% HM cut-off is inclusive of (not additional to) the Mineral Resource reported above 2.0% HM cut-off. Thunderbird: The Mineral Resource estimate was prepared by Optiro Pty Ltd and first disclosed under the JORC Code (2012) refer to ASX announcement 5 July 2016 for further details including Table 1. The Dampier Project Mineral Resources are reported inclusive of (not additional to) Ore Reserves. The Mineral Resource reported above 3% HM cut-off is inclusive of (not additional to) the Mineral Resource reported above 7.5% HM cut-off.

[2]THM is within the 38µm to 1mm size fraction and reported as a percentage of the total material, slimes is the -38µm fraction and oversize is the +1mm fraction.

[3]Tonnes and grades have been rounded to reflect the relative accuracy and confidence level of the estimate, thus the sum of columns may not equal.

[4] Night Train: Estimates of Mineral Assemblage are presented as percentages of the Heavy Mineral (HM) component of the deposit, as determined by magnetic separation, QEMSCAN™ and XRF for one of 12 composite samples. Magnetic fractions were analysed by QEMSCAN™ for mineral determination as follows: Ilmenite: 40-70% TiO_2 >90% Liberation; Leucoxene: 70-90% TiO_2 >90% Liberation; High Titanium Leucoxene (HiTi Leucoxene) and Rutile 90% TiO_2 >90% Liberation, and Zircon: 66.7% ZrO_2+HfO_2 >90% Liberation. The non-magnetic fraction was submitted for XRF analysis and minerals determined as follows: Zircon: ZrO2+Hf02/0.667 and High Titanium Leucoxene (HiTi Leucoxene): TiO_2/0.94. HM assemblage determination- was by the QEMSCAN™ process for 11 of 12 composite samples which uses observed mass and chemistry to classify particles according to their average chemistry, and then report mineral abundance by dominant % mass in particle. For the TiO_2 minerals the following breakpoints were used to distinguish between Ilmenite 40% to 70% TiO_2, Leucoxene 70% to 90% TiO_2, High Titanium Leucoxene and Rutile > 90%, Screening of the heavy mineral was not required. Thunderbird: Estimates of Mineral Assemblage are presented as percentages of the Heavy Mineral (HM) component of the deposit, as determined by magnetic separation, QEMSCAN™ and XRF. Magnetic fractions were analysed by QEMSCAN™ for mineral determination as follows: Ilmenite: 40-70% TiO_2 >90% Liberation; Leucoxene: 70-94% TiO_2 >90% Liberation; High Titanium Leucoxene (HiTi Leucoxene): >94% TiO_2 >90% Liberation; and Zircon: 66.7% ZrO_2+HfO_2 >90% Liberation. The non-magnetic fraction was submitted for XRF analysis and minerals determined as follows: Zircon: ZrO_2+HfO_2/0.667 and High Titanium Leucoxene (HiTi Leucoxene): TiO_2/0.94.

[5]in-situ assemblage grade is determined by multiplying the percentage of HM by the percentage of each valuable heavy mineral within the heavy mineral assemblage at the resource block model scale.

SHEFFIELD MINERAL RESOURCE FOR THUNDRBIRD PROJECT (in-situ tonnes)

Summary of Mineral Resource[1,2,3]			In-situ Tonnes[4]					
Deposit	Mineral Resource Category	Cut off (THM%)	THM Tonnes Millions (Mt)	Zircon (kt)	HiTi Leuc[5] (kt)	Leuco-xene (kt)	Ilmenite (kt)	Total VHM (kt)
Thunderbird low-grade	Measured	3.0	45	3,600	1,000	1,000	12,000	17,700
	Indicated	3.0	140	11,800	3,800	4,300	39,100	59,000
	Inferred	3.0	38	3,200	1,000	1,200	10,500	15,900
	Total	3.0	223	18,600	5,900	6,500	61,700	92,600
Night Train low-grade	Inferred	1.2	4.2	560	220	1,900	900	3,590
	Total	1.2	4.2	560	220	1,900	900	3,590
Total low-grade	Measured	3.0	45	3600	1000	1000	12000	17700
	Indicated	3.0	140	11,800	3,800	4,300	39,100	59,000
	Inferred	Various	42	3,760	1,220	3,100	11,400	19,490
	Total	Various	227	19,160	6,120	8,400	62,600	96,190
Thunderbird high-grade	Measured	7.5	32	2,300	700	600	8,400	12,000
	Indicated	7.5	76	5,800	1,800	1,600	21,000	30,200
	Inferred	7.5	20	1,600	500	500	5,600	8,200
	Total	7.5	127	9,700	3,000	2,700	35,000	50,400
Night Train high-grade	Inferred	2.0	3.0	420	170	1,500	540	2,600
	Total	2.0	3.0	420	170	1,500	540	2,600
Total high-grade	Measured	7.5	32	2300	700	600	8400	12000
	Indicated	7.5	76	5,800	1,800	1,600	21,000	30,200
	Inferred	Various	23	2,020	670	2,000	6,140	10,800
	Total	Various	131	10,120	3,170	4,200	35,540	53,000

Notes:

[1] Night Train: Refer to Tables 1, 3 & 4 and Appendices 1 & 2 for further information. The Night Train Mineral Resource estimate was prepared by Optiro Pty Ltd and disclosed under the JORC Code (2012). The Mineral Resource reported above 1.2% HM cut-off is inclusive of (not additional to) the Mineral Resource reported above 2.0% HM cut-off. Thunderbird: The Mineral Resource estimate was prepared by Optiro Pty Ltd and first disclosed under the JORC Code (2012) refer to ASX announcement 5 July 2016 for further details including Table 1. The Dampier Project Mineral Resources are reported inclusive of (not additional to) Ore Reserves. Thunderbird: The Mineral Resource reported above 3% HM cut-off is inclusive of (not additional to) the Mineral Resource reported above 7.5% HM cut-off. Night Train: The Mineral Resource reported above 1.2% HM cut-off is inclusive of (not additional to) the Mineral Resource reported above 2.0% HM cut-off.

[2] THM is within the 38µm to 1mm size fraction and reported as a percentage of the total material, slimes is the -38µm fraction and oversize is the +1mm fraction.

[3] Tonnes and grades have been rounded to reflect the relative accuracy and confidence level of the estimate, thus the sum of columns may not equal.

[4] The contained in-situ tonnes for the valuable heavy minerals were derived from information from the Mineral Resource tables

[5] HiTi Leucoxene and Rutile (%) combined for Night Train at a >90% TiO_2 (as one assemblage sample utilised=> 90% rutile and HiTi Leucoxene), HiTi Leucoxene for Thunderbird > 94% TiO_2

GOVERNANCE AND INTERNAL CONTROLS

Mineral Resource and Ore Reserve are compiled by qualified Sheffield personnel and/or independent consultants following industry standard methodology and techniques. The underlying data, methodology, techniques and assumptions on which estimates are prepared are subject to internal peer review by senior Company personnel. Where deemed necessary or appropriate, estimates are reviewed by independent consultants. Competent Persons named by the Company are members of the Australasian Institute of Mining and Metallurgy and/or the Australian Institute of Geoscientists and qualify as Competent Persons as defined in the JORC Code 2012.

COMPETENT PERSONS AND COMPLIANCE STATEMENTS

The information in this report that relates to Exploration Results is based on information compiled by Mr Seb Gray, a Competent Person who is a Member of Australian Institute of Geoscientists (AIG). Mr Gray is a full-time employee of Sheffield Resources Ltd and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Gray consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The information in this report that relates to the estimation of the Mineral Resources is based on information compiled by Mrs Christine Standing, a Competent Person who is a Member of the Australian Institute of Geoscientists (AIG) and the Australasian Institute of Mining and Metallurgy (AusIMM). Mrs Standing is a full-time employee of Optiro Pty Ltd and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which she 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'. Mrs Standing consents to the inclusion in this report of the matters based on her information in the form and context in which it appears.

SUPPORTING INFORMATION REQUIRED UNDER ASX LISTING RULES, CHAPTER 5

The supporting information below is required, under Chapter 5 of the ASX Listing Rules, to be included in market announcements reporting estimates of Mineral Resources and Ore Reserves.

Section 1, Section 2 and Section 3 of JORC Table 1 can be found in Appendix 2.

PREVIOUSLY REPORTED INFORMATION

This report includes information that relates to Exploration Results, Mineral Resources and Ore Reserves prepared and first disclosed under the JORC Code 2012 and a Bankable Feasibility Study. The information was extracted from the Company's previous ASX announcements as follows:

- Exploration results: "NEW LARGE HIGH GRADE DISCOVERY SOUTH OF THUNDERBIRD" 13 November 2018
- Night Train aircore results: "EXCEPTIONAL RESULTS CONFIRM MAJOR DISCOVERY AT NIGHT TRAIN" 9 October 2018
- Drilling commences: "SHEFFIELD COMMENCES 8,000m REGIONAL DRILLING PROGRAM AT THUNDERBIRD", 01 August 2018
- Quarterly report: "QUARTERLY ACTIVITIES REPORT FOR THE PERIOD ENDED 30 JUNE 2018" 12 July 2018
- Thunderbird Resource: "SHEFFIELD DOUBLES MEASURED MINERAL RESOURCE AT THUNDERBIRD" 5 July 2016
- Night Train metallurgical scoping results: "PREMIUM ZIRCON AT NIGHT TRAIN", 14 April, 2016
- Night Train Discovery: "NEW MINERAL SANDS DISCOVERY AT NIGHT TRAIN" 22 September, 2015
- Regional drilling results: "THREE NEW MINERAL SANDS DISCOVERIES IN CANNING BASIN" 25 February, 2015

These announcements are available to view on Sheffield's website www.sheffieldresources.com.au.

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

FORWARD LOOKING AND CAUTIONARY STATEMENTS

The contents of this report reflect various technical and economic conditions at the time of writing. Given the nature of the resources industry, these conditions can change significantly over relatively short periods of time. Consequently, actual results may vary from those contained in this report.

Some statements in this report regarding estimates or future events are forward-looking statements. They include indications of, and guidance on, future earnings, cash flow, costs and financial performance. Forward-looking statements include, but are not limited to, statements preceded by words such as "planned", "expected", "projected", "estimated", "may", "scheduled", "intends", "anticipates", "believes", "potential", "predict", "foresee", "proposed", "aim", "target", "opportunity", "could", "nominal", "conceptual" and similar expressions. Forward-looking statements, opinions and estimates included in this report are based on assumptions and contingencies which are subject to change without notice, as are statements about market and industry trends, which are based on interpretations of current market conditions. Forward-looking statements are provided as a general guide only and should not be relied on as a guarantee of future performance. Forward-looking statements may be affected by a range of variables that could cause actual results to differ from estimated results and may cause the Company's actual performance and financial results in future periods to materially differ from any projections of future performance or results expressed or implied by such forward-looking statements. So there can be no assurance that actual outcomes will not materially differ from these forward-looking statements.

ENDS

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ABOUT SHEFFIELD RESOURCES

Sheffield Resources Limited is focused on developing its 100% owned, world class Thunderbird Mineral Sands Project, located in north-west Western Australia. Sheffield continues to also assess other regional exploration opportunities.

THUNDERBIRD MINERAL SANDS

Thunderbird is one of the largest and highest grade mineral sands discoveries in the last 30 years.

Sheffield's Bankable Feasibility Study shows Thunderbird is a technically low risk, modest capex project that generates strong cash margins from globally significant levels of production over an exceptionally long mine life of 42 years.

Thunderbird will generate a high-quality suite of mineral sands products with specifications suited to market requirements. These products include Premium Zircon suitable for the ceramic sector and LTR Ilmenite which will be one of the highest-grade sulfate feedstocks available globally.

Thunderbird is located in one of the world's most attractive mining investment jurisdictions and is well placed to deliver long term, secure supply of high quality products to a range of potential customers.

The Company is targeting initial production in 2020. The initial planned production profile is aligned with expected emerging supply gaps in global mineral sands markets.

ASX Code:	SFX	Market Capitalisation:	A$171m
Issued shares:	255.4m	Cash (unaudited, 31 December 2018):	A$13.4m

APPENDIX 1

Summary of information to support the Night Train Mineral Resource estimate

The Mineral Resource for the Night Train deposit is reported in accordance with the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' (JORC Code) and ASX Listing Rules. This Appendix provides a summary of information and JORC Code Table 1 commentary to support Sheffield's Mineral Resource estimate for the Night Train deposit.

The Night Train heavy mineral sands deposit is located on the Dampier Peninsula, about 60 km southwest of Derby, Western Australia. The deposit is located approximately 20 km to the southeast of Sheffield's Thunderbird deposit, and about 2.5 km from the proposed Thunderbird access/haul road.

The Mineral Resource inventory attributable to the Night Train deposit as at 29 January 2019, reported above cut-off grades of 1.2% and 2.0% total heavy minerals (THM) and by JORC Code classification is presented in Table 2.1.

Table2.1: Night Train deposit Mineral Resource summary as at 29 January 2019

					In-situ Assemblage					
Deposit	Mineral Resource Category	Cut-off (THM%)	Material Tonnes Millions (Mt)	THM (%)	Zircon (%)	HiTi Leucoxene Rutile (%)	Leuco-xene (%)	Ilmenite (%)	Oversize (%)	Slimes (%)
Night Train	Inferred	1.2	130	3.3	0.45	0.18	1.5	0.71	2.2	8.7
	Inferred	2.0	50	5.9	0.82	0.33	2.9	1.06	2.2	10.2

			In-situ Tonnes					
Deposit	Mineral Resource Category	Cut-off (THM%)	THM Tonnes Millions (Mt)	Zircon (kt)	HiTi Leucoxene and Rutile (kt)	Leucoxene (kt)	Ilmenite (kt)	Total VHM (kt)
Night Train	Inferred	1.2	4.2	560	220	1,900	900	3,590
	Inferred	2.0	3.0	420	170	1,500	540	2,600

Notes:
- *THM is within the 38 µm to 1 mm size fraction and reported as a percentage of the total material, slimes is the -38 µm fraction and oversize is the +1 mm fraction.*
- *All tonnages and grades have been rounded to reflect the relative uncertainty of the estimate, thus the sums of columns may not equal.*
- *Estimates of mineral assemblage are presented as percentages of the total heavy mineral (THM) component. For the TiO_2 minerals specific breakpoints are used to distinguish between total rutile and high Ti leucoxene (>90% TiO_2), leucoxene (70 to 90% TiO_2) and ilmenite (40 to 90% TiO_2).*

Ownership/Tenure

The Night Train deposit is within exploration licences E04/2171, which is held by Thunderbird Operations Pty Ltd (Thunderbird Operations), a 100% owned subsidiary of Sheffield.

Deposit geology and interpretation

The Night Train deposit is hosted by deeply weathered Cretaceous-age stratigraphic units within fine to medium, well-sorted compacted sand and highly weathered sandstone. Mineralisation is interpreted over a lateral extent of 2 km east-west by 5 km north-south and is open along strike to the northwest, south and down-dip to the west. Mineralisation occurs from surface to depths of up to 76.5 m. Within the defined resource area the thickness of the mineralised horizon ranges from 3 m to 35 m with an average thickness of 13 m. The thickness of the overburden ranges from 2 m to 52 m with an average thickness of 26 m.

Sheffield interpreted mineralised domains for the resource model using geology and a total heavy minerals (THM) cut-off grade. The mineralised horizon was defined using a nominal cut-off grade of approximately 1.0% THM and within the mineralised horizon a higher-grade domain was defined using a nominal cut-off grade of approximately 3.0% THM. Geological logging and oversize content was used to interpret a unit of sandstone-quartzite that lies above the mineralised horizon.

The mineralisation at Night Train is hosted by fine, clean, predominantly quartz sand, below a stacked sequence of medium to very-coarse grained, clean quartz sands. The heavy mineral has a median diameter (d50) in the

range 80 to 100 µm. These characteristics are interpreted by Sheffield to represent an offshore depositional setting similar to that of Thunderbird (located approximately 20 km northwest of Night Train) but at a higher stratigraphic level.

Drilling and sampling techniques

The drill database used to define the resource model comprises 44 vertical drill holes for a total of 1,882 m with a total of 1,225 assay data. The holes were all drilled by Sheffield during 2014, 2015 and 2018 and are on a nominal spacing of approximately 200 m to 500 m east-west and are on drill lines that are spaced 900 m to 1,000 m apart. Aircore drilling was used to collect 1-3kg samples at 1.5m intervals down-hole. A summary of the drilling used for Mineral Resource estimation is included in Table 2.2.

Table 2.2: Summary of drilling supporting the Night Train Mineral Resource

Company	Year	Number of drill holes	Metres drilled	Number of assays
Sheffield	2014	15	732.0	482
	2015	5	298.5	199
	2018	24	851.5	544
Total		**44**	**1,882.0**	**1,225**

Survey

Drill holes were located using the MGA94, Zone 51 coordinate system. Collar locations for 19 of the holes drilled in 2018 were surveyed by licensed surveyors using a combination of RTK and Static Trimble R6 R8 receivers with an accuracy of +/- 0.02 m horizontal and 0.03 m elevation. The collar locations for the remaining 25 drill holes were surveyed by Sheffield or Thunderbird Operations employees using a handheld Garmin GPS system with expected accuracy of +/- 5 m horizontal.

A digital elevation model (DEM) was obtained by Sheffield from Outline Global in 2015 with an accuracy of +/- 1.5 m and on a grid of 2 m by 2 m. The resultant file was large and this surface was discretised by Optiro to a 20 m by 20 m grid. The discretised DEM was used to constrain the resource model to below the topographical surface.

The drill hole collar data was projected to the discretised DEM surface by Sheffield to determine the collar elevation. Optiro verified the collar elevations of the drill holes against the DEM surface.

Geological logging

The samples were washed and panned, then geologically logged on site in 1.5 m intervals by Sheffield geologists. All samples were logged for primary, secondary and oversize lithology, qualitative hardness, grainsize, rounding, sorting and washability. Visual estimates of total heavy minerals (THM)%, slimes % and oversize %, and depth to water table were also recorded.

Sampling analyses

THM, slimes and oversize determination was by screening, weighing and heavy liquid separation. Samples from the drill holes were analysed at Diamantina Laboratories in Perth. All samples were analysed using -38 µm slimes / +1 mm oversize screens. Separation and determination of THM% was by heavy liquid using tetrabromoethane (TBE) with a density 2.96 g/ml from the +38µm-1mm fraction.

Heavy mineral concentrates from drill samples were grouped to form composite samples which were subjected to analysis to determine the mineral assemblage. The mineral assemblage of the resource was determined from analyses of 12 composite samples of heavy mineral concentrate (HMC), collected from 19 drill holes (sampling from a total of 201 m of downhole interval). QEMSCAN analysis by Bureau Veritas Mineral Laboratories was used for determination of the mineral assemblage.

For one of the samples (DACP005) the mineral assemblage was determined using a similar method to that developed for the Thunderbird Mineral Sands Deposit. The following combination of screening, magnetic separation, QEMSCAN and XRF analysis was used:

- HMC was magnetically separated into highly-susceptible (H/S) magnetic 1, magnetic 2 and non-magnetic fractions, with each fraction weighed. The magnetic 1 and 2 fractions were combined and analysed by QEMSCAN™ for mineral determination as follows:

  Ilmenite: 40 to 70% TiO_2 >90% liberation
  Leucoxene: 70 to 90% TiO_2 >90% liberation
  Rutile and high Ti leucoxene: >90% TiO_2 >90% liberation
  Zircon: 66.7% ZrO_2+HfO_2 >90% liberation.

- The non-magnetic fraction was submitted for XRF analysis and minerals determined as follows:

  Zircon: ZrO_2+HfO_2/0.667
  High titanium leucoxene and rutile: TiO_2/0.90.

For the eleven samples analysed in 2018, the HMC from individual samples was combined according to THM grade and weight into (nominal) >20 g composite samples for mineral assemblage determination. The HM assemblage determination was by the QEMSCAN process which uses observed mass and chemistry to classify particles according to their average chemistry, and then report mineral abundance by % mass. For the TiO_2 minerals the following breakpoints were used to distinguish between:

Rutile	>94% TiO_2
High Ti leucoxene	90% to 94% TiO_2
Leucoxene	70% to 90% TiO_2
Ilmenite	40% to 70% TiO_2.

QAQC and data quality

QAQC procedures for Sheffield's 2014, 2015 and 2018 drilling programmes included the insertion of a field standard and a blank sample, and field duplicates at the drill site. Laboratory standards were inserted by Diamantina and an additional 20 samples that were analysed by Diamantina were also analysed by Western GeoLabs (WGL) in Perth, Western Australia. In total, the QAQC samples represent 12.6% of the Sheffield data.

No trends or bias were noted for the analysis of the blank and standard material. Overall results indicate that analysis of THM by the duplicate samples had good correlation with the original samples.

Two twin holes were drilled 4 m east-west and 2 m apart north-south. Results indicate good correlation of the THM data with both holes intersecting 9 m of >1% THM mineralisation at similar depths

The assay data are considered to have sufficient quality for the purpose of estimation and reporting of Mineral Resource.

Density

Bulk density was determined using a proprietary formula supplied by the leading global mineral sands consultancy TZ Minerals International (TZMI). The formula is based on heavy mineral and slimes percentage concentrations and includes assumptions about both packing content and mineral densities. All tonnages for the Mineral Resource estimates are expressed on a dry tonnage basis.

Data analysis

Data analysis and estimation was undertaken using Snowden Supervisor and Datamine software.

All of the samples have been taken over intervals of 1.5 m and compositing was not required. Top-cut (cap) grades were applied to the THM and oversize. The top-cut levels were determined using a combination of top cut analysis tools, including grade histograms, log probability plots and the coefficient of variation. A top-cut was not required for the slimes data.

Variogram analysis was undertaken to determine the THM, slimes and oversize continuity within the mineralised horizons and the horizontal continuity ranges for the mineral assemblage components. Kriging neighbourhood analysis was undertaken to determine the block size and the kriging parameters.

Mineral Resource estimation

The resource model was developed for the Night Train deposit by Optiro using Datamine software. The resource model was constructed using a parent block size of 125 mE by 250 mN on 1.5 m benches, and the parent blocks were allowed to sub-cell down to 12.5 mE by 25 mN by 0.5 mRL to more accurately represent the geometry and volumes of the geological and mineralisation horizons. Parent blocks were used for grade estimation.

THM, slimes and oversize block grades were estimated using ordinary kriging techniques with appropriate top-cuts applied to the THM and oversize data and search ellipses oriented within the plane of the mineralisation. Inverse distance (cubed) was used to estimate the percentage of zircon, ilmenite, leucoxene and combined high Ti leucoxene and rutile. A plan of the THM grade averaged over the entire thickness of the deposit is included as Figure 2.2 and cross-sections are included in Figure 2.3.

The block models were validated by:

- visual comparison of the drill holes and blocks
- statistical comparison of the mean input grade (top-cut and declustered) with the estimated block grade
- examining trend plots of the input data and estimated block grades.

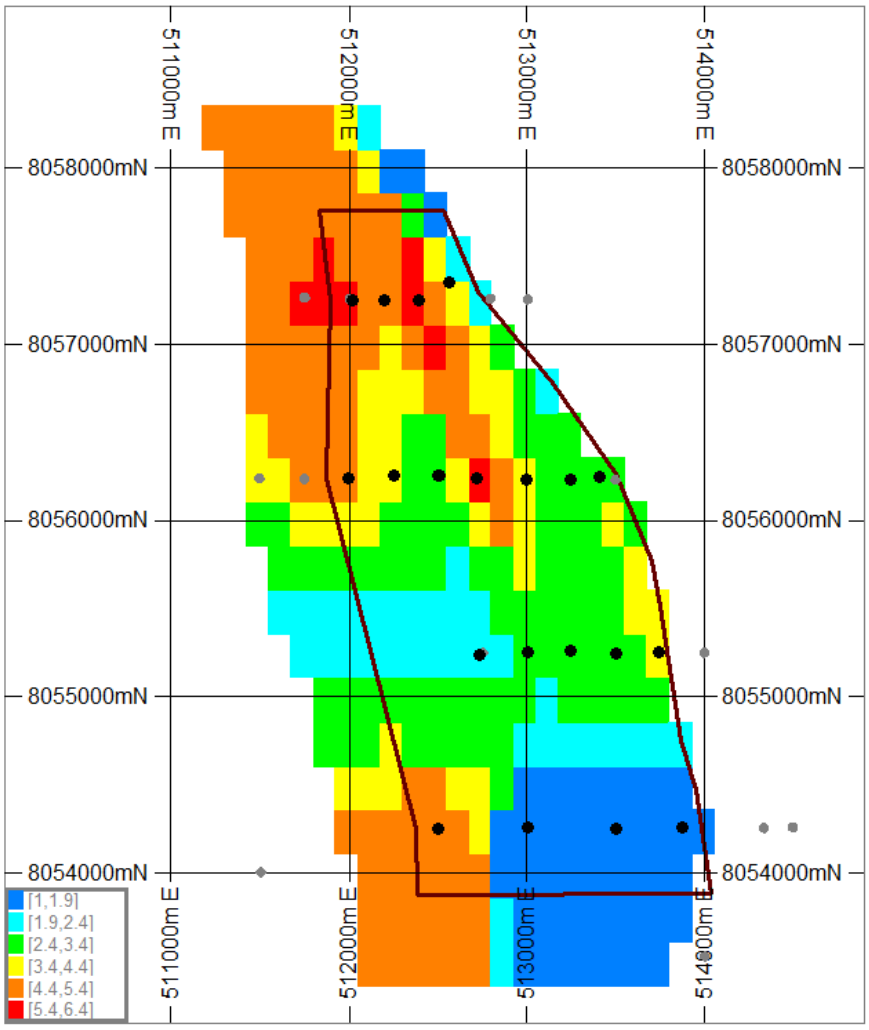
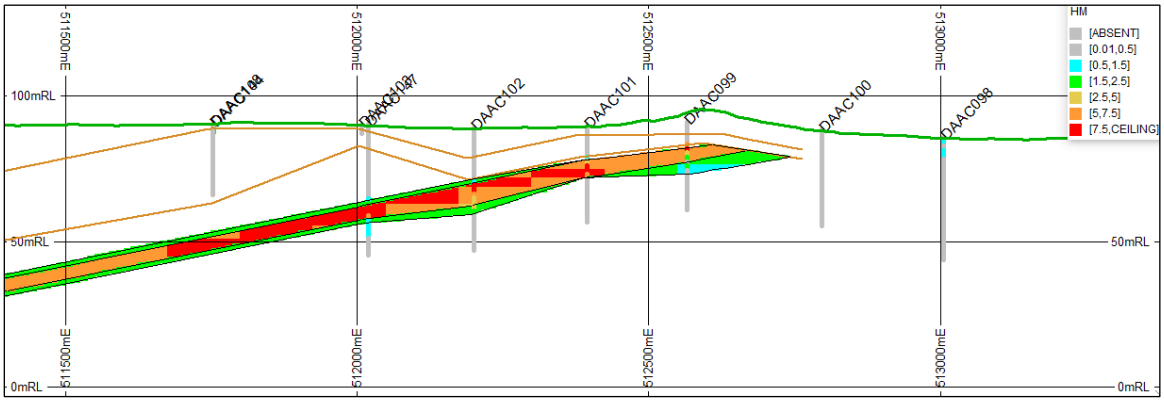


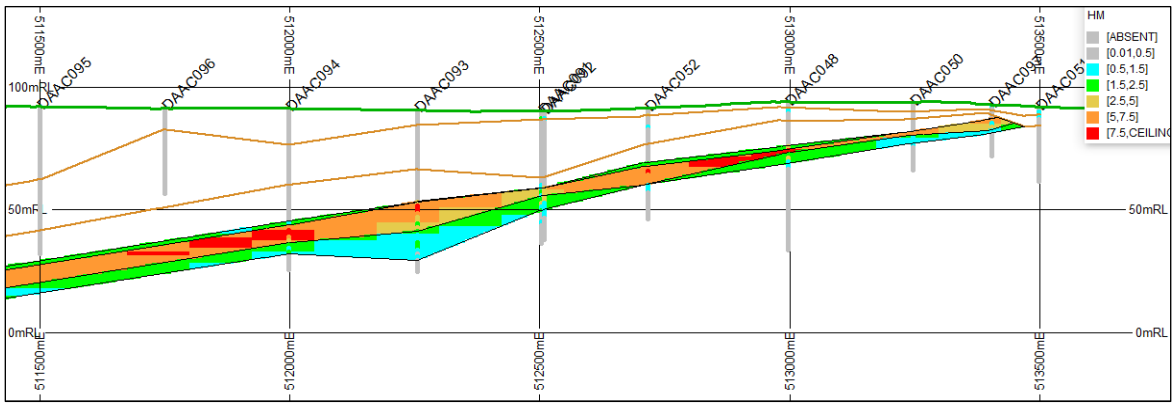
Figure 2.2: Night Train plan[1] of average total heavy mineral (THM) grade

[1]Black heavy line is boundary of Inferred Night Train Mineral Resource. Outside the black heavy line is the conceptual Exploration Target at Night Train. Grey drill holes to the west of the Resource terminated above the mineralisation and do not close off the mineralisation.

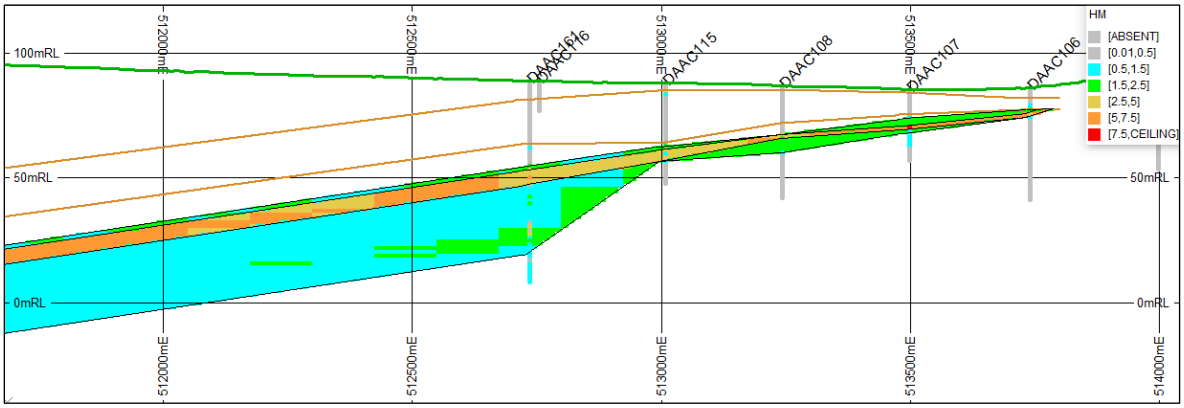
Night Train: Section 8,057,250 N coloured by THM (5x vertical exaggeration)



Night Train: Section 8,056,250 N coloured by THM (5x vertical exaggeration)



Night Train: Section 8,055,250 N coloured by THM (5x vertical exaggeration)



Night Train: Section 8,054,250 N coloured by THM (5x vertical exaggeration)

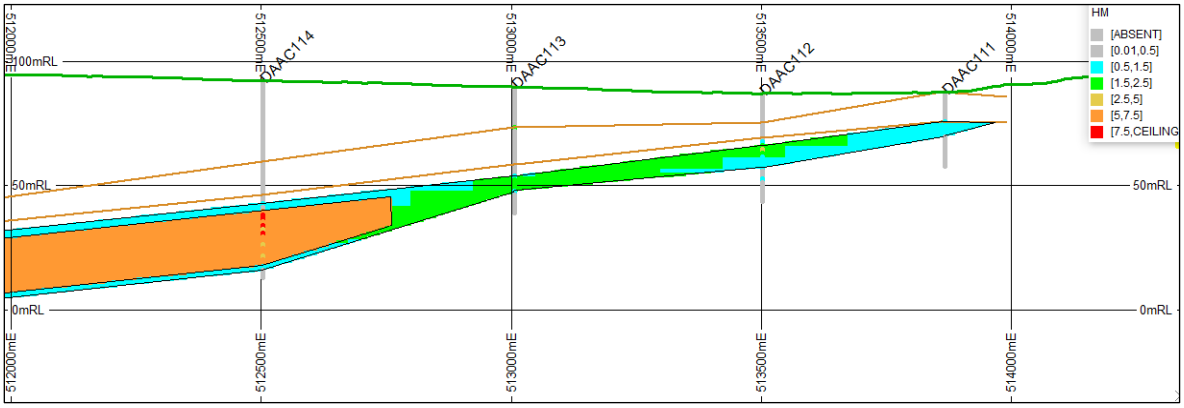


Figure 2.3: Night Train Mineral Resource Cross Sections

Mineral Resource classification

The Mineral Resource has been classified on the basis of confidence in geological and grade continuity and taking into account data quality, data density, confidence in estimation of heavy mineral content, and the location of the mineral assemblage data. Inferred Mineral Resources are defined within the area where the mineralised horizon has been intersected by drilling and the majority of blocks were estimated within the first search pass. The drill holes within the Inferred Resource are on a nominal spacing of approximately 200 m to 500 m east-west and are on drill lines that are spaced 900 m to 1,000 m apart.

The assigned classification of Inferred at the Night Train deposit reflects the Competent Person's assessment of the accuracy and confidence levels in the Mineral Resource estimate.

Mineral Resource statement

The Mineral Resource has been classified in accordance with the guidelines of the JORC Code (2012) and has been reported above cut-off grades of 1.2% and 2.0% total heavy minerals (Table 2.2). The Mineral Resource has been reported above 1.2% and 2.0% total heavy minerals cut-off grades to reflect current commodity prices and processing. These cut-off grades were selected by Sheffield based upon comparison with similar deposits. The THM % is the total heavy minerals from within the -1mm+38µm fraction and is reported as a percentage of the total material, and the VHM components are reported as a percentage with the THM fraction.

It is considered that the Night Train deposit has a reasonable prospect of eventual economic extraction when considered in the context of the deposit location and existing infrastructure and taking into consideration the depth, thickness and grades of the deposit.

Table 2.2: Night Train deposit Mineral Resource summary as at 29 January 2019

					In-situ Assemblage					
Deposit	Mineral Resource Category	Cut-off (THM%)	Material Tonnes Millions (Mt)	THM (%)	Zircon (%)	HiTi Leucoxene Rutile (%)	Leuco-xene (%)	Ilmenite (%)	Oversize (%)	Slimes (%)
Night Train	Inferred	1.2	130	3.3	0.45	0.18	1.5	0.71	2.2	8.7
	Inferred	2.0	50	5.9	0.82	0.33	2.9	1.06	2.2	10.2

			In-situ Tonnes					
Deposit	Mineral Resource Category	Cut-off (THM%)	THM Tonnes Millions (Mt)	Zircon (kt)	HiTi Leucoxene and Rutile (kt)	Leucoxene (kt)	Ilmenite (kt)	Total VHM (kt)
Night Train	Inferred	1.2	4.2	560	220	1,900	900	3,590
	Inferred	2.0	3.0	420	170	1,500	540	2,600

Notes:
- *THM is within the 38 µm to 1 mm size fraction and reported as a percentage of the total material, slimes is the -38 µm fraction and oversize is the +1 mm fraction.*
- *All tonnages and grades have been rounded to reflect the relative uncertainty of the estimate, thus the sums of columns may not equal.*
- *Estimates of mineral assemblage are presented as percentages of the total heavy mineral (THM) component. For the TiO_2 minerals specific breakpoints are used to distinguish between total rutile and high Ti leucoxene (>90% TiO_2), leucoxene (70 to 90% TiO_2) and ilmenite (40 to 90% TiO_2).*

In addition, an Exploration Target has been identified to the west, north and south of the Inferred Mineral Resource. It is estimated that this contains 80 to 100 million tonnes at an average grade of 3.0 to 4.0% THM. The potential quantity and grade of the Exploration Target is conceptual in nature, as there has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource. The thickness of the overburden ranges from 0.5 m to 71 m with an average thickness of 30 m.

Appendix 2: JORC (2012) Table 1 Report

The table below summaries the assessment and reporting criteria used for the Night Train deposit Mineral Resource estimate and reflects the guidelines in Table 1 of *The Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves* (the JORC Code, 2012).

Section 1 Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• NQ (70 mm) diameter aircore drilling used to collect a at source rotary split 1 to 3kg samples at 1.5m intervals down-hole. • Mineral sands industry-standard drilling technique. • See below for sample and assay QAQC procedures and analysis. • Note of the 44 holes used in the Mineral Resource estimate, 15 (34%) were drilled by Sheffield in 2014 and 5 (11%) were drilled by Sheffield (2015). Thunderbird Operations Pty Ltd, a 100% owned subsidiary of Sheffield, drilled 24 (55%) in 2018. The same drilling and sampling techniques have been employed for all programmes.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• Aircore system approximately 70 mm diameter using a blade (face sampling) drill bit, NQ size, was applied. • Where penetration by blade was not achieved or was slow, a hammer was used for the first 15m. • System used as an industry standard for HMS deposits.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *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.*	• Rotary splitter beneath the splitter was used to collect a 1 to 3kg sub-sample from 1.5m intervals. • Sample weight was recorded at the laboratory. • Duplicate samples for Sheffield holes were collected at the drill site (see below) to enable analysis of data precision. • Sample condition of Sheffield holes (wet to dry and good to poor qualitative recovery) was logged at the drill site. Analysis shows no material bias in the differing sample conditions logged. • Bulk samples collected in 3m composite intervals from cyclone, capturing remaining material with mineralised portions retained. • The sample quality is considered appropriate to establish and support Mineral Resource estimation.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• Every drill sample was washed and panned, then geologically logged on site in 1.5m intervals. • Sheffield record primary, secondary and oversize lithology, qualitative hardness, grainsize, rounding, sorting, and washability, visual estimates of THM%, SL% and OS%, and depth to water table. • Heavy mineral sachets were examined under a microscope following heavy medium separation by laboratory and assessed as to whether sand or from rock. • The entire length of the drill hole was logged; minimum (nominal) interval length is 1.5m. • Logging is suitable such that interpretations of grade and deposit geology can be used to support the Mineral Resource estimation procedure and classification applied.

Criteria	JORC Code explanation	Commentary
Sub-sampling techniques and sample preparation	• *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	**THM%, SL% OS% Determination** Drill Site • A 1 to 3kg sample is collected at 1.5m intervals in numbered bags at the drill site via rotary splitter at the cyclone discharge point. • Duplicate samples (field duplicates) collected at drill site for holes 1 in every 40 samples. • Reference blank (builder's sand) material samples inserted 1 each in every 40 samples. • Samples submitted to an external laboratory for heavy liquid separation (HLS) determination of weight per cent heavy mineral (THM%), slimes (SL%) and oversize (OS%) at a screen split of -38µm, +38µm and +1mm. External Laboratory • The 1 to 3kg drill sample was sub-sampled via a rotary splitter to approximately 200g for analysis. • The 200g sub-sample was soaked overnight in water then screened and weighed. • THM%, SL% and OS% calculated as percentage of total sample weight (see below). Laboratory repeats were conducted 1 in every 34 samples (1 in 29 samples in 2014, 1 in every 31 samples in 2015, 1 in every 42 samples in 2018). • Laboratory internal standard inserted (nominally) 1 in every 59 samples (1 in 59 samples in 2014, 1 in 52 samples in 2015, 1 in 63 samples in 2018). • 20 umpire samples were analysed at another external laboratory. Four umpire laboratory repeats were carried out. • Laboratory provided a sachet containing the Heavy Mineral Concentrate (HMC) for each sample – this was used in HM assemblage determination (see below). All • Visual estimates of THM%, SL% and OS% logged at the drill site were compared against laboratory results to identify significant errors. • Spacing of duplicate, standard, blank and laboratory repeat samples are designed to identify sample misplacement or misallocation during sample collection and laboratory analysis. • Analysis of field duplicate samples and laboratory repeats are sufficient to show the data has acceptable precision, indicating the sub-sampling and sample preparation techniques are appropriate for the deposit style and the Mineral Resource estimation procedure and classification applied. **HM Assemblage Determination** • Heavy Mineral Concentrate (HMC) from individual samples was combined according to THM grade and weight into (nominal) >20g composite samples for HM assemblage determination. • Weighed HMC composite was split via a micro-riffle to ensure THM%, SL% and OS% of the final composite sample can be correctly calculated. • HM assemblage data was collected from same or proximal holes to make >20g composite based on similar physical assessment of composition. • Screening prior to analysis was not required due to the clean nature of the HM.

Criteria	JORC Code explanation	Commentary
		• HM assemblage determination was by QEMSCAN™ to determine the component mineralogy. This method has rigorous (laboratory) internal quality control measures, and this in comparison with visual observations of HM concentrate is considered sufficient to show the data has acceptable precision, indicating the sub-sampling and sample preparation techniques are appropriate for the deposit style and the Mineral Resource estimation procedure and classification applied. • QEMSCAN™ particle classification rule for DACP005 TiO_2 sample breakpoints are <40%, => 40% ilmenite, =>70% leucoxene, =>90% rutile and high Ti leucoxene. • QEMSCAN™ particle classification rule for DACP008 to DACP018 TiO_2 sample breakpoints are <40%, => 40% Ilmenite, => 70% leucoxene, => 90% high Ti leucoxene, =>94% rutile. • For the block model TiO_2 breakpoints are <40%, => 40% Ilmenite, => 70% leucoxene, => 90% combined rutile and high Ti leucoxene.
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.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	**HM%, SL% OS% Determination** • Assay and laboratory procedures are industry standard, although method specifics and heavy liquid composition can vary. • Sheffield drill holes contributed 100% of the assay database. • SL% was determined using a 38µm screen. • OS% was determined using a +1mm screen. • THM% was determined using heavy liquid TBE (2.96g/ml). • The method produces a total grade as weight per cent of the primary sample. • Method does not determine the relative amounts of valuable (saleable or marketable) and non-valuable heavy mineral species. See below for details of HM assemblage determination. • Reference standard and blank material samples inserted at the drill site 1 each in every 40 samples • The blank material used is commercially available builder's sand. • Reference blanks are examined for performance over time and within laboratory batches. Batches or sub-batches are re-analysed if unacceptable QAQC data are returned. • In total QAQC samples represent 12.6% of the total assay database. • Analysis of reference blanks and laboratory standards, repeats show the data to be of acceptable accuracy and precision for the Mineral Resource estimation procedure and classification applied. **HM Assemblage Determination** • HM assemblage is determined from Sheffield drill holes. Assemblage sample DACP005 • HM assemblage determination was by a combination of screening, magnetic separation, QEMSCAN™ and XRF assay to determine the component mineralogy of the HMC. • This method is considered an industry standard,

Criteria	JORC Code explanation	Commentary
		typically optimised according to the HM characteristics of individual deposits. • For this sample a similar method to that developed for the Thunderbird Mineral Sands Deposit was applied. • HMC was magnetically separated into highly-susceptible (H/S) magnetic 1, magnetic 2 and non-magnetic fractions, with each fraction weighed. The magnetic 1 and 2 fractions were combined and analysed by QEMSCAN™ for mineral determination as follows: Ilmenite: 40 to 70% TiO_2 >90% liberation Leucoxene: 70 to 90% TiO_2 >90% liberation High titanium leucoxene (high Ti leucoxene) and rutile: >90% TiO_2 >90% liberation Zircon: 66.7% ZrO_2+HfO_2 >90% liberation • The non-magnetic fraction was submitted for XRF analysis and minerals determined as follows: Zircon: ZrO_2+HfO_2/0.667 Rutile and high TiO_2 leucoxene: TiO_2/0.90. • Reference material was not used, the method design and comparison to visual observation is considered sufficient to establish acceptable accuracy of the data for the reporting of exploration results. <u>Assemblage samples DACP008 to DACP018</u> • Heavy Mineral Concentrate (HMC) from individual samples is combined according to HM grade and weight into (nominal) >20g composite samples for HM assemblage determination. • Weighed HMC is split via a micro-riffle to ensure THM%, SL% and OS% of the final homogenised composite sample can be correctly calculated. • HM assemblage determination was by the QEMSCAN™ process which uses observed mass and chemistry to classify particles according to their average chemistry, and then report mineral abundance by % mass. • For the TiO_2 minerals specific breakpoints are used to distinguish between rutile (>94% TiO_2), high Ti leucoxene (>90% TiO_2), leucoxene (>70% TiO_2), ilmenite (>40% TiO_2). • Reference material is not used, other measures of accuracy and the method design are considered sufficient to establish acceptable accuracy of the data for the Mineral Resource estimation and classification applied.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Sheffield data was logged electronically using "validation at point of entry" systems prior to storage in the Company's drill hole database, which is managed by Company personnel and an external consultancy. • Documentation related to data custody and validation is maintained by the Company. • A copy ("snapshot") of the Mineral Resource database is retained separately from the primary drill hole database. • All drill holes were included in the from the drill database. • Two holes were drilled 4m east-west and 2m apart

Criteria	JORC Code explanation	Commentary
		north-south. Results indicate good correlation of the THM, slimes and oversize data with both holes intersecting 9m of >1% THM mineralisation at similar depths • The verification and treatment of the data is considered sufficient for the Mineral Resource estimation procedure and classification applied.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• For 25 drill holes the collar locations were surveyed by Sheffield employees using a handheld Garmin GPS system with expected accuracy of +/- 5m horizontal. • For 19 drill holes the collar locations were surveyed by licensed surveyors using a combination of RTK and Static Trimble R6 R8 receivers with an accuracy of +/- 0.02 m horizontal and 0.03 m. • Easting and northing co-ordinates are MGA Zone 51 (GDA94). • Drill hole collar elevations were determined by projection of surveyed drill hole collars to a 20m by 20m DEM over the Night Train area. This was produced from a 15cm accuracy Digital Elevation Model (DEM) supplied by Outline Global in 2015 based on a 2m by 2m grid. This was discretised to a 20m by 20m grid by taking the central point of each grid cell. • The Mineral Resource estimate used the 20m by 20m model as surface topography. RL measured by hand held GPS units has poor accuracy and the DEM model provides a consistent spatial topography over the project area. • The quality and accuracy of the topographic control is considered sufficient for the Mineral Resource estimation procedure and classification applied.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Holes were drilled between 200m to 500m spacing in four east-west lines spaced 900m to 1,000m apart. • The drill database used in the resource estimate comprises 44 holes, totalling 1,882m, with 1,225 samples assayed. • Samples for HM assemblage determination are composited on intervals according to a combination of grade and geology appropriate to reflect resource estimation domains. Samples have been composited from individual holes, or when not possible based on geological and grade constraints, holes that are proximal. • 12 composites from 19 holes were used in the resource estimate. • The data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource estimation procedure and classification 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.* • *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.*	• All drilling is vertical making it normal to the horizontal orientation of geology and mineralisation.

Criteria	JORC Code explanation	Commentary
Sample security	• *The measures taken to ensure sample security.*	• Sample security is not considered a significant risk given the location of the deposit and bulk-nature of mineralisation. • Nevertheless, the use of recognised transport providers, sample dispatch procedures directly from the field to the laboratory, and the large number of samples are considered sufficient to ensure appropriate sample security.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• All data has been validated by at least two Company geologists and reviewed by Optiro.

Section 2 Reporting of Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *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.*	• Exploration results are entirely within a 100% owned Thunderbird Operations Pty Ltd exploration tenement. Thunderbird Operations Pty Ltd is a 100% owned subsidiary of Sheffield Resources Ltd. • E04/2171 was granted on the 21/02/2013 and expires on 20/02/2023. An extension of term was successfully granted on 23 April 2018. • The tenement was 100% transferred from Sheffield Resources Ltd to its 100% owned subsidiary Thunderbird Operations Pty Ltd on 01/06/2017. • The tenement is located on the Dampier Peninsula in the Kimberley region of Western Australia. • There are no known or experienced impediments to obtaining a licence to operate in the area. • Sheffield and its subsidiary Thunderbird Operations Pty Ltd have been operating successfully in the region for more than 7 years.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Sheffield carried out the initial exploration at the Night Train deposit. Initial exploration in the region for Mineral Sands was carried out by Rio Tinto, although not at the Night Train occurrence.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The Dampier Project is within the Canning Basin in the Kimberley region of Western Australia. The Canning Basin is an intracratonic basin which contains Ordovician to Cretaceous deposits covered by Cainozoic sediments. • Night Train is within deeply weathered Cretaceous-aged sand formations. • Night Train is hosted by fine to medium grained, clean, dominantly quartz sand, below a stacked sequence of fine to very-coarse grained, clean quartz sands. • An offshore depositional setting is interpreted, similar to that of the nearby Thunderbird deposit, but at a higher stratigraphic level. • The heavy mineral has a median diameter (d50) in the range 70 to 90µm, is dominated by VHM, is free from coatings, and has a high zircon and leucoxene content.

Drillhole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drillholes:*
	  • easting and northing of the drillhole collar
	  • elevation or RL (elevation above sea
		• Results relating to the drill holes used in the resource have been publicly released in previous Company announcements and reports referring to the Night Train deposit. See Sheffield ASX announcements Night Train discovery: “New Mineral Sands Discovery at Night Train” 22 September 2015; regional drilling results: “Three New Mineral Sands Discoveries in Canning Basin” 25 February 2015; metallurgy “Premium Zircon at Night Train” 14

Criteria	JORC Code explanation	Commentary
	level in metres) of the drillhole collar • dip and azimuth of the hole • down hole length and interception depth • hole length.	April 2016, regional drilling results "Exceptional Results Confirm Major Discovery at Night Train" 9 October 2018, "Three New Mineral Sand Discoveries Near Thunderbird" 17 October 2018" and "New Large High Grade Discovery South of Thunderbird" 13 November 2018. • Information relating to the number of drill holes, assayed samples, location accuracy, orientation etc. is included in this table. • Diagrams in the report show the location of and distribution of drill holes in relation to the Mineral Resource.
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 relevant – Mineral Resource is defined. • Reported intersects from drill holes used in the resource estimate have been publicly released in previous Company announcements and reports referring to the Night Train deposit (see Drill hole information section above).
Relationship between mineralisation widths and intercept lengths	• *If the geometry of the mineralisation with respect to the drillhole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• Not relevant – Mineral Resource is defined.
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.*	• Cross section and plans views included in announcement.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• All information considered material to the reader's understanding of the database, estimation procedure and classification of the Mineral Resource has been 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.*	• Where relevant this information has been included or referred to elsewhere in this Table.
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).*	• Plan to carry out metallurgical and process flow test work for Night Train, compositing of bulk sampling and infill drilling to increase the confidence assigned to resource category.

Section 3 Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• Drill hole data was extracted directly from the Company's drill hole database which includes internal data validation protocols. • Validation of the exported data was confirmed using mining software (Micromine) validation protocols, and visually in plan and section views. • Compilation of data external to the drill database

Criteria	JORC Code explanation	Commentary
		(e.g. HM assemblage source data) was cross-checked manually, and through statistical comparison. • A copy ("snapshot") of the Mineral Resource database is retained separately to the primary drill hole database. • Data was further validated by Optiro upon receipt, and prior to use in the estimation.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	• Mr Gray has visited the site and the primary assay laboratory on numerous occasions from 2014 onwards. • Mrs Standing has not visited the site. She has visited the primary laboratory. • Where material, information relating to observations from Mr Gray's visits has been included Sheffield announcements referenced above.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• Domains were interpreted on a cross-sectional basis by Sheffield using Micromine software based on the logging and grade information according to the deposit geology described above. • The mineralised horizon was defined using a nominal ≥1.0% THM cut-off with a minimum width of 3m. • A higher-grade domain was defined within the mineralised horizon using a nominal cut-off grade of 3% THM. • Geological logging and oversize content was used to interpret a unit of sandstone-quartzite that lies above the mineralised horizon. This was interpreted from the geological logging (sandstone or quartzite), hardness of 3 or greater, and/or high oversize contents (>20%).
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 Inferred Resource is 4.0km long by 0.8km to 1.6km width at a 1.2% THM cut-off. At a 2.0% THM cut-off the Inferred Resource is 4.0km long by 0.4km to 1.6km width. • The Mineral Resource defined above a 1.2% THM cut-off grade ranges in thickness from 1.5m to 34m, with an average thickness of 11m. The thickness of the overburden ranges from 2m to 53m with an average thickness of 26m. • The Mineral Resource defined above a 2% THM cut-off grade ranges in thickness from 1.5m to 22.5m, with an average thickness of 6m. The thickness of the overburden ranges from 1.5m to 55m with an average thickness of 28.5m • In addition, an Exploration Target has been identified to the west, north and south of the Inferred Mineral Resource. It is estimated that this contains 80 to 100 million tonnes at an average grade of 3.0 to 4.0% THM. The potential quantity and grade of the Exploration Target is conceptual in nature, as there has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource. The thickness of the overburden ranges from 0.5m to 71m with an average thickness of 30m • The interpreted mineralisation used to define the Exploration Target and Inferred Resource extends over a lateral extent of 1km to 2km east-west by 5km north-south and is open along strike in the north-west, south and down-dip to the west.

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 availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	• THM, slimes and oversize quantities were estimated using ordinary kriging (OK) into blocks of 125mE by 250mN by 1.5mRL. Zircon, leucoxene, ilmenite and combined rutile and high Ti leucoxene percentages were estimated using inverse distance (ID) cubed into the parent blocks. • Block dimensions were selected from kriging neighbourhood analysis and reflect the variability of the deposit and the model's practicality for future mine planning. Sub-cells to a minimum dimension of 12.5mE by 25mN by 0.5mRL were used to represent volume. For the definition of the topographical surface and soil horizon (of 15cm) sub-celling was reduced to 12.5mE by 25mN by 0.15mRL. • The drill holes are on a nominal spacing of approximately 200m to 500m east-west and are on drill lines that are spaced 900m to 1,000m apart. • A maximum extrapolation distance of 500m was applied along strike and 125m across strike (approximately half the drill spacing) for definition of the Inferred Resource. • Data analysis and estimation was undertaken using Snowden Supervisor and Datamine software. • All of the samples used for the resource estimate have been taken over intervals of 1.5m. The data was not composited and the assay data from the 1.5m samples was used for the resource estimate. • Wireframe interpretations of mineralisation were made by Sheffield based on geological logging and heavy mineral content, using a threshold of ~1.0% THM and ~3.0% THM to define the mineralised horizons. Geological logging was used to interpret a layer of sandstone/quartzite that overlies the mineralised horizon. • Optiro assessed the robustness of the domains by critically examining the geological interpretation and by using a variety of measures, including statistical and geostatistical analysis. The mineralised domains are considered geologically robust in the context of the resource classification applied to the estimate. • All variables were estimated separately and independently. • Grade capping was applied to THM% and OS%. The top-cut levels were determined using a combination of top cut analysis tools, including grade histograms, log probability plots and the coefficient of variation. • Variogram analysis was undertaken to determine the kriging estimation parameters used for OK estimation of THM, slimes and oversize. • THM mineralisation continuity was interpreted from variogram analyses to have an along strike range of 1,240m and a down-dip range of 680m. • Kriging neighbourhood analysis was performed in order to determine the block size, sample numbers and discretisation levels. • Three estimation passes were used for THM; the first search was based upon the variogram ranges; the second search was two times the initial search and the third was four times the initial search. The third search had reduced sample numbers required for estimation. Almost 60% of the blocks were estimated in the first pass, 40% in the second

Criteria	JORC Code explanation	Commentary
		search pass and the remaining 1% in the third search pass. • The THM, slimes and oversize estimated block model grades were visually validated against the input drill hole data and comparisons were carried out against the declustered drill hole data and by northing, easting and elevation slices. • The VHM estimated block model grades were visually validated against the input drill hole data and comparisons were carried out against the drill hole data and by northing and easting slices. • Mineral Resources have not been previously estimated for Night Train.
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 for the Night Train deposit has been reported above cut-off grades of 1.2% and 2.0% THM to represent the resource that may be extracted under current market conditions. The maximum slimes content is 19.6% and so an upper cut-off grade for slimes was not applied. • These parameters have been selected by Sheffield in consultation with Optiro based on current experience and preliminary economic assessments carried out by Sheffield for HM deposits elsewhere in Western Australia. They represent that proportion of the deposit considered to have reasonable prospects of eventual economic extraction.
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.*	• In determining the criteria for reasonable prospects for eventual economic extraction, potential mining methods considered are wet, dredge mining or dry dozer-trap operations, similar to those commonly and currently in use in HM mining operations both in Australia and globally. • The thickness, areal extent, and continuous nature of the mineralisation at Night Train are such that non-selective bulk mining methods can be appropriately considered. • These assumptions were also considered when determining resource block sizes, and resource classification. • On the basis of these assumptions, the Company considers there are no mining factors which are likely to affect the assumption that the deposit has reasonable prospects for eventual economic extraction.
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.*	• Sheffield has conducted metallurgical test work test work on samples from Night Train. Ceramic grade high quality zircon was able to be produced using conventional mineral sands processing techniques. Night Train is low in iron contaminates and the zircon was produced without an enhanced leaching stage. The grainsize of zircon and HiTi products are fine to medium grained with a D50 of 79µm from a composite sample averaging 4.7% THM with 17.4% zircon assemblage. • See Night Train metallurgical scoping results: "Premium Zircon at Night Train", 14 April 2016 • To date, the Company considers there are no metallurgical factors which are likely to significantly affect the assumption that the deposit has reasonable prospects

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.*	• The Company has completed a Public Environmental Review for its proposed Thunderbird Mine Site 20 km to the northeast and proposed haul road 2 km to the east. No specific environmental reviews have been carried out specifically at the Night Train occurrence. • On the basis of these studies, the Company considers there are no environmental factors which are likely to affect the assumption that the deposit has reasonable prospects for eventual economic extraction.
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• No direct measurements of bulk density have been taken. • Bulk density is assumed from an industry-standard formula which accounts for the THM and slimes content of sand deposits. The resultant values are considered to be consistent with observations of the material compared with other similar HM deposits with known bulk density values. • A recommendation for future work is that confirmatory bulk density information is acquired.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• The estimate has been classified as Inferred according to the guidelines of the JORC Code (2012), taking account of the confidence in geological and grade continuity, data quality, data density, confidence in estimation of heavy mineral content, and the location of the mineral assemblage data. • Inferred Mineral Resources are defined within the area where the mineralised horizon has been intersected by drilling and the majority of blocks were estimated within the first search pass. In plan, a polygon was used to define the areas of Inferred Mineral Resources. • The assigned classification of Inferred reflects the Competent Person's assessment of the accuracy and confidence levels in the Mineral Resource estimate.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• The Mineral Resource has been reviewed internally as part of normal validation processes by Optiro. • No external audit or review of the current Mineral Resource has been conducted.
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.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• The assigned classification of Inferred reflects the Competent Person's assessment of the accuracy and confidence levels in the Mineral Resource estimate. • The estimate is suitable for input into long term planning studies. • No production has occurred from the deposit.