Heavy Minerals LIMITED

ASX Announcement Date: 6 Dec 2021

MINERAL RESOURCE INCREASED AT INHAMBANE TO 90 Mt @ 3.0% THM

- Inhambane heavy mineral sands JORC Mineral Resource has increased by 59% to 90 Mt @ 3.0% THM with 2.7 Mt of contained THM
- Mining Licence Application modified to include an additional 30.3368 km^2 of tenure (Figure 1 & Table 2) with HVY securing prospective ground directly bordering RIO Tinto's and Savannah Resources Jangamo Project (4.4 Bt @ 3.9% THM[3])
- Additional ground includes Mineral Resource defined during HVY's initial drilling program conducted in 2014
- HVY has updated the Mineral Resource estimate to account for this additionally secured tenure and along with this, a significant increase in resource pricing has justified a reduction in the resource cut-off grade used for reporting the Mineral Resource estimate
- Ilmenite dominated mineral assemblage along with credits of zircon, rutile and leucoxene are defined in the updated report. These key minerals have seen significant price increases in the previous 12-18 months (current benchmark pricing: Ilmenite US$350 per ton[1], Zircon US$1,500 per ton[2])

Heavy Minerals Limited (ACN 647 831 833) ("**HVY**", "**Heavy Minerals**" or the "**Company"**) is pleased to announce that the updated Mineral Resource at the Inhambane heavy mineral sands project has increased by 59% to 90 Mt @ 3.0% THM with 2.7 Mt of contained THM (previously 1.7 Mt). The updated Inferred Mineral Resource is highlighted in Table 1 and is Ilmenite dominated with credits of zircon, rutile and leucoxene. Based on increased ilmenite and zircon benchmark pricing, the company has reduced the cut-off grade for reporting from an historical 2% THM to 1.7% THM.

Mineral sands have seen substantial pricing increases over the past 12-18 months with benchmark Ilmenite pricing increasing approximately 60% since October 2020 to US$350 per tonne. Zircon pricing has also seen significant appreciation with Zircon commanding US$1,500 a tonne.[3]

Table 1: Inhambane Mineral Resource Summary

MINERAL RESOURCE SUMMARY FOR INHAMBANE PROJECT AS AT DECEMBER 2021

Summary of Mineral Resources(1)								HM Assemblage(2)			
Mineral Resource Category	Material (Mt)	In Situ THM (Mt)	THM (%)	SL (%)	OS (%)	Altered Ilmenite (%)	Primary Ilmenite (%)	Rutile (%)	Leucoxene (HiTi) (%)	Zircon (%)	Others (%)
Inferred	90	2.7	3.0	5	0	29	31	2	4	5	29
Grand Total(3)	90	2.7	3.0	5	0	29	31	2	4	5	29

Notes:

(1) Mineral resources reported at a cut-off-grade of 1.7% THM.

(2) Mineral assemblage is reported as a percentage of in situ THM content.

(3) HVY has a 70% interest in the Inhambane heavy mineral sands project

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E-mail: info@heavyminerals.com | Website: www.heavyminerals.com |
Non-Executive Chairman: Adam Schofield | Executive Director & CEO: Nic Matich | Non-Executive Director: Greg Jones | Non-Executive Director: Glenn Simpson |
Company Secretary: Stephen Brockhurst

Additional Tenure (Inhambane Mozambique):

The Company's Mozambican mining application has been amended to include additional ground ceded previously when transitioning from an exploration licence to a mining licence application. The ceding of ground was conducted to comply with National Institute of Mines (INAMI) regulations whereby application boundaries must be rounded to the nearest 10 seconds. A subsequent application with INAMI resulted in the Mining Application being extended to the South and the West (Figure 1). This additional ground includes an area previously drilled by HVY and this, coupled with a revised THM cut-off grade from 2.0% THM to 1.7% THM has resulted in a 59% increase in contained heavy mineral to 2.7 Mt (increased from 1.7 Mt). The updated JORC Inferred Mineral Resource of 90 MT @ 3.0% THM is contained within a relatively small portion of the mining license application (Figure 2). The additional ground now under application includes highly prospective areas, bordering the Rio Tinto and Savannah Jangamo project which has a "world class" Mineral Sand Resource of 4.4 Bt @ 3.9% THM[3]

Table 2: Changes to mining licence application

Licence No	Holder	Area	Status	Grant date	Expiry Date
10255C *At 14th September 2021*	+258 Limitada	183.5 km2	Mining Concession Licence Application Pending	N/A	N/A
10255C *At 1st December 2021*	+258 Limitada	213.8 km2	Mining Concession Licence Application Pending	N/A	N/A

Inhambane Metallurgical Testing:

HVY plans to conduct metallurgical testing of the samples brought back from the 2014 Mozambique drilling campaign. HVY is undertaking an audit of the stored samples and intends to supply sufficient material quantities to conduct Scoping Study level testwork to develop a process flowsheet and expected mineral products. The development of process flow sheets will provide the groundwork for an engineering Scoping Study to develop CAPEX and OPEX and deliver an understanding of the pathway forward to commercial development.

HVY will keep the market updated as to progress with the audit and submission of samples for metallurgical testing.

Executive Director & CEO, Mr. Nic Matich said:

"HVY has worked with-in the constraints of the COVID pandemic to produce tangible results for shareholders from our Mozambique asset. The significant Increase of the Mineral Resource highlights the prospectivity of our tenure and bodes well for the future of the project."

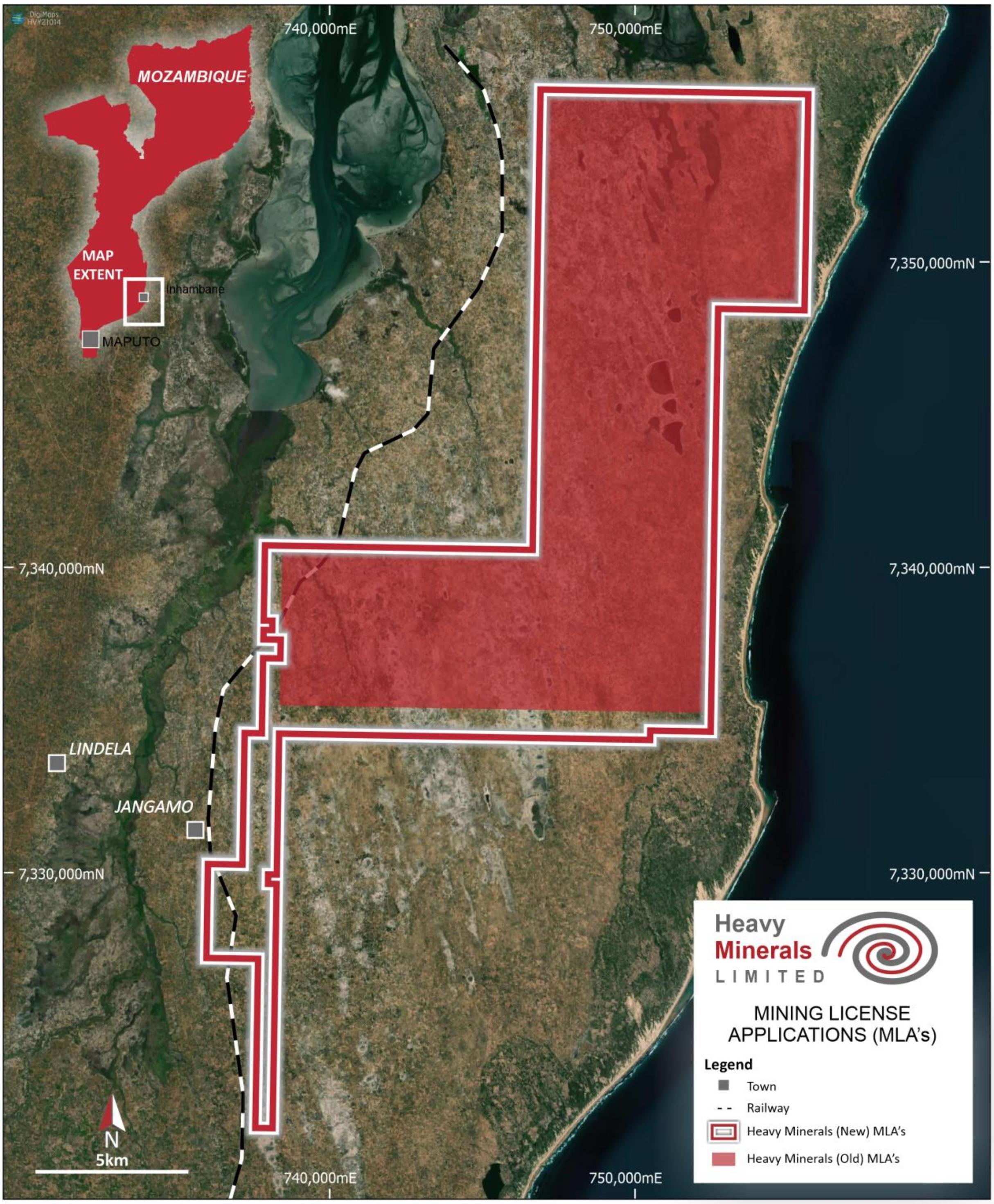

Figure 1: Mining Licence Application pre and post granting of additional ground

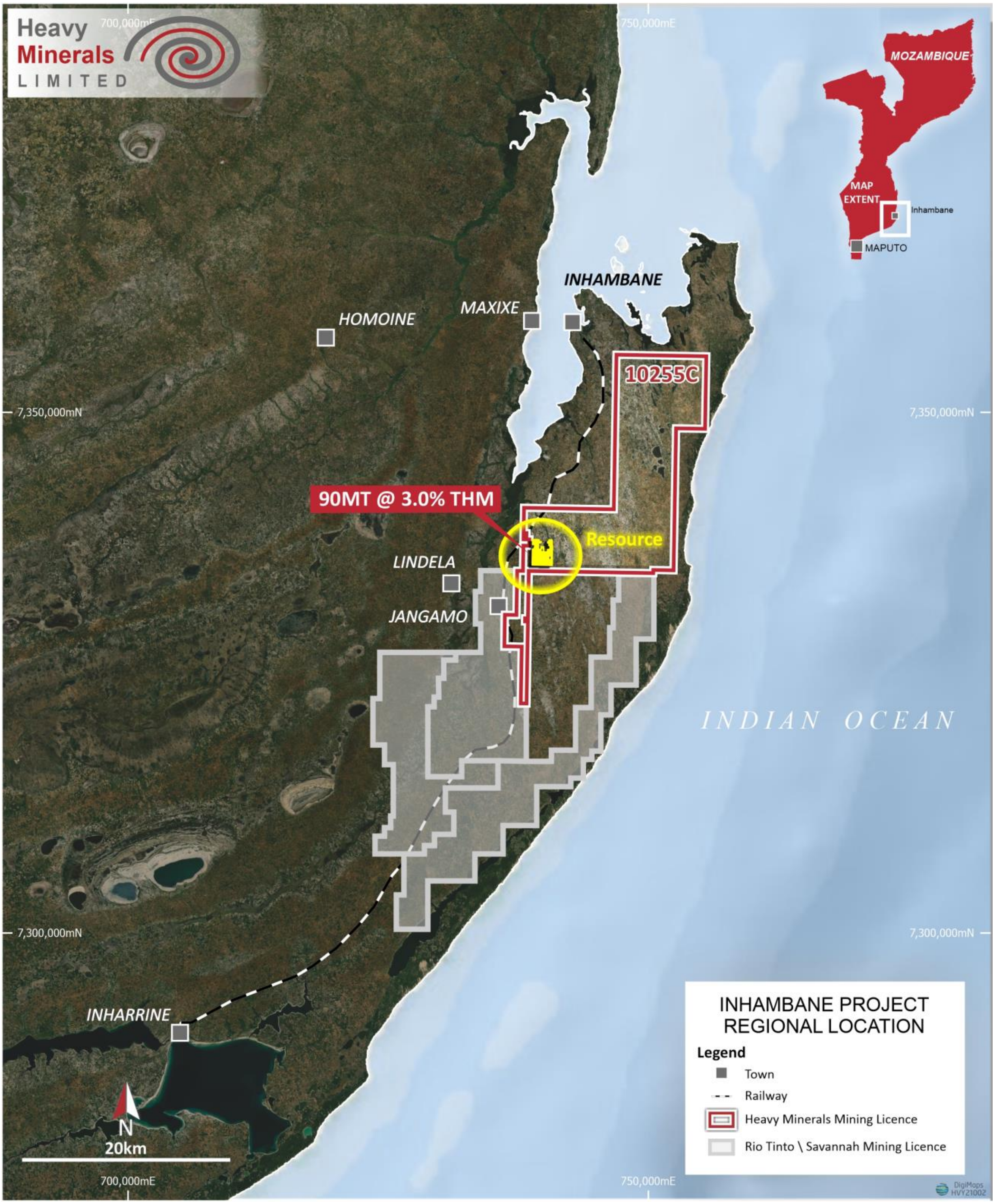

Figure 2: Updated mining license application – highlighting updated Inferred Mineral Resource outline

Heavy Mineral Sands Market:

Ilmenite and Zircon pricing has seen a significant uplift in the last 12 to 18 months with benchmark ilmenite pricing increasing 60% since October 2020, to US$350 per ton[1]. Zircon pricing has also seen benchmark pricing increases, with the Iluka Zircon price set at approximately US$1,500 per ton, effective 1st October 2021[2].

Existing Heavy Minerals suppliers including Iluka and Image Resources have described the market thematic as being one of excess demand. Iluka Resources Zircon "customers" are on an allocation basis with multiple customers seeking volumes exceeding their allocation[4].

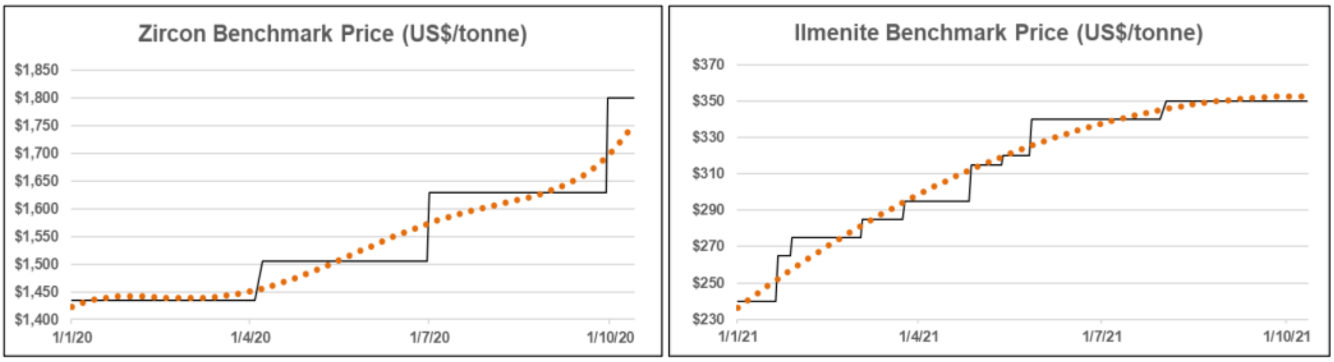

Figure 3: Source: Image Resources ASX release 27/10/2021

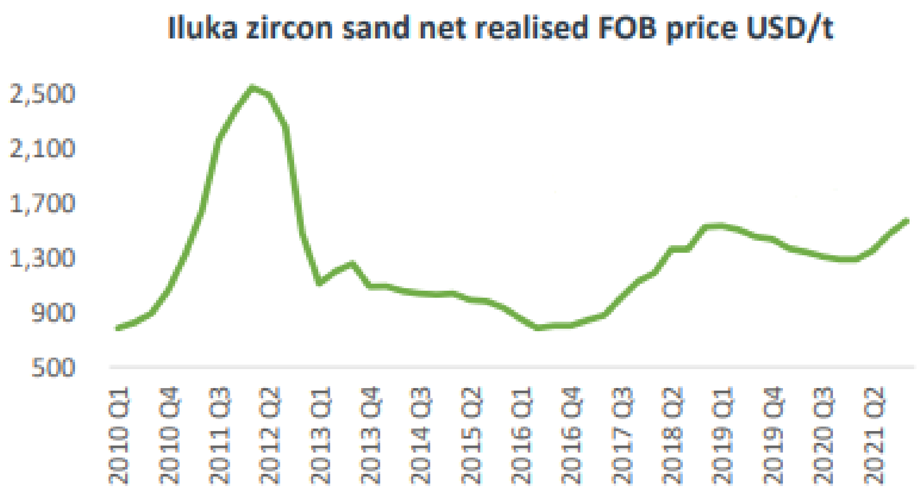

Figure 4: Source: Iluka Presentation to 22nd Annual Mineral Sands Conference 16/11/2021

Summary Mineral Resource Estimate:

LOCATION AND HISTORY

HVY currently has the rights to a mineral sand concession in southern Mozambique called Inhambane. The Inhambane project is located on a mining license application adjacent to and immediately to the north of two mineral leases held by Rio Tinto (Figure 2).

The Inhambane Project is located in the South of Inhambane Province. The tenement lies across the borders of the Inhambane and Jangamo districts.

In 2013 HVY partnered with a Mozambican Company +258 LDA to secure the Inhambane project and HVY currently owns 70% of +258 LDA which in turn owns 100% of the tenement.

The original tenure was an exploration license, 4658L (197.57 km^2). This licence was reduced to 193.81 km^2 by the Department of Mines in Mozambique to meet statutory requirements. A mining concession (10255C) was applied for in 2020 which covers an area of 183.55 km^2. In 2021 an extension to this mining concession was applied for and granted, adding an additional 30.34 km^2 to the concession. The current mining concession applied for is 213.89 km^2.

HVY conducted due diligence on the tenement in early 2014 and followed up with a successful Aircore drilling and assay program which delivered a resource in early 2015.

This resource estimation work represents the maiden resource for the Inhambane Project.

GEOLOGY

The Inhambane province is part of the coastal region of southern Mozambique which forms part of the Mozambique basin, which is up to 400 km wide, with an onshore area of about 270 000 km^2 and a long axis of about 1200 km (Förster 1975; Matthews et al., 2001).

The bulk of the titanium and zircon sand mineralisation are associated with at least 160 m of older marine-intertidal-aeolian sediments that include three generations of stable older palaeodunes (D1, D2 and D3) which occur inland of the coastline and overlie a package of marine-intertidal sediments (Porter, 2016). These units are variously distributed throughout the project area in varying thickness and occurrence.

Unit D3 is the most important in terms of economic geology, with an average of 3.3% Total HM and low slime content (average of <5%), making it potentially amenable to low-cost mining methods such as dozer trap or dredging. These are overlain by the contemporary aeolian D4 unit and alluvial material (Porter, 2016).

The better heavy sand mineralisation at Mutamba occurs within the three main zones of Jangamo, Dongane and Ravene, all of which have relatively similar mineralisation characteristics. The combined ilmenite, rutile and zircon economic HM content is 60 to 80% THM, with the bulk of the mineralisation hosted by the D2, D3 and Fluvial units. The THM grain-size distribution for Mutamba has a range 90 to 210 µm, with 50% of HM grains >142 µm. The overall slime content for Mutamba is 7.1% and typically comprises kaolinite and illite, with lesser amounts of smectite, chlorite and mica.

The tenement is located over a seaward dune system trending towards a landward dune system. These Dune systems are separated by a drainage line with associated lakes and swamps. The Rio Tinto dune system lies within the seaward dune system. Both dune systems host concentrations of minerals such as ilmenite, altered ilmenite, zircon and rutile. HVY has a focus on topographical based structures and as such has identified six initial target areas. The Quaternary formations in these areas consist mostly of alluvium deposits and sand dunes (coastal and inland).

INITIAL MINERAL RESOURCE ESTIMATE

The initial resource estimate and methodology used to generate the estimate for the Inhambane project can be found on HVY's website at the following link:

https://www.heavyminerals.com/technical-reports/

This estimate was prepared by Mr Greg Jones of GNJ Consulting Pty Ltd, who accepted the role of Competent Person for the estimate. Mr Jones classified the initial estimate of 51 Mt @ 3.4% THM as an Inferred Mineral Resource and is reported in accordance to the JORC Code (2012). The most recent report on this estimate is titled "Heavy Minerals Limited, Inhambane Mineral Resource Estimate, May 2021" and summarises the exploration results on which the estimate is based, describes how the estimate was prepared, and includes Sections 1 to 3 of JORC Code Table 1.

EXPLORATION ACTIVITIES

Drilling targeted an area close to the main access road with a high likelihood of success based on the proximity to Rio Tinto's project. Drill spacing and observed mineralisation support the Inferred Mineral Resource estimate.

A total of 41 holes were drilled for 1783 m. Aircore Drilling was carried out by Agua Terra (Mozambican based drilling company) using a truck mounted drill rig and NQ sized rods. Samples were obtained at 1.5 m intervals which generated about 8 kg of material that was split down to 1.5 - 2.5 kg using the cone splitter at the bottom of the sample cyclone.

The cyclone used for sampling was a Metzke Fixed Cone Splitter with Transition. Samples were subsequently split down to approximately 1 - 1.5 kg using cone and quartering. The smaller sub-samples were labelled and bagged for export to the primary laboratory for processing. Any wet or damp samples were allowed to dry prior to the splitting stage. A total of 1175 samples were taken of which 832 were submitted for assay representing approximately 71% of the total samples. Samples selected for assaying were then securely transported back to Australia for processing through Diamantina Laboratories in Perth.

Subsequent to heavy mineral float sink analysis, mineral assemblage composites were prepared based on geological interpretation and observations from logging and visual observation of heavy mineral sachets. A total of three mineral assemblage composites were prepared and submitted to ALS in Perth for QEMSCAN analysis.

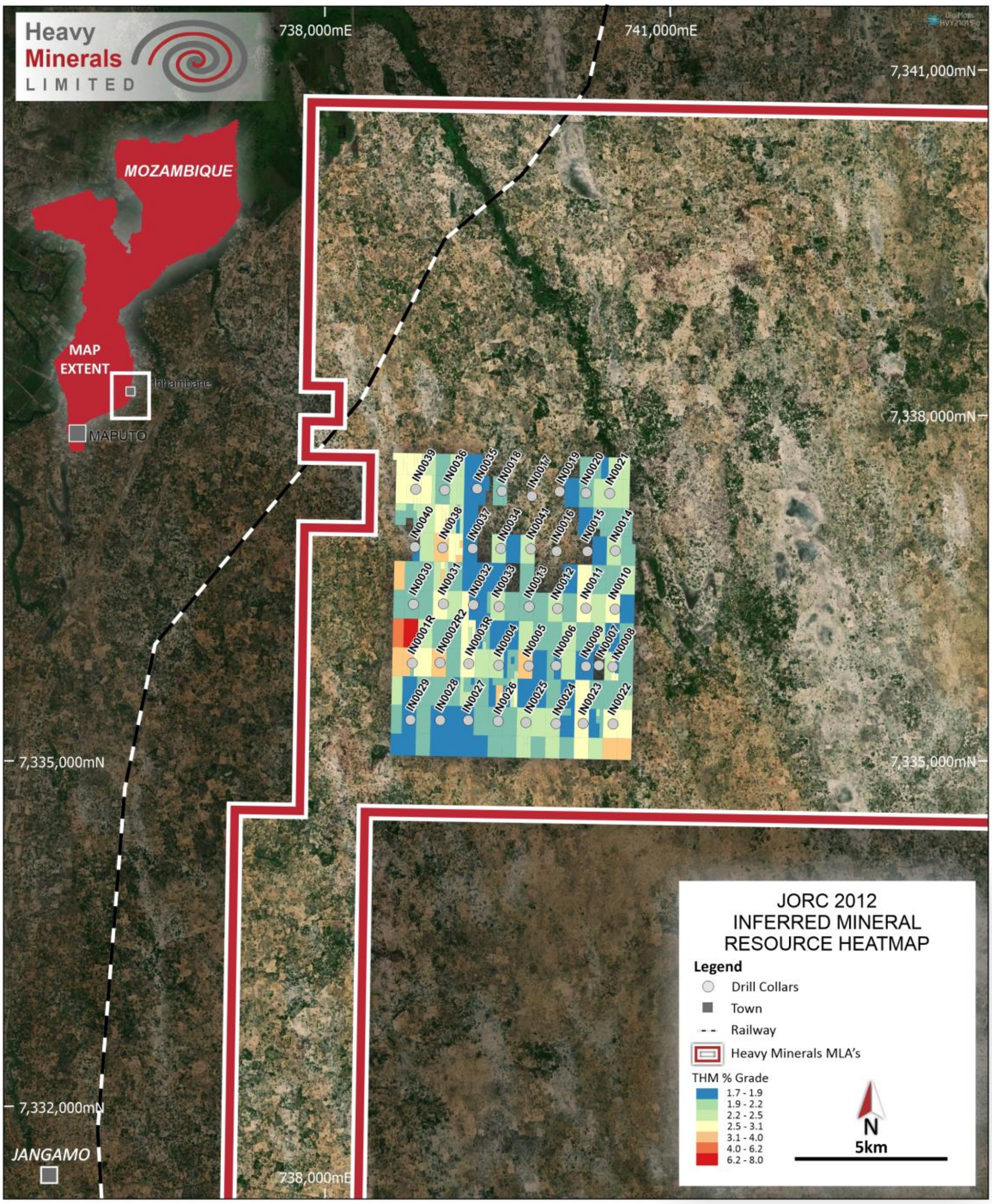

Figure 5: Drill Collars from 2014 drilling campaign and heat map showing THM as a weighted average above the 1.7% THM cut-off grade.

MINERAL ASSEMBLAGE COMPOSITES

Mineral assemblage composites are designed to test the mineralogical and chemical characteristics of the heavy mineral suite to enable meaningful economic evaluation to be undertaken for any given heavy mineral sand deposit. There are a wide range of techniques available ranging from grain point counting to QEMSCAN analysis and through to complex gravity, magnetic and electrostatic separation methods in order to mimic wet and dry separation plant performance.

Bulk sample composites were prepared by HVY with guidance from GNJ Consulting in order to create a preliminary mineralogical break down of the Inhambane deposit. These composites are generated by completing a geological and stratigraphic interpretation of the primary drill holes, down hole logging and assaying. Samples from domains with similar geological characteristics have been grouped together.

A total of 3 composite samples were created from HM sinks collected from the Inhambane project. To ensure that the composites were representative of each of the mineralised zones, each composite was made up of HM concentrates (sinks) weighted on the contributing HM grades, taken along and across strike within the deposit based on preliminary inspection and logging of HM sinks (sachet logging).

The composited samples were submitted to ALS Metallurgy (Perth) for QEMSCAN analysis. This procedure is discussed in the next section.

DESCRIPTION OF QUANTITATIVE MINERALOGICAL ANALYSIS (QEMSCAN)

QEMSCAN is the name for an integrated automated mineralogy and petrography solution providing quantitative analysis of minerals, rocks and man-made materials. QEMSCAN is an abbreviation standing for Quantitative Evaluation of Minerals by SCANning electron microscopy, and a registered trademark owned by FEI Company since 2009.

The samples that were submitted to ALS were riffle split to produce sub-samples of suitable size for making QEMSCAN polished sections. Each sub-sample was mixed with size-graded, high purity graphite to ensure particle separation and discourage density segregation. The sample-graphite mixtures were then set into moulds using a two-part epoxy resin, producing a representative sub-sample of randomly orientated particles. After curing, the resin blocks were cut back to expose a fresh surface and progressively ground and fine-polished. Passing QA/QC checks, the sections were carbon coated for electron beam conductivity and presented to the QEMSCAN for analysis.

The samples were analysed using QEMSCAN technology in PMA (Particle Mineral Analysis) mode. The scan was performed with a pixel spacing set at 5 µm. A random selection of particles for each sample was analysed.

A wide range of mineral characteristics are reported from the QEMSCAN analysis including mineral abundance on both a pixel and particle assignment, particle images, elemental deportment (on both a pixel and particle assignment) and calculated average grain and particle sizes.

It should be noted that QEMSCAN is only a preliminary mineralogical assessment technique and one of its limitations is an inability to predict final product characterisation and performance of wet and dry mineral separation performance. Therefore, it should be used in conjunction with other physical separation techniques in order to provide more valuable characterisation information.

SUMMARY OF MINERALOGY

The detailed mineral analysis by QEMSCAN analysis allows for important valuable heavy minerals such as ilmenite, zircon and rutile to be estimated as stand-alone mineral groups and also allows for a detailed breakdown of trash minerals which can be grouped into larger 'buckets' such as magnetic and non-magnetic other. Critical trash minerals can be identified such as chrome, monazite, kyanite and sillimanite and garnet as these can have particularly important impacts on the recovery of valuable heavy mineral species.

From the detailed QEMSCAN analysis we have created a summary mineral breakdown (Table 3) and used this to apply to the defined mineral composites that will be interpolated into the block model.

Table 3 Inhambane mineralogy summarised from the ALS QEMSCAN analysis

MACNUM	ILMA	ILM	RUTI	ZIRC	LEUC	KYASIL	CHRM	MONA	STAU	GARN	NMOTH[1]	MOTH[2]
IN-Z3-001	22.6	33.1	1.3	3.9	3.1	4.8	5.1	0.2	0.8	0.0	14.9	10.2
IN-Z5-001	34.3	31.7	1.8	5.3	3.9	2.8	5.3	0.4	0.6	0.0	8.7	5.2
IN-Z5-002	31.7	28.7	1.8	4.4	3.9	3.9	4.6	0.3	1.1	0.0	14.1	5.6

Notes:

1 refer to Table 4.3 for the definition of minerals included in non-magnetic others

2 refer to Table 4.3 for the definition of minerals included in magnetic others

The bulk samples are referred to as MACNUM (mineral assemblage composite number) in the resource model and associated files. The MACNUM field values are referenced by a prefix IN (for Inhambane) and are numbered based on domain (Z3 and Z5) and then sequentially.

All fields were checked for out of range values and a check of the sum of the assemblage to 100 per cent was also conducted.

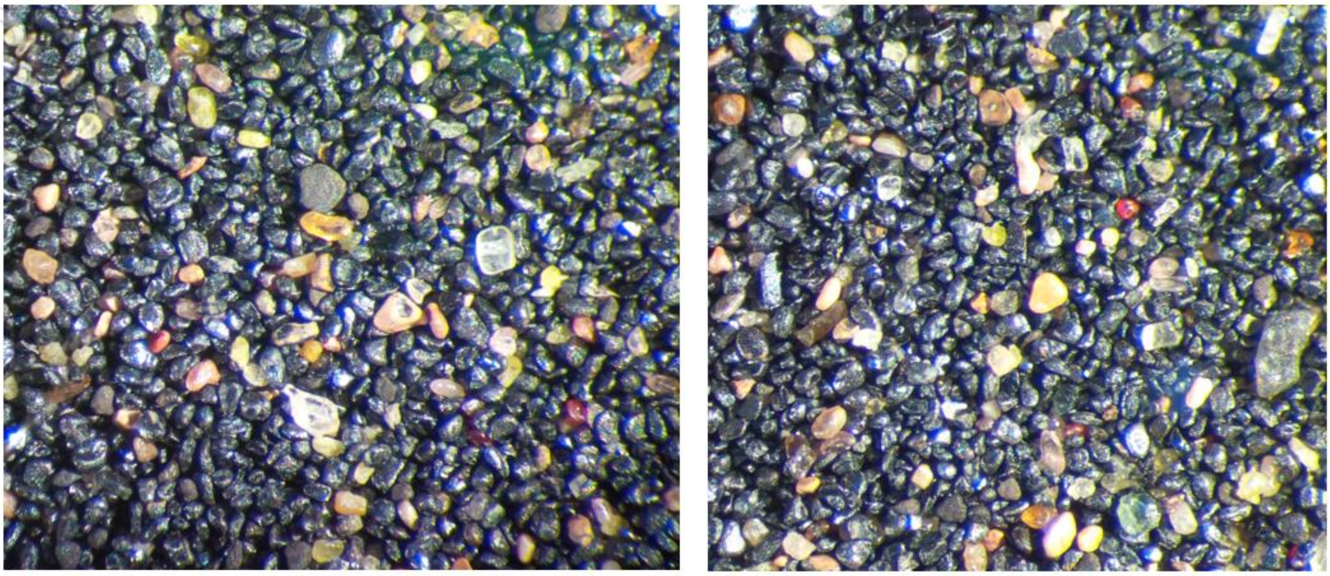

Figure 6 Photo-micrographs of IN-Z3-001 (left) and IN-Z5-001 (right) - approximately 2.5 - 3.0 cm field of view

Figure 6 shows composite samples under reflected light. The grains are well rounded and well sorted, indicative of a mature winnowing environment. Some ilmenite exhibits mild oxidation and the levels of trash mineral commensurate with the analysis from the QEMSCAN.

DATA ANALYSIS

From all the supplied data an MS Access database was created to store all information in a relational database. This included the development of duplicate and standard sample queries. A number of minor issues were observed and corrected, and these were traced back to some of the original logging capture process (and subsequently corrected).

Drill hole RL's were assumed as correct based on the DGPS survey pickup. Checking against topography was not considered accurate given that the original topography was based on SRTM data and has a limited and occasionally unreliable absolute accuracy.

The representivity of samples was checked by comparing the split weights of samples at the beginning and ending of each drill rod (effectively the 1st half versus the 2nd half of the rod).

The rate of submission of duplicate analysis for the Inhambane deposit was 1 in 40 for both laboratory and rig duplicates for a combined repeat ratio of 1 in 20. The laboratory was blind to the field duplicates and as part of their normal procedure, the laboratory duplicates were taken regardless of whether they fell on client samples or internal laboratory standards.

Overall, the duplicate lab and field samples showed good precision and lab and company standards that were submitted as part of the drill hole program QA/QC also returned values within the expected mean and calculated mean (within 2 standard deviations).

INTERPRETATION AND WIREFRAMING

It was identified early in the literature study and then confirmed during the drilling program that distinct lithological horizons could be identified in the project area. Dunal units dominate the bulk of the geology of the Inhambane area and are characterised by high elevation dunes and ferric oxide staining of the sand grains.

The dunal units are subdivided into three progressively younger and more mineralised units, two of which are marked distinct from the first, with higher SLIMES and generally as poorly mineralised. This unit overlies a hard clay dominated, intertidal unit and forms the shield onto which successive dunal units have been deposited. There also exist some fluvial deposited sand units forming distinct geographical outlines that mirror present-day drainage patterns.

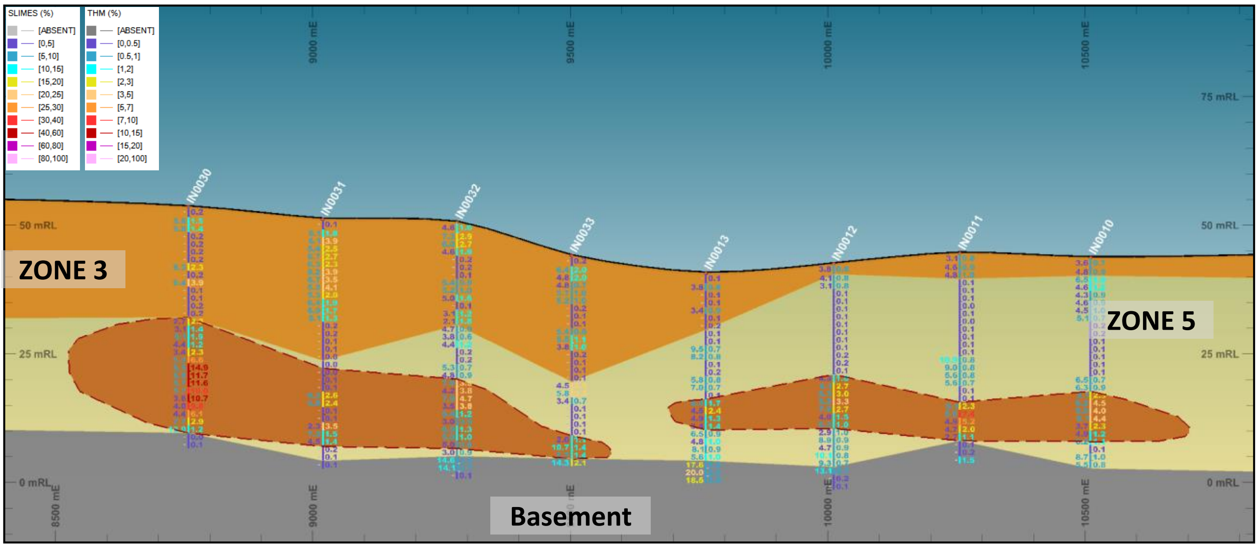

Figure 7 Section 7336344 mN showing the interpretation of the contact between ZONE 3 and ZONE 5 and basement (10 x Z-axis) (note that easting coordinates on this cross section are shown in a local grid. The definitions for this grid are described in the Mineral R

GEOLOGICAL AND GRADE MODELLING

Preparation of the geological grade model was based on a combination of coding model cells in drill holes inside closed wireframes solids, and below wireframe surfaces including geology and basement. Modelling convention has the largest parent cell size possible used which is generally based on half the distance between holes of the dominant drill hole spacing in the X and Y dimensions. Cell dimensions are generally used such to avoid the use of overly small cells that imply a level of refinement in the model that is not justified by the drill hole spacing.

The dominant drill grid spacing for the Inhambane deposit is 250 x 500 x 1.5 m. This would indicate parent cell dimensions in XYZ of 125 x 250 x 1.5 m and following testing with different cell sizes this was the parent cell size that was chosen for the final model. Given the early stage of exploration for the Inhambane project and the uncertainty in the accuracy of topography away from and in between drill holes, it was decided that a smaller sub cell breakdown was not warranted. Subsequent exploration and modelling exercises may be able to make better use of detailed topography surveys such as LiDAR.

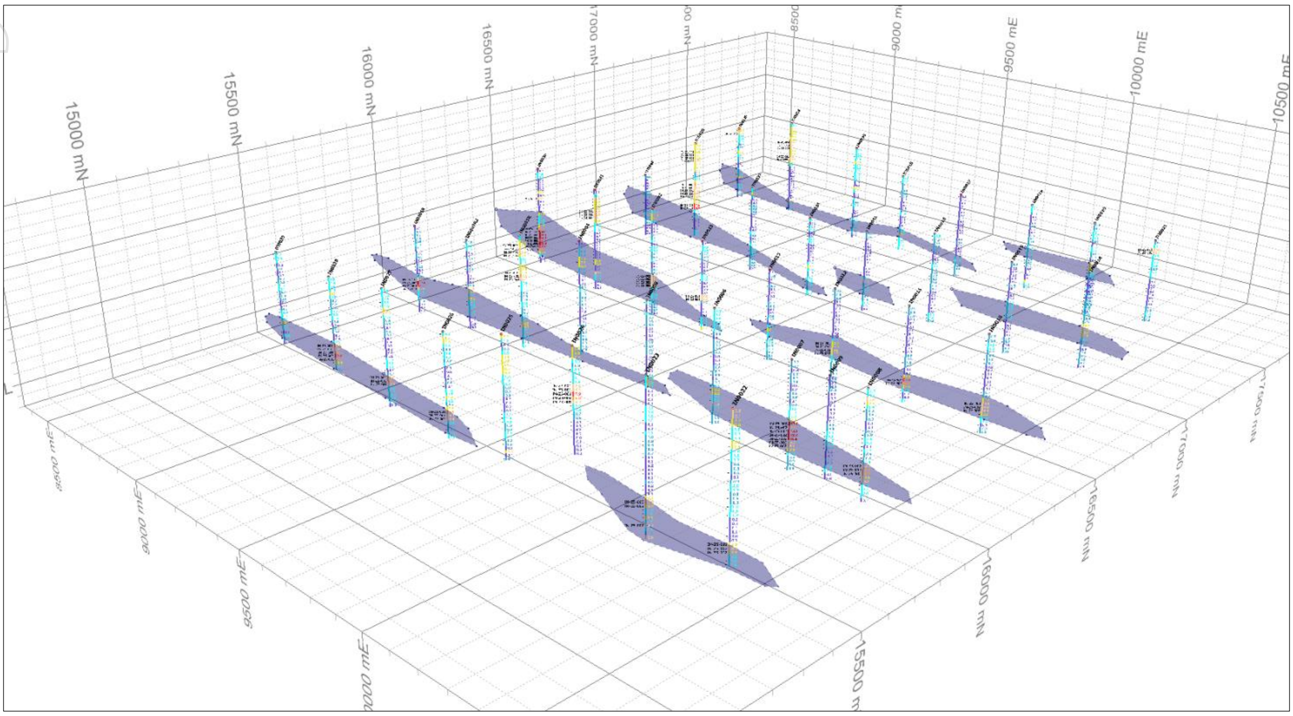

Figure 8 Generalised east and west strandline locations (looking north-west and presented in local grid)

Inverse distance cubed was used along with nearest neighbour to interpolate grades, logged indices and mineral assemblage composite id numbers into the block model. Experimental variograms were developed from the drilling, however were not used to define the search ellipses. Search ellipses were developed through a number of trial runs, testing the grade interpolation vs drill hole grades each time until a satisfactory distribution comparison was achieved. All drill holes (41 original holes) and assays (832 assays) were used for the geological interpretation and grade interpolation given that they were part of the original tenure under 4658L. To reduce the size of the resource to accommodate the change in tenure, the model has been trimmed and re-reported to honour the new boundary.

A dynamic ellipsoid modelling technique using dip, trend and plunge (from the digitised trends) strings to control the search ellipse orientation for sub zones within the model to account for variations in the dip, trend and plunge of mineralisation. This is a completely flexible routine and is very useful for wide, thin and extremely elongate strandlines particularly in mineral sands even when changes in dip, trend and plunge are very subtle.

The average bulk density was selected as 1.7 gcm^{-3}. This is an average bulk density applied across the entire resource estimate. It was selected based on the experience of the Competent Person, the average HM and SLIMES grades and given that the average bulk density of quartz sand is 1.6 gcm^{-3}.

MODEL VALIDATION

The volume model and drill hole file was validated on-screen against the geology and basement wireframes to ensure zone allocation had been correctly assigned. The volume model was validated to ensure that adequate resolution was obtained with the use of sub-cells.

On reviewing the grade interpolation there was no smearing of grades observed between zones, but minor smoothing of higher grades (from high drill hole grades to lower model grades) and lower grades (from low drill hole grades to higher model grades).

The model was interrogated to see if any cells were not estimated and whether cells were estimated in the first, second or third estimation pass as expected given the surrounding sampling density. To this end the search volume field flag, EST, was used to cross check the interpolation parameters. None of the domains remained un-estimated for drill assay primary grades.

Population distributions were calculated for the two critical assay fields; HM and SLIMES as both normal and log normal distributions. These populations were further isolated to hard coded ZONE unique values. Bend histograms were prepared for drill hole and model results for each domain and the key assay fields HM and SLIMES and were compared with acceptable representation of drill hole grades in the model. Swathe plots were prepared for comparison of key assay grades along the long axis of the interpreted strike of mineralisation. These showed an acceptable representation of drill hole grades into the block model.

The assignment of mineralogy was made by nearest neighbour to the block model constrained by domains as per the individual drill hole assays.

RESULTS

Consideration has been given to the reasonable prospects for eventual economic extraction for the Inhambane prospect. Factors such as current mineral sands prices, likely mining methodology, thickness of mineralised intervals, mineral recoveries and high-level costs for mining and processing have all been applied to the Mineral Resource at the nominated HM cut-off grade.

The classification of the Inhambane Mineral Resource estimate has been assigned an Inferred Mineral Resource category and is supported by criteria as follows:

- drill hole spacing;
- thickness and continuity of mineralisation;
- the quality of QA/QC sampling; and
- the distribution of mineral assemblage composites.

This is the maiden Mineral Resource estimate for the Inhambane project and is entirely in the Inferred category.

The drill spacing is currently wide spaced and geology and mineralisation continuity is only inferred at this stage. There are demonstrated and continuous layers of mineralisation within ZONE 5 which may be indicative of strandline development and preservation, however the wide spaced drilling does not allow for the confirmation of this. The potential uncertainty of this classification can be demonstrated by the one attempt at infill drilling which resulted in identifying a washout of mineralisation (which are rare, however can be encountered in marine strandline deposits).

The quality of QA/QC sampling was completed to a recommended industry standard and supports the selected Mineral Resource category. The inclusion of company blind standard samples and twin drilling would further enhance the QA/QC aspect and therefore confidence in the Mineral Resource estimate, however this has not been undertaken at this stage.

The sample support and distribution of mineral assemblage composites is to an adequate level of density to infer an overall global average of mineral assemblage. The current tonnage assignment to each mineral assemblage composite is well below what would be considered to be an adequate degree of resolution to infer a high level of confidence for monthly production rates. Despite the small number of composite samples those results do broadly infer a HM to trash mineral ratio that may be economically favourable across the area drilled.

In addition to all of the criteria discussed in this section there is also the consideration of the cut-off-grade used to report the Mineral Resource estimate. Cut-off grades and grade tonnage figures and discussion are presented Table 4.

The selection of the HM cut-off grade used for reporting was selected based on the following criteria:

- deposits within Mozambique and within comparable depositional settings and with similar to lower value mineralogy are utilising cut-off grades of approximately 1.3 to 2.9% THM;
- the grade tonnage curves show inflexion points at 1.5 and 2.5% THM, indicating a natural grade and tonnage break point.

A cut-off grade of 1.7% THM to account for the value of the VHM (valuable heavy mineral) content and to align with an average of inflexion points on the grade tonnage curves.

The Mineral Resource statement for the Inhambane deposit is presented in Table 4 below and the Mineral Resource outline is presented in Figure 2. This table conforms to guidelines set out in the JORC Code (2012) and is formatted for external reporting.

The Inhambane project comprises an Inferred Mineral Resource of 90 Mt @ 3.0% THM and 5% SLIMES containing 2.7 Mt of THM. The breakdown of the Mineral Resource category is as follows:

- an Inferred Resource of 90 Mt @ 3.0% THM and 5% SLIMES containing 2.7 Mt of THM with an assemblage of 60% ilmenite, 2% rutile, 5% zircon and 4% leucoxene.

Table 4 Mineral Resource Estimate at December 2021

MINERAL RESOURCE SUMMARY FOR INHAMBANE PROJECT AS AT DECEMBER 2021

Summary of Mineral Resources[1]						HM Assemblage[2]					
Mineral Resource Category	Material (Mt)	In Situ THM (Mt)	THM (%)	SL (%)	OS (%)	Altered Ilmenite (%)	Primary Ilmenite (%)	Rutile (%)	Leucoxene (HiTi) (%)	Zircon (%)	Others (%)
Inferred	90	2.7	3.0	5	0	29	31	2	4	5	29
Grand Total[3]	**90**	**2.7**	**3.0**	**5**	**0**	**29**	**31**	**2**	**4**	**5**	**29**

Notes:

(1) Mineral resources reported at a cut-off-grade of 1.7% THM.

(2) Mineral assemblage is reported as a percentage of in situ THM content.

(3) HVY has a 70% interest in the Inhambane heavy mineral sands project

The supporting criteria for the Mineral Resource classification is presented in Appendix 1 in alignment with the reporting requirements for Table 1 from the JORC Code (2012). The Mineral Resource figures presented in Table 1 are consistent with guidelines from the JORC Code (2012) with respect to reporting significant figures in addition to the experience of the Competent Person, Mr Greg Jones.

RECOMMENDATIONS

Recommendations for further work to improve or refine the Mineral Resource estimate for the Inhambane deposit have been identified for a number of areas.

The following points are recommended to be considered by HVY for follow-up action or attention:

- further develop QA/QC procedures to include twin drilling and internal company blind field standards for submission to laboratories for analysis;
- opportunities to test the presence of strandline style mineralisation within the interpreted marine/alluvial sequence which was not previously identified as an Exploration Target;
- consideration of the refining the mineralogical and quality characterisation test work for the deposit to determine the true potential saleability of ilmenite; and
- further extension of the resource which is still open in all directions, infill drilling for the Inhambane project and target testing at other identified sites in the project region.

This announcement has been authorised by the Board of Directors of the Company.

For further information, please contact:

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About Heavy Minerals Limited

Heavy Minerals Limited (ASX: HVY) is an Australian listed industrial mineral exploration company. The Company's projects are prospective for industrial minerals including but not limited to Garnet, Zircon, Rutile, and Ilmenite. The Company's primary focus is the Port Gregory Garnet Project in Australia which has an Exploration Target of between 3.5Mt and 4.5Mt contained Garnet.

To learn more please visit: www.heavyminerals.com

Competent Person Statement

The information in this announcement that relates to Exploration Targets is based on and fairly represents information and supporting documentation prepared by Mr. Greg Jones (FAusIMM) who is a Non-Executive Director of Heavy Minerals Limited. Mr. Jones is a Fellow of the Australasian Institute of Mining and Metallurgy and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity that is being reported on 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. Jones has reviewed this report and consents to the inclusion in the report of the matters in the form and context with which it appears.

The Mineral Resource estimates referred to in this announcement were first reported in accordance with ASX Listing Rule 5.7 in the Company's prospectus dated 27 July 2021 and released on the ASX market announcements platform on 10 September 2021. The JORC Mineral Resource report that supports this original Mineral Resource estimate is hosted on the company website at the following link:

https://www.heavyminerals.com/technical-reports/

The Company is releasing updated information that confirms an increase in the Mineral Resource estimate that was reported in the prospectus by way of changing the reporting THM cut-off grade and the expansion of tenure that increases the extent of the Mineral Resource to the south.

References

[1]Image Resources ASX release 18/10/2021
[2]Iluka Presentation to 22nd Annual Mineral Sands Conference 16/11/2021
[3]https://www.savannahresources.com/assets/mutamba-jangamo-project/
[4]Iluka Presentation to Macquarie Western Australia Forum 2021

Appendix 1: JORC Table 1

Section 1 Sampling Techniques and Data		
Criteria	**Explanation**	**Comment**
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (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.*	• *The deposit was sampled using Reverse Circulation Air-Core (RCAC), top drive rotary open hole.* • *An estimate was made of the approximate size of the samples expected based on the drilling interval, the size of the drill rod and the split taken from the drill rig sampling cyclone. The size of the split was in line with expectations.* • *RCAC drilling was used to obtain a 1.5 to 2 m samples from which approximately 1.2-2.5 kg was collected using a Metzke Fixed Cone Splitter with Transition. The sample was then split down to approximately 1 kg for transport back to Diamantina Laboratories in Perth, Australia for assaying. The sample was then dried, de-slimed (material less than 45 µm removed) and then oversize (material +2mm) was removed* • *Approximately 100 g of the resultant sample was then subjected to a heavy mineral (THM) float/sink technique using tetra-bromo-ethane (TBE: SG=2.92-2.96 gcm-3).* • *The resulting THM concentrate was then dried and weighed. Some of the THM concentrate samples were grouped together to form mineral assemblage composite samples.* • *These mineral assemblage composite samples then were subjected to QEMSCAN analysis.*
Drilling techniques	• *Drill type (e.g. 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).*	• *RCAC drilling accounts for 100 per cent of the total drilling. All holes were drilled vertical with no downhole surveying to confirm hole direction. The size of the drill rods used for the drilling program was NQ.*

Criteria	Explanation	Comment
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.*	• *Drill sample recovery was considered to be quite good with sample weights as expected (based on the size of the drill rods, sampling interval and split size). Ground conditions were dry to damp and considered ideal for air core drilling in sand. Heavy groundwater flow can adversely affect sand recovery and influence the preferential segregation of heavy mineral from quartz sand and clay.* • *Sampling on the drill rig was observed to ensure that the cyclone remained clean. The cyclone was washed at the end of each hole and cleaned with hammering or scraping as required.* • *The representivity of samples was checked by comparing the split weights of samples at the beginning and ending of each drill rod (effectively the 1st half versus the 2nd half of the rod). The original sample weights were not recorded, however cone and quartering was carried out on samples recovered from the cyclone, which were then weighed. The split samples therefore are representative of the original sample (considering the final split as an equal subset ratio of the original sample).* • *The sample weights were analysed for each of the positions within the drill rod* • *There is a very minor amount of bias between sample position 1 and sample position 2 however it does tend to switch backwards and forwards and the overall weight differential between the 2 sample positions is considered not significant enough to impact on sample representivity.*
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.*	• *HVY collected detailed qualitative logging of geological characteristics to allow a robust geological interpretation to be carried out.* • *Logging of RCAC samples recorded estimated slimes, washing, colour, lithology, dominant grainsize, coarsest grainsize, sorting, induration type, hardness, estimated rock and estimated THM.* • *All drill holes were logged in full and approximately 68 per cent of samples were assayed and used in the resource estimation exercise.*

Criteria	Explanation	Comment
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *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.*	• *No core samples were taken due to the unconsolidated nature of the material being drilled and sampled as well as the disaggregation process during air core drilling.* • *Samples were recovered from the cone splitter beneath the cyclone. Samples were then transported to a core yard where they were subsequently dried, cone and quartered to a smaller subsample more appropriate for transport back to Australia.* • *The final sample size was approximately 1 kg and considered to be appropriate compared with the grain size of the material being sampled.* • *Sample preparation is consistent with contemporary industry practices.* • *QA/QC in the form of laboratory and rig duplicates were used to monitor laboratory performance. Laboratory and rig duplicates were submitted at the rate of approximately 1 in 40 each for a combined submission rate of one in 20. The rig duplicates were collected from the sampling apparatus at the rate of approximately 1 every 40th interval sampled, given the next sample number in sequence, then submitted for assay. Separate duplicate samples were not collected during the cone and quartering after drying in Mozambique.* • *Analysis of sample duplicates was undertaken by standard geostatistical methodologies to test for bias and to ensure that sample splitting was representative. Assay results of samples and their field duplicates were compared and no systemic differences observed, implying that bias had not been introduced by the cone splitter.* • *Given that the grain size of the material being sampled is sand and approximately 70 to 300 µm, an approximate sample size of 1 kg is more than adequate.*
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks,*	• *Assaying was carried out at Diamantina laboratory in Perth, a laboratory that specialises in assay analysis for the mineral sand industry. Every 25th sample was duplicated in the laboratory and a laboratory standard was inserted at a rate of 1 in 40. THM was separated from light minerals by a sink/float process using TBE.* • *The sample analysis process produced the following assays:* • *- heavy mineral ('THM') > 45 µm, <2 mm, > 2.96 SG* • *- slime ('SL') < 45 µm* • *- oversize ('OS') > 2 mm* • *To maintain QA/QC, two duplicate assaying procedures were implemented.*

Criteria	Explanation	Comment
	duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.	• *Every 20th sample in the laboratory was split and both sub-samples processed through the entire assaying procedure.* • *Two samples were collected at the rig at every 40th sample and subjected to the complete assaying process. The laboratory was blind to these duplicates.* • *The THM mineralogy was determined by compositing THM concentrates (sinks) from the same geological domain or ore zones in order to obtain sufficient THM on which to conduct a mineralogical examination.* • *The mineralogy composites were selected based on the geological zones along and between lines of drilling. This resulted in 3 samples being taken across entire deposit. One from ZONE 3 and 2 from ZONE 5.* • *The heavy mineral from each sample was subjected to QEMSCAN analysis through the ALS laboratory in Perth.* • *All assaying for the Inhambane deposit was carried out by Diamantina Laboratories.* • *Duplicate samples were submitted however blind field standards were not submitted by HVY as part of the drilling program at the Inhambane deposit.*
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.*	• *All results were checked by the Competent Person* • *The Competent Person made periodic visits to the laboratory to observe sample processing* • *Verification of intersections was limited to checking for variance between logged estimates of grade and the assayed grades. No significant variances were identified that warranted any re-assay.* • *No holes were twinned during the drilling program.* • *Data collected by HVY was entered digitally in the field and uploaded to Microsoft Access and managed as a database.* • *Minor adjustments to assay data was made prior to model interpolation, including setting of absent data to half the value of assay threshold values. No obvious outliers were identified during data analysis.*
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.*	• *HVY surveyed drill holes by differential global positioning system ('DGPS').* • *The grid system used is the Moznet spheroid and the grid is UTM Zone 36 South). Modelling was conducted in a rotated local mine grid.* • *Topographic control was inadequate from available satellite tomography and so drill hole collars which had been surveyed in via DGPS were used instead.*

Criteria	Explanation	Comment
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.*	• *Based on the experience of the Competent Person the data spacing and distribution through the drill hole programs Is considered adequate for the assigned Mineral Resource classification. Holes were drilled at approximately 250 m across inferred strike of mineralisation and 500 m along strike.* • *No sample compositing or de-compositing has been applied. The majority of sampling was taken on 1.5 m intervals with a single 2 m interval from surface to aid the sample quarantine process for transport back to Australia.*
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.*	• *Sample orientation is vertical and approximately perpendicular to the dip and strike of the mineralisation resulting in true thickness estimates. Drilling and sampling is carried out on a regular rectangular grid that is broadly aligned to the strike of the orebody mineralisation.* • *No bias caused by orientation of drill holes anticipated from drilling vertical holes into a mineral sands deposit.*
Sample security	• *The measures are taken to ensure sample security.*	• *All samples are numbered, with samples split and residues stored along with THM sinks. Samples were collected from the cyclone on the drill rig and collected into numbered bags for transport back to the core yard for drying and sub splitting. Residual sample was retained on-site and the sub split sample for assay was re-bagged, sealed in packaging materials for transport back to Australia. The uppermost 2 m of each drill hole was bagged and transported in a separate batch to be processed through quarantine as per Australian International Quarantine Regulations for soil samples. This was done to minimise the cost of having approximately 1.6 tonnes of sample go through quarantine and a treatment process.* • *The samples that bypassed the quarantine process were transported directly to Diamantina Laboratories for checking in and subsequent assay. Quarantine samples were transported directly to Intertek for quarantine treatment and from there couriered to Diamantina for assaying.*
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• *There are no existing audits or reviews. This represents the maiden resource estimate for the Inhambane project.*

Section 2 Reporting of Exploration Results		
Criteria	**Explanation**	**Comment**
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.*	• *The resource lies within the granted exploration licence 4658L. Tenure is 100% owned by Mozambique Company +258 of which HVY owns 70%. Subsequent to drilling a mining concession was applied for, 10255C which covers an area of 183.55 km2. As a consequence of the change in tenure size and movement in tenure boundary the southernmost portion of the resource and one line of drilling was outside the current tenement. A subsequent re-application of tenure to has been made to amalgamate new vacant ground into the mining concession application and now that ground has been granted (still in application) there is an imperative to re-report the Mineral Resource estimate to its original area.* • *At the time of reporting all tenure was secure and any administrative costs or fees were fully paid up.*
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• *Previous tenement holders in the area, Rio Tinto, conducted hand auger drilling over the southern half of the 4658L tenement.*
Geology	• *Deposit type, geological setting and style of mineralisation.*	• *The deposit style is a combination of dunal and fluvial/marine sediments. Heavy mineral accumulations are preserved throughout the stratigraphic sequence.*
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* - *easting and northing of the drill hole collar* - *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* - *dip and azimuth of the hole* - *down hole length and interception depth* - *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Independent Geologist should clearly explain why this is the case.*	• *There are a number of drill holes that have a modest contribution to the overall THM tonnage of the deposit mineralisation (the top 25% of holes with contributions of length times THM grade are listed as follows:* • *IN0003R, IN0007, IN0022, IN0023, IN0026, IN0030, IN0031, IN0036, IN0038.* • *Other drill hole results contribute to the identification of the wide and thick zone of mineralisation via multiple intersections of drill holes. The composited drill hole listing is presented in Appendix 2.*

Criteria	Explanation	Comment
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• *No grade cutting was undertaken, nor compositing or aggregation of grades made prior or post the grade interpolation into the block model. Selection of the bottom basal contacts of the mineralised domains were made based on discrete logging and grade information collected and assayed by HVY.* • *Not applicable - all samples are 1.5 m long, except the first sample below ground surface which was 2 m long.* • *No metal equivalents were used for reporting of Mineral Resources.*
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	• *All drill holes are vertical and perpendicular to the dip and strike of mineralisation and therefore all interceptions are approximately true thickness.* • *Drill holes are inferred to intersect the mineralisation approximately perpendicularly.* • *The deposit style is flat-lying and so the vertical holes are assumed to intersect the true width of any mineralisation.*
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• *Refer to this release and the main body of report hosted at https://www.heavyminerals.com/technical-reports/*
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.*	• *Reporting of results is restricted to Mineral Resource estimates generated from geological and grade block modelling.* • *Composited drill hole intervals which were used to prepare the Mineral Resource estimate are presented in Appendix 2*

Criteria	Explanation	Comment
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.*	• *Samples of THM to be determined for mineral assemblage were created by compositing THM sink fractions from drill hole samples interpreted to have intersected the same geological horizon and mineralisation, and for which viewing of the THM sinks suggested similar assemblage grades.* • *Samples have not yet been tested for in situ density.*
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• *Further work via infill mineral assemblage composite sampling is recommended in order to further the confidence in the current Inferred Mineral Resource.* • *Exploration by geophysical and drilling is planned on other parts of the tenement.* • *Refer to this release and the main body of report hosted at https://www.heavyminerals.com/technical-reports/*

Section 3 Estimation and Reporting of Mineral Resources

Criteria	Explanation	Comment
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.*	• *The surveying, logging and assay data is stored in a Microsoft Access database.* • *The drill logs were recorded electronically at the rig for the HVY drilling program, and the hole locations recorded by hand-held GPS at the time of drilling.* • *Each field of the drill log database was verified against allowable entries and any keying errors corrected at the time by the logger.* • *At the completion of each hole, an entry was made to a hand-written drilling diary. The diary recorded the hole name, date, depth, number of samples, time of start and finish, a description of the location of the hole in relation to the last hole and other things. Such a diary provides valuable evidence if there is an error in hole naming or surveying.* • *Visual and statistical comparison was undertaken to check the validity of results.*

Criteria	Explanation	Comment
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• *No site visit was undertaken by the Competent Person during the modelling exercise as they are familiar with the deposit and style of mineralisation. Mr Paul Leandri supervised the drilling and sampling activities for the duration of the program and is a Member of the AIG and a Member of the AusIMM.*
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.*	• *The geological interpretation was undertaken by GNJ Consulting using all logging and sampling data and observations. The geological interpretation is inferred due to the wide spaced drilling, however the geological characteristics of the host units is consistent and traceable between holes both across and along the inferred strike of the mineralisation.* • *Interpretation of geological surfaces or domains to be used in block modelling were determined utilising THM sinks and geology logging.* • *Any alternative geological interpretations would necessitate a reassignment of mineral composite ID (for mineral assemblage testwork). These are carefully selected to align with discrete geological domains and a re-assignment of those domain boundaries would require new mineral composites to be assayed or for those composite ID's to be removed from the interpolation.* • *An alternative interpretation would entail preparing tighter mineralised envelopes in order to constrain grade above a certain cut-off. At this stage of the resource estimation confidence this is not considered a valid approach.* • *The Mineral Resource estimate was controlled by the geological / mineralised surfaces and beneath the topographic surface.* • *The Inhambane deposit sits within a number of dune and fluvial/marine depositional settings. A washout has been interpreted to have removed mineralisation in the area of drill hole IN0009 (which did not intersect mineralisation recorded from holes immediately to the east and west.*
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• *The Mineral Resource reported is within the portion of the Inhambane tenement drilled by HVY to date (10255C Mining Concession application), and extends for approximately 2.3 km long, 2 km wide and approximately 25 to 35 m thick on average. Mineralisation is present from surface over a large portion of the deposit, although should be qualified by saying that mineralisation above the 1.7% THM cut-off grade was only intersected in 9 holes. A total of 36 of the 41 holes drilled contained drill hole intercepts above cut-off grade. The average composite length per drill hole above the THM cut-off grade was 4.5 m with a*

Criteria	Explanation	Comment
		minimum of 1.5 m and a maximum of 21.5 m.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The 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 (eg 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.*	• *The Mineral Resource estimate was prepared using CAE Mining software (Datamine). Inverse distance weighting techniques were used to interpolate assay grades from drill hole samples into the block model and nearest neighbour techniques were used to interpolate index values and nonnumeric sample identification into the block model.* • *The regular dimensions of the drill grid and the anisotropy of the drilling and sampling grid allowed for the use of inverse distance methodologies as no de-clustering of samples was required.* • *Appropriate and industry standard search ellipses were used to search for data for the interpolation and suitable limitations on the number of samples and the impact of those samples was maintained. An inverse distance weighting to the power of 3 was used so as not to over smooth the grade interpolations.* • *Hard domain boundaries were used and these were defined by the geological surfaces that were interpreted, however a moving or dynamic search ellipse was used to account for variations in the dip, trend and plunge of mineralisation.* • *This was the maiden mineral resource estimate carried out for the Inhambane project.* • *No assumptions were made during the resource estimation as to the recovery of by-products.* • *All potentially deleterious elements were included as part of the mineral composite analysis and were included in the modelling report.* • *For the Inhambane deposit the average parent cell size used was approximately half that for the average drill hole spacing in the north-south and east-west directions (which was 500 x 250 x 1.5 m) and the same as the dominant sample spacing down hole. This resulted in a parent cell size of 250 x 125 x 1.5 m.* • *No assumptions were made regarding the modelling of selective mining units however it is assumed that a form of dry mining will be undertaken and the cell size and the sub cell splitting will allow for an appropriate dry mining ore reserve to be prepared. Any other mining methodology will be more than adequately catered for with the parent cell size that was selected for the modelling exercise for the deposit.*

Criteria	Explanation	Comment
	• *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.*	• *No assumptions were made about correlation between variables.* • *The Mineral Resource estimate was controlled to an extent by the geological / mineralisation and basement surfaces.* • *Grade cutting or capping was not used during the interpolation because of the regular nature of sample spacing and the fact that samples were not clustered nor wide spaced to an extent where elevated samples could have a deleterious impact on the resource estimation.* • *Sample distributions were reviewed and no extreme outliers were identified either high or low that necessitated any grade cutting or capping.* • *Validation of grade interpolations were done visually In CAE Studio (Datamine) software by loading model and drill hole files and annotating and colouring and using filtering to check for the appropriateness of interpolations.* • *Statistical distributions were prepared for model zones from both drill holes and the model to compare the effectiveness of the interpolation. Along strike distributions of section line averages (swath plots) for drill holes and models were also prepared for comparison purposes.*
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• *Tonnages were estimated an assumed dry basis. This is based on estimates for in situ bulk density for quartz sand (1.6 gcm^{-3}) and the contributions of weight from THM and SLIMES to a typical bulk density algorithm. A bulk density of 1.7 gcm^{-3} was selected and is consistent with other estimates used throughout the mineral sands industry.*
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• *Cut-off grades for THM were used to prepare the reported resource estimate. These cut-off grades were defined by GNJ Consulting as being conservative for typical comparative example deposits and mineralogy suites.*
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the*	• *No specific mining method is assumed other than potentially the use of dry mining via dozer trap. This allows for a moderately selective mining process while still maintaining bulk economies of scale. A minimum thickness was assumed for the reporting of the mineral resource as being 2 m for continuity of pits (less than 0.5% of the contained THM tonnes) and 90% of the THM tonnage is hosted by 8 m thickness or greater.* • *Given the thickness of the Inhambane prospect (average of 14 m) this is not considered to be an issue for dozer trap or any other contemporary dry mining technique. A lower cut-off grade would allow for more material to be mined, leading to thicker mining sequences and a lower stripping ratio.*

Criteria	Explanation	Comment
	mining assumptions made.	• *Reasonable mining and processing costs, mineral prices and mineral recoveries were considered for reasonable prospects of eventual economic extraction. These are detailed in the Mineral Resource report located at the following link:* *https://www.heavyminerals.com/technical-reports/*
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• *No metallurgical assumptions were used in the preparation of the Mineral Resource. All of the grade values of the mineral assemblage are considered to be within acceptable limits for economic exploitation.* • *For consideration of reasonable prospects of eventual economic extraction, a range of recoveries for mineral species was considered and these are detailed in the Mineral Resource report located at the following link:* *https://www.heavyminerals.com/technical-reports/*
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• *No assumptions have been made regarding possible waste and process residue however disposal of by-products such as SL, sand and oversize are normally part of capture and disposal back into the mining void for eventual rehabilitation. This also applies to mineral products recovered and waste products recovered from metallurgical processing of heavy mineral.*

Criteria	Explanation	Comment
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.*	• *A bulk density of 1.7 gcm^{-3} was selected and is consistent with other estimates used throughout the mineral sands industry. This was considered by the Competent Person to be a conservative approach.* • *No measurements of density of in situ materials have yet been acquired.* • *A bulk density of 1.7 gcm^{-3} was selected and is consistent with other estimates used throughout the mineral sands industry.*
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 resource classification for the Inhambane deposit was based on the following criteria: drill hole spacing; the quality of QA/QC processes; and the distribution of mineral assemblage composites. All the estimated mineralisation above the cut-off criterion has been classified as Inferred Resources because there is information to infer there is mineralisation of the tenor estimated, but that information is insufficient to ascribe a higher level of confidence to the estimates.* • *The classification of the Inferred Mineral Resources for the Inhambane deposit were supported by all of the criteria as noted above.* • *The Competent Person considers that the result appropriately reflects a reasonable view of the deposit categorisation.*
Audits or reviews.	• *The results of any audits or reviews of Mineral Resource estimates.*	• *No audits or reviews of the new Mineral Resource estimate for the Inhambane deposit has been undertaken at this point in time.*
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if*	• *There was no geostatistical process undertaken for the interpolation (such as variography or conditional simulation) during the resource estimation of the Inhambane deposit.*

Criteria	Explanation	Comment
	such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.	
	• *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.*	• *The broad spacing of drill holes and method of creating the resource model imply the estimates of Mineral Resources are global rather than local.*
	• *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• *There is no previous history of mining mineral sands with the tenement.*

Appendix 2: Inhambane Project - Drilling

Drill Hole Collars

HOLE_ID	EASTING (UTM zone 36S)	NORTHING (UTM zone 36S)	RL (m)	EOH (m)	DIP	AZIMUTH	LEASE	DATE	DRILL TYPE	DRILL SIZE
IN0001R	738759	7335849	42.0	41	-90	360	10255C	3/05/2014	AC	NQ
IN0002R2	739000	7335853	43.6	41	-90	360	10255C	3/05/2014	AC	NQ
IN0003R	739250	7335845	54.5	50	-90	360	10255C	1/05/2014	AC	NQ
IN0004	739511	7335830	61.6	48.5	-90	360	10255C	3/05/2014	AC	NQ
IN0005	739772	7335825	47.3	36.5	-90	360	10255C	3/05/2014	AC	NQ
IN0006	740009	7335827	53.2	47	-90	360	10255C	4/05/2014	AC	NQ
IN0007	740268	7335822	44.2	44	-90	360	10255C	4/05/2014	AC	NQ
IN0008	740502	7335818	43.9	44	-90	360	10255C	4/05/2014	AC	NQ
IN0009	740380	7335830	42.6	41	-90	360	10255C	4/05/2014	AC	NQ
IN0010	740521	7336318	42.7	41	-90	360	10255C	4/05/2014	AC	NQ
IN0011	740267	7336326	43.6	41	-90	360	10255C	5/05/2014	AC	NQ
IN0012	740022	7336324	41.5	44	-90	360	10255C	5/05/2014	AC	NQ
IN0013	739774	7336340	39.7	41	-90	360	10255C	5/05/2014	AC	NQ
IN0014	740523	7336825	46.7	41	-90	360	10255C	5/05/2014	AC	NQ
IN0015	740281	7336820	43.1	41	-90	360	10255C	5/05/2014	AC	NQ
IN0016	740014	7336822	46.2	41	-90	360	10255C	6/05/2014	AC	NQ
IN0017	739798	7337300	41.1	41	-90	360	10255C	6/05/2014	AC	NQ
IN0018	739539	7337344	40.8	38	-90	360	10255C	6/05/2014	AC	NQ
IN0019	740040	7337340	42.4	41	-90	360	10255C	7/05/2014	AC	NQ
IN0020	740269	7337327	41.9	44	-90	360	10255C	7/05/2014	AC	NQ
IN0021	740474	7337323	40.9	38	-90	360	10255C	7/05/2014	AC	NQ
IN0022	740503	7335321	61.1	56	-90	360	10255C	7/05/2014	AC	NQ
IN0023	740243	7335326	60.4	60.5	-90	360	10255C	7/05/2014	AC	NQ
IN0024	740009	7335324	60.7	41	-90	360	10255C	8/05/2014	AC	NQ
IN0025	739747	7335334	53.6	50	-90	360	10255C	8/05/2014	AC	NQ
IN0026	739505	7335345	44.1	44	-90	360	10255C	8/05/2014	AC	NQ
IN0027	739245	7335353	50.8	50	-90	360	10255C	8/05/2014	AC	NQ
IN0028	739002	7335354	46.5	41	-90	360	10255C	8/05/2014	AC	NQ
IN0029	738743	7335357	47.5	41	-90	360	10255C	9/05/2014	AC	NQ
IN0030	738769	7336361	52.6	47	-90	360	10255C	9/05/2014	AC	NQ
IN0031	739030	7336364	50.2	48.5	-90	360	10255C	9/05/2014	AC	NQ
IN0032	739291	7336356	49.6	50	-90	360	10255C	10/05/2014	AC	NQ
IN0033	739513	7336341	43.1	41	-90	360	10255C	10/05/2014	AC	NQ
IN0034	739528	7336845	36.5	38	-90	360	10255C	10/05/2014	AC	NQ
IN0035	739323	7337365	48.3	47	-90	360	10255C	10/05/2014	AC	NQ
IN0036	739041	7337353	54.0	47	-90	360	10255C	11/05/2014	AC	NQ
IN0037	739284	7336845	43.2	41	-90	360	10255C	11/05/2014	AC	NQ
IN0038	739023	7336853	57.4	47	-90	360	10255C	11/05/2014	AC	NQ
IN0039	738789	7337360	44.2	38	-90	360	10255C	11/05/2014	AC	NQ
IN0040	738781	7336862	34.1	32	-90	360	10255C	12/05/2014	AC	NQ

HOLE_ID	EASTING (UTM zone 36S)	NORTHING (UTM zone 36S)	RL (m)	EOH (m)	DIP	AZIMUTH	LEASE	DATE	DRILL TYPE	DRILL SIZE
IN0041	739756	7336838	38.0	38	-90	360	10255C	12/05/2014	AC	NQ

Heavy Minerals LIMITED

Significant Drill hole intersections >1.7% THM

HOLE_ID	EASTING (UTM zone 36S)	NORTHING (UTM zone 36S)	RL (m)	EOH (m)	DIP	AZIMUTH	FROM (m)	TO (m)	LENGTH (m)	THM (%)	SLIMES (%)	ZONE (%)
IN0001R	738759	7335849	43	41	-90	360	24.5	32.0	7.5	6.0	8	5
IN0002R2	739000	7335853	44.6	41	-90	360	21.5	24.5	3	3.1	8	5
IN0002R2	739000	7335853	44.6	41	-90	360	26.0	27.5	1.5	2.2	7	5
IN0003R	739250	7335845	55.5	50	-90	360	2.0	11.0	9	2.9	5	3
IN0003R	739250	7335845	55.5	50	-90	360	12.5	18.5	6	3.5	7	3
IN0003R	739250	7335845	55.5	50	-90	360	18.5	21.5	3	3.1	8	5
IN0003R	739250	7335845	55.5	50	-90	360	23.0	24.5	1.5	1.7	5	5
IN0003R	739250	7335845	55.5	50	-90	360	36.5	42.5	6	2.0	6	5
IN0004	739511	7335830	62.6	48.5	-90	360	6.5	11.0	4.5	2.2	4	3
IN0005	739772	7335825	48.3	36.5	-90	360	32.0	36.5	4.5	3.4	3	5
IN0006	740009	7335827	54.2	47	-90	360	0.0	3.5	3.5	1.9	5	3
IN0006	740009	7335827	54.2	47	-90	360	30.5	35.0	4.5	2.3	7	5
IN0006	740009	7335827	54.2	47	-90	360	38.0	39.5	1.5	3.4	4	5
IN0007	740268	7335822	45.2	44	-90	360	23.0	36.5	13.5	7.8	4	5
IN0008	740502	7335818	44.9	44	-90	360	3.5	6.5	3	2.7	6	5
IN0008	740502	7335818	44.9	44	-90	360	29.0	36.5	7.5	4.3	6	5
IN0010	740521	7336318	43.7	41	-90	360	3.5	5.0	1.5	2.0	7	5
IN0010	740521	7336318	43.7	41	-90	360	26.0	33.5	7.5	3.5	5	5
IN0011	740267	7336326	44.6	41	-90	360	29.0	35.0	6	4.2	5	5
IN0012	740022	7336324	42.5	44	-90	360	23.0	29.0	6	2.9	6	5
IN0013	739774	7336340	40.7	41	-90	360	24.5	27.5	3	2.1	5	5
IN0014	740523	7336825	47.7	41	-90	360	21.5	27.5	6	2.7	5	5
IN0018	739539	7337344	41.8	38	-90	360	29.0	30.5	1.5	2.0	6	5
IN0019	740040	7337340	43.4	41	-90	360	36.5	38.0	1.5	2.5	13	200
IN0020	740269	7337327	42.9	44	-90	360	5.0	6.5	1.5	1.7	5	5
IN0020	740269	7337327	42.9	44	-90	360	18.5	23.0	4.5	2.3	6	5
IN0021	740474	7337323	41.9	38	-90	360	3.5	6.5	3	3.4	7	5
IN0021	740474	7337323	41.9	38	-90	360	15.5	17.0	1.5	1.7	6	5
IN0022	740503	7335321	62.1	56	-90	360	0.0	8.0	8	2.9	3	3
IN0022	740503	7335321	62.1	56	-90	360	9.5	17.0	7.5	2.1	4	3
IN0022	740503	7335321	62.1	56	-90	360	33.5	35.0	1.5	1.8	5	5
IN0022	740503	7335321	62.1	56	-90	360	47.0	51.5	4.5	2.9	4	5
IN0023	740243	7335326	61.4	60.5	-90	360	44.0	48.5	4.5	3.7	4	5
IN0023	740243	7335326	61.4	60.5	-90	360	51.5	56.0	4.5	2.7	2	5
IN0023	740243	7335326	61.4	60.5	-90	360	59.0	60.5	1.5	3.6	7	5
IN0024	740009	7335324	61.7	41	-90	360	0.0	6.5	6.5	2.4	5	3
IN0024	740009	7335324	61.7	41	-90	360	14.0	23.0	9	4.6	3	3
IN0025	739747	7335334	54.6	50	-90	360	0.0	2.0	2	2.7	3	3
IN0025	739747	7335334	54.6	50	-90	360	8.0	15.5	7.5	2.7	4	3
IN0025	739747	7335334	54.6	50	-90	360	45.5	47.0	1.5	2.6	5	5
IN0026	739505	7335345	45.1	44	-90	360	2.0	5.0	3	2.8	4	3
IN0026	739505	7335345	45.1	44	-90	360	26.0	27.5	1.5	2.5	5	5
IN0026	739505	7335345	45.1	44	-90	360	30.5	36.5	6	4.2	4	5
IN0026	739505	7335345	45.1	44	-90	360	42.5	44.0	1.5	1.8	19	200

HOLE_ID	EASTING (UTM zone 36S)	NORTHING (UTM zone 36S)	RL (m)	EOH (m)	DIP	AZIMUTH	FROM (m)	TO (m)	LENGTH (m)	THM (%)	SLIMES (%)	ZONE (%)
IN0027	739245	7335353	51.8	50	-90	360	0.0	2.0	2	1.8	5	3
IN0027	739245	7335353	51.8	50	-90	360	3.5	6.5	3	1.9	7	3
IN0027	739245	7335353	51.8	50	-90	360	8.0	11.0	3	2.7	7	3
IN0027	739245	7335353	51.8	50	-90	360	36.5	41.0	4.5	5.2	4	5
IN0028	739002	7335354	47.5	41	-90	360	5.0	8.0	3	2.2	8	3
IN0028	739002	7335354	47.5	41	-90	360	27.5	38.0	10.5	4.9	6	5
IN0029	738743	7335357	48.5	41	-90	360	2.0	3.5	1.5	1.9	7	3
IN0029	738743	7335357	48.5	41	-90	360	30.5	32.0	1.5	2.4	5	5
IN0029	738743	7335357	48.5	41	-90	360	36.5	38.0	1.5	1.8	6	5
IN0030	738769	7336361	53.6	47	-90	360	11.0	12.5	1.5	2.3	6	3
IN0030	738769	7336361	53.6	47	-90	360	14.0	15.5	1.5	3.9	6	3
IN0030	738769	7336361	53.6	47	-90	360	21.5	23.0	1.5	2.3	3	5
IN0030	738769	7336361	53.6	47	-90	360	24.5	26.0	1.5	1.9	5	5
IN0030	738769	7336361	53.6	47	-90	360	27.5	42.5	15	8.7	5	5
IN0031	739030	7336364	51.2	48.5	-90	360	2.0	18.5	16.5	2.8	6	3
IN0031	739030	7336364	51.2	48.5	-90	360	33.5	36.5	3	2.5	6	5
IN0031	739030	7336364	51.2	48.5	-90	360	39.5	41.0	1.5	3.5	2	5
IN0032	739291	7336356	50.6	50	-90	360	2.0	6.5	4.5	2.5	6	3
IN0032	739291	7336356	50.6	50	-90	360	18.5	20.0	1.5	1.8	2	3
IN0032	739291	7336356	50.6	50	-90	360	30.5	36.5	6	4.0	6	5
IN0033	739513	7336341	44.1	41	-90	360	2.0	5.0	3	2.0	6	3
IN0033	739513	7336341	44.1	41	-90	360	24.5	27.5	3	3.4	5	5
IN0033	739513	7336341	44.1	41	-90	360	39.5	41.0	1.5	2.1	14	200
IN0034	739528	7336845	37.5	38	-90	360	23.0	24.5	1.5	2.7	4	5
IN0035	739323	7337365	49.3	47	-90	360	0.0	2.0	2	2.0	5	3
IN0035	739323	7337365	49.3	47	-90	360	5.0	8.0	3	1.9	4	3
IN0035	739323	7337365	49.3	47	-90	360	20.0	21.5	1.5	2.3	5	5
IN0036	739041	7337353	55	47	-90	360	0.0	21.5	21.5	2.8	5	3
IN0036	739041	7337353	55	47	-90	360	41.0	42.5	1.5	2.4	6	5
IN0037	739284	7336845	44.2	41	-90	360	2.0	3.5	1.5	2.2	4	3
IN0037	739284	7336845	44.2	41	-90	360	27.5	29.0	1.5	2.0	5	5
IN0038	739023	7336853	58.4	47	-90	360	0.0	14.0	14	2.7	5	3
IN0038	739023	7336853	58.4	47	-90	360	18.5	33.5	15	4.7	3	3
IN0039	738789	7337360	45.2	38	-90	360	0.0	6.5	6.5	2.4	5	3
IN0039	738789	7337360	45.2	38	-90	360	11.0	14.0	3	2.1	3	3
IN0039	738789	7337360	45.2	38	-90	360	26.0	27.5	1.5	2.0	4	5
IN0041	739756	7336838	39	38	-90	360	23.0	24.5	1.5	3.7	2	5