

ASX

ANNOUNCEMENT

23 October 2025

Cyclone metallurgical testwork shows improved recoveries

- A drilling program during 2024 produced 11 tonnes of bulk sample representative of the first 3 years of the Cyclone mine plan
- The bulk sample is being processed as part of an R&D Project testing recent mineral processing developments and innovations on Cyclone ore
- Wet Concentrator Plant (WCP) test work on an 8-tonne bulk sample is complete and mineral separation plant (MSP) testwork has commenced
- Significant improvements in recovery of heavy mineral (HM), ZrO_2 and TiO_2 have been achieved in the heavy mineral concentrate (HMC)
- Samples of HMC and final products will be provided to potential customers for evaluation
- **Project outcomes are expected to unlock shareholder value using new processing and product information for this Australian zircon-rich heavy mineral project.**

Emerging silica sands developer, Diatreme Resources Limited (ASX: DRX) provides an update to the market on metallurgical testwork being undertaken by Mineral Technologies (MT) on bulk samples from the zircon-rich heavy mineral sands Cyclone project.

The testwork and reporting is expected to be completed by end of November 2025, with the results to be used to design an improved flowsheet for processing the Cyclone ore into zircon and titanium dioxide products.

Diatreme's CEO, Neil McIntyre commented: *"This testwork is very positive, indicating the potential for higher than previously expected valuable mineral recoveries, while further advancing our understanding of the Cyclone project and preparing us for its development in the right market conditions."*

"With the focus on key critical minerals in the current environment, including Zircon and Titanium we are continually looking at innovative solutions to generate shareholder value from this zircon-rich project in the world-class Eucla Basin."



BULK SAMPLE

An 11-tonne bulk sample suitable for an intensive metallurgical testwork program was prepared from a drilling program at Cyclone during 2024 (refer ASX announcement 31 October 2024). Diatreme completed the drilling program to a plan that involved drilling 106 holes to obtain a total of 3,278 metres of NQ air-core sample.

Drilling occurred on four grid lines within the ore zone of the mine plan on a pattern to provide a bulk sample representative of the first three years of mining (refer Figure 5).

A representative subset of holes was separated out for various test work with the balance used to composite a primary bulk sample.

The primary purpose of this bulk sample project is to target higher mineral recoveries and efficient processing using the latest equipment developments and innovative processes. Laboratory characterisation and a chemical assay of the bulk sample (Table 1) have shown that the bulk sample grade (2.97% HM) is higher than the average Ore Reserve grade (2.6% HM).

HM	ZrO ₂	TiO ₂	Fe ₂ O ₃	SiO ₂	Al ₂ O ₃	P ₂ O ₅	CeO ₂
2.97%	0.79%	1.89%	0.67%	92.6%	1.94%	0.01%	0.01%

Table 1: Bulk sample chemical assay

The most recent change to the Probable Ore Reserve (Table 2) was reported in an ASX announcement on 15 June 2016 “Cyclone Study Reaffirms Project Profitability”.

Ore Reserve	HM % of ore	Zircon % of HM	Rutile % of HM	Leucoxene % of HM	HiTi % of HM	Altered Ilmenite % of HM	SiTiOx % of HM
138Mt	2.6%	28	3	7	23	13	22
Mineral % of ore		0.72	0.07	0.17	0.59	0.32	0.57

Table 2: Cyclone Probable Ore Reserve

Note: Diatreme is not aware of any new information or data that materially affects the Probable Ore Reserve estimate. All material assumptions and technical parameters underpinning the estimate continue to apply and any changes are not sufficient to materially affect the estimate. Diatreme confirms that the form and context in which the Competent Person’s findings are presented have not been materially modified from the original market announcement.

A three-tonne portion of the bulk sample has been sent to an interested party for independent evaluation and HMC product samples will be made available to potential customers for assessment. MT was engaged to undertake the metallurgical testwork at its Carrara, Queensland facility for this research and development project using eight tonnes of bulk sample.



The bulk sample was initially processed through a standard feed preparation circuit which included sample homogenisation, screening to remove oversize particles and desliming to remove very fine particles. The majority of the sample consisted of sand sized particles with a typical particle size between 53 microns and 3mm. This is the material that is processed at a range of operating settings to select equipment and operating parameters to design the WCP process flowsheet.

The proportion of material in each size range is:

- 90.9% sand particles for process testwork
- 4.57% coarse particles that are removed before processing
- 4.51% slimes that are removed during processing

The proportions of coarse and slimes that will report to the tailing stream is low, demonstrating that Cyclone ore has a desirable size distribution for mineral sand processing. The majority of valuable HM to be recovered has a particle size less than 500 microns with the average size being approximately 210 microns.

Coarse particles between 500 microns and 3mm are lighter waste mineral grains, predominantly silica, which are removed during processing using gravity separation and screening equipment.

A chemical assay of the sand portion of the bulk sample with particle size between 45 microns and 3mm was taken prior to commencing WCP testwork (Table 3).

ZrO ₂	TiO ₂	Fe ₂ O ₃	SiO ₂	Al ₂ O ₃	P ₂ O ₅	CeO ₂
0.82%	1.82%	0.64%	93.8%	1.33%	0.01%	0.01%

Table 3: Bulk sample (45micron - 3mm) chemical assay

The HM grades of the bulk sample and its sand portion were determined using heavy liquid separation:


- Total bulk sample grade (2.97% HM)
- Sand portion of WCP feed grade (3.53% HM)

Low grade material that is removed as oversize and slimes effectively increases the grade of the sand portion that is processed through the gravity concentration equipment.

WET CONCENTRATOR PLANT

Previous bulk sample testwork during 2011 and 2012 used MG6.3 spirals for primary and secondary rougher processing. This program involved testwork using the more recently developed MG12 spiral and the new compact CT1 spiral that operates at a higher slurry density than the larger diameter spirals.

The results of these tests demonstrated the MG 12 spiral had superior metallurgical performance and it was selected for processing the majority of the bulk sample. The MG12 spiral is particularly efficient at recovering zircon and achieved a recovery of 95% to the rougher concentrate.



The CT1 spiral was tested at standard settings and showed potential for practical advantages over the traditional spiral design, particularly for improving water efficiency and tailings densification. A portion of the bulk sample has been retained for additional R&D testwork on the CT1 spiral at a broader range of slurry densities and feed rates. An image of the MG12 and CT1 spirals used for the testwork is shown in Figure 1.



Figure 1: MG12 spiral foreground & CT1 spiral background (fully enclosed small diameter)

Two sub-samples of concentrate from the rougher spirals were screened, one at 1mm and the other at 425 microns. The undersize portions became feed for the cleaner spiral evaluation.

Both size ranges of cleaner feed were tested using MG12 and HG10i spirals to select the most suitable spiral for the cleaner stage. The HG10i spiral using -425 micron feed produced the best result for recovery versus yield and was selected for the first stage of the cleaner circuit. An image of the HG10i spiral during evaluation is shown in Figure 2.



Figure 2: HG10i spiral processing concentrate from the rougher spirals

Concentrate from the cleaner spirals was then tested in an up-current classifier (UCC) and was also tested using MG12 and HG10i spirals as options for the cleaner scavenger duty. The UCC produced a superior result and was used to process the cleaner spiral concentrate to produce a coarse underflow HMC product. The cleaner spiral tails and UCC fine overflow required additional finishing to improve the HM grade of both streams.

Testwork for the finisher stages to upgrade these streams included tests on the MG12 spiral, HG10i spiral, shaking table, and wet high intensity magnetic separator (WHIMS). Final equipment selections were MG12 spirals for the cleaner scavenger and UCC overflow cleaner, and two stages of shaking table for the UCC overflow cleaner scavenger.

Four process streams of concentrate were combined to produce the HMC product:

- Underflow from the UCC
- Concentrate from the UCC overflow cleaner (MG12 spiral)
- Two concentrate streams from the two stages of shaking tables.

The complete WCP metallurgical process that was developed from the testwork program is shown in Figure 3.

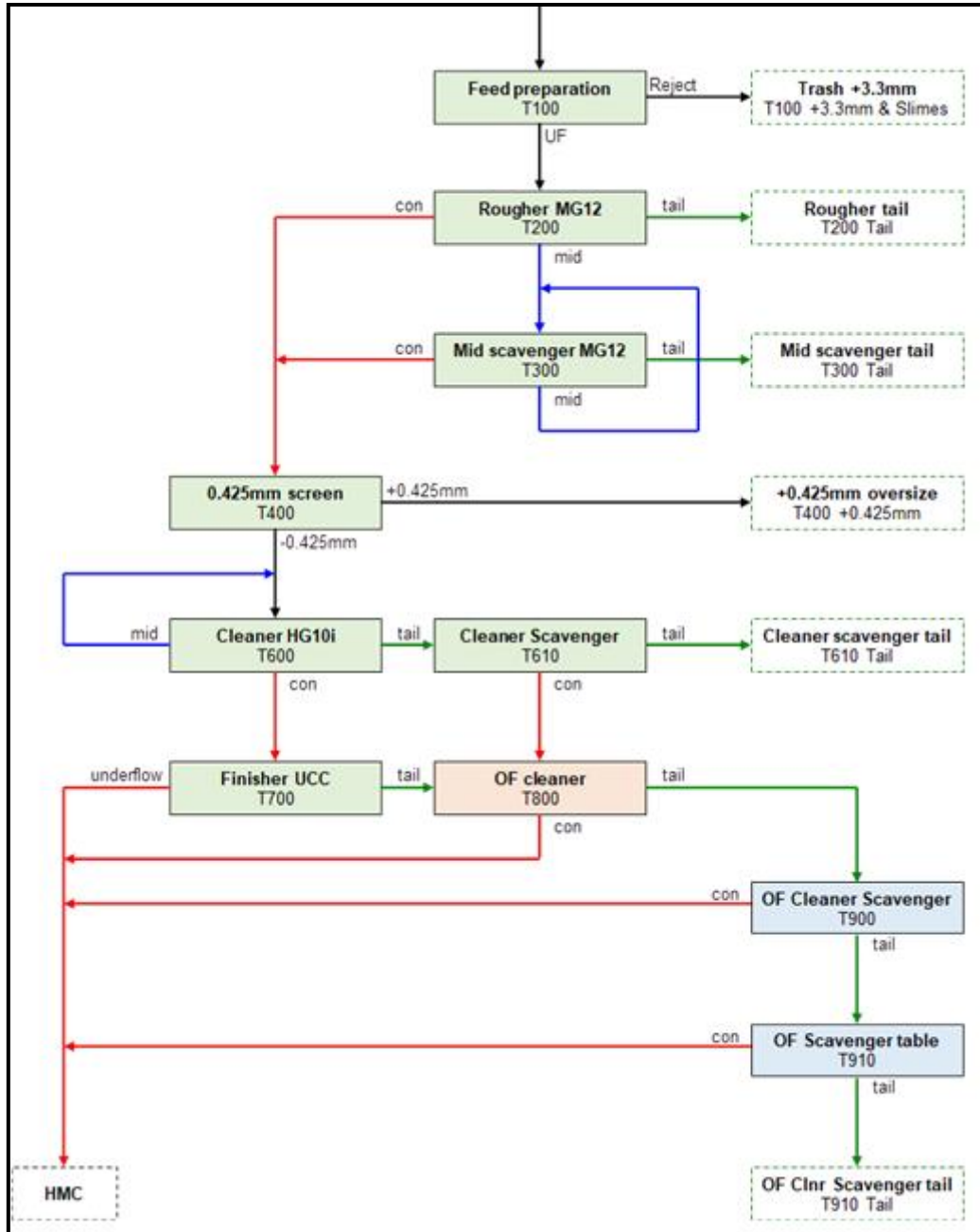


Figure 3: WCP metallurgical testwork flowsheet



HEAVY MINERAL CONCENTRATE

The quality of the HMC produced during this testwork achieved the goal of increasing recovery of valuable heavy minerals containing zirconium dioxide (ZrO_2) and titanium dioxide (TiO_2). This was achieved using different equipment, processes and settings to those used previously. The total HM recovery to HMC increased from 54.9% to 76.5%, ZrO_2 recovery increased from 82.0% to 88.2%, and TiO_2 recovery increased from 30.8% to 48.8%.

The magnitudes of these improvements are shown in Table 4, where the percentage improvement is shown relative to previous testwork in absolute terms, and also in relative terms.

RECOVERY	Previous Testwork (%)	Current Testwork (%)	Increase (absolute %)	Increase (relative %)
HM	54.9	76.5	21.6	39.3
ZrO_2	82.0	88.2	6.2	7.5
TiO_2	30.8	48.8	18	58.4

Table 4: Recovery of HM, ZrO_2 & TiO_2

The higher recoveries have resulted in an increase in the quantity of HMC produced relative to previous testwork, from 1.62% of the bulk sample to 2.69% of the bulk sample. Recovery of waste minerals also increased as expected. This additional waste will be rejected at the MSP and is a consequence of targeting higher recoveries of the valuable HM. The HM grade has been reduced from previous testwork (97.9%) to current testwork (90.8%).

The chemical assay of the main compounds in the HMC product is shown in Table 5.

ZrO_2	TiO_2	Fe_2O_3	SiO_2	Al_2O_3	Cr_2O_3	MgO	MnO	P_2O_5
27.2%	34.8%	7.39%	26.0%	1.49%	0.03%	0.10%	0.17%	0.12%

Table 5: HMC chemical assay

The HMC product assayed at 300ppm for combined radioactive elements (uranium + thorium) which aligns with previous testwork.

MINERAL SEPARATION PLANT

Testwork has commenced on the HMC product to optimise production of two final products, zircon and HiTi. The HiTi product will be a mix of five TiO_2 minerals that occur in the Cyclone ore: rutile, leucoxene, HiTi, altered ilmenite and siliceous tioxide.

Previous testwork produced two HiTi products, one containing 67% TiO_2 and the other containing a smaller quantity of 87% TiO_2 . This testwork is expected to produce a significantly higher quantity of a single HiTi product with a quality that will be a mix of the previous two products. This combined product has been demonstrated as suitable feed to the chloride process for production of TiO_2 pigment or for processing to target other end uses.



There is no set processing route to be followed for this MSP testwork due to R&D nature of the work. Processing will occur stage by stage with assays and hold points as necessary to determine the equipment and settings to be used for subsequent stages. The majority of the MSP processing is expected to use dry separation equipment including magnetic separation and electrostatic separation. Wet separation equipment is also likely to be required, particularly shaking tables, and possibly spirals and wet magnetic separation to remove silica and other highly siliceous minerals.

The MSP testwork is expected be completed this month, with the detailed metallurgical report available in November 2025. Diatrema continues to engage with potential project partners and investors concerning Cyclone, aiming to maximise shareholder value from this Australian critical mineral project.

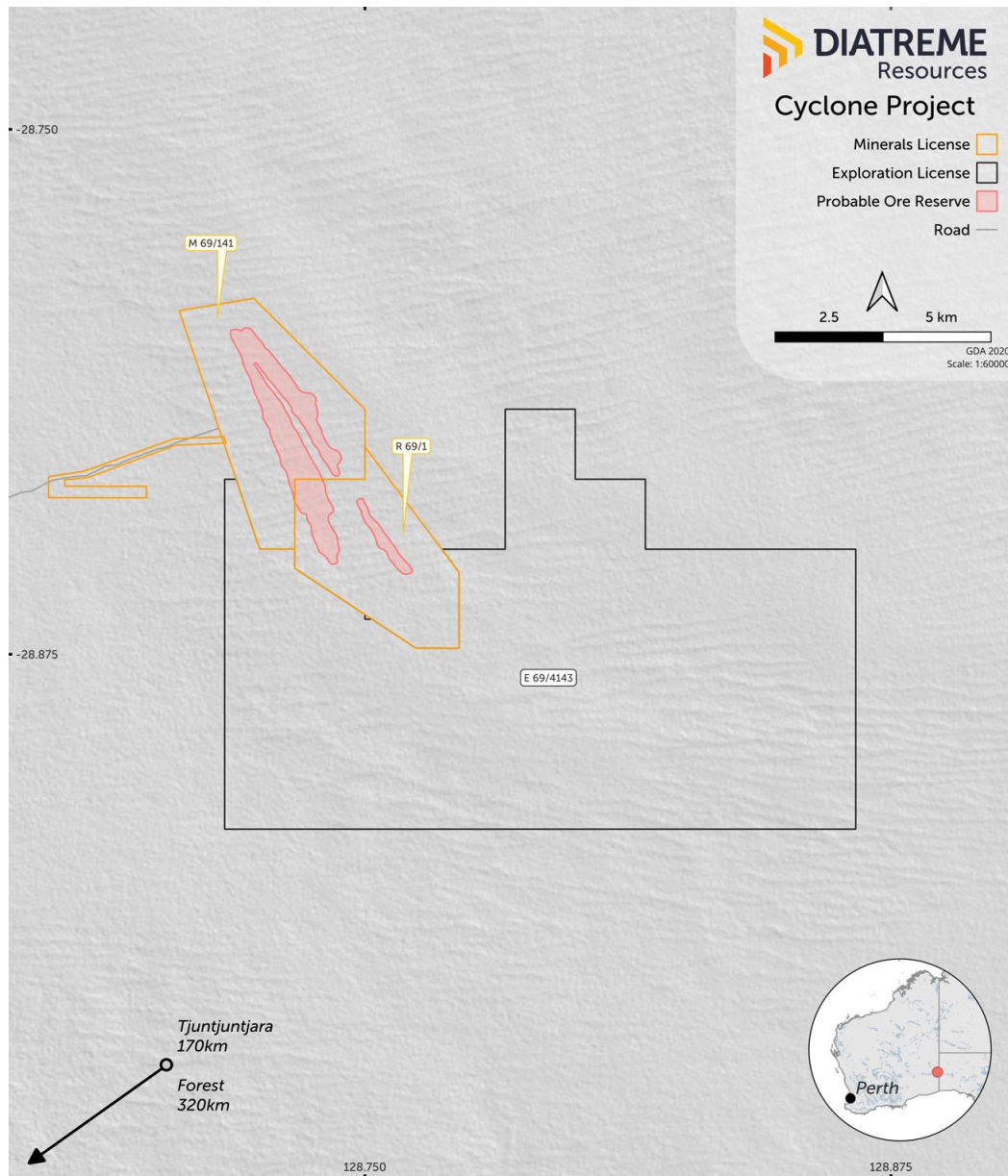



Figure 4: Cyclone Project location, WA


Bulk Sample Locations

Table 6: Drill Hole Collar Details


Hole ID	Easting	Northing	Elevation	Azimuth	Dip	Hole TD	Sample Roof	Sample Floor
WL24001	473871.8	6811090	335.442	0	-90°	39	23	37
WL24002	473897.7	6811094	335.68	0	-90°	38	23	36
WL24003	473918.4	6811104	334.96	0	-90°	38	20	37



Hole ID	Easting	Northing	Elevation	Azimuth	Dip	Hole TD	Sample Roof	Sample Floor
WL24004	473941.1	6811111	335.985	0	-90°	38	19	36
WL24005	473960.2	6811118	336.032	0	-90°	39	21	37
WL24006	473987.1	6811131	336.209	0	-90°	36	18	35
WL24007	474013.8	6811132	336.41	0	-90°	36	20	35
WL24008	474034.6	6811139	336.668	0	-90°	36	20	35
WL24009	474034.6	6811139	336.668	0	-90°	36	18	35
WL24010	474059.3	6811142	336.994	0	-90°	36	18	35
WL24011	474081.2	6811147	337.224	0	-90°	38	21	36
WL24012	474103.5	6811151	337.471	0	-90°	38	22	36
WL24013	474126.7	6811155	337.858	0	-90°	37	21	36
WL24014	474147.2	6811157	338.199	0	-90°	36	20	34
WL24015	474182.8	6811171	338.392	0	-90°	36	20	34
WL24016	474215	6811178	338.594	0	-90°	36	19	34
WL24017	474232.8	6811177	338.692	0	-90°	36	19	34
WL24018	473599.2	6811083	332.275	0	-90°	33	19	31
WL24019	473620.9	6811089	332.254	0	-90°	32	20	30
WL24020	473647.5	6811091	332.378	0	-90°	33	20	31
WL24021	473672.9	6811086	332.524	0	-90°	32	16	30
WL24022	473703.5	6811085	332.952	0	-90°	35	15	33
WL24023	473730.9	6811081	333.294	0	-90°	33	17	31
WL24024	473754.1	6811080	333.534	0	-90°	33	16	31
WL24025	473774.7	6811081	333.772	0	-90°	34	17	32
WL24026	473798.8	6811082	334.245	0	-90°	38	17	36
WL24027	473847.1	6811087	335.068	0	-90°	39	17	37
WL24028	474026.3	6811826	339.155	0	-90°	35	18	33
WL24029	473995.2	6811825	338.533	0	-90°	36	19	34
WL24030	473967.8	6811821	338.029	0	-90°	35	18	33
WL24031	473940.2	6811814	337.455	0	-90°	35	18	32
WL24032	473915.2	6811808	336.61	0	-90°	33	15	32
WL24033	473885.2	6811797	336.479	0	-90°	33	12	31
WL24034	473858.2	6811787	335.999	0	-90°	33	14	31
WL24035	473836.3	6811777	335.791	0	-90°	36	15	34
WL24036	473811.3	6811767	335.555	0	-90°	33	16	31
WL24037	473792.3	6811758	335.628	0	-90°	33	17	31
WL24038	473767.6	6811748	335.724	0	-90°	31	13	30
WL24039	473742.3	6811742	335.679	0	-90°	33	13	31
WL24040	473712.2	6811736	335.627	0	-90°	32	14	30



Hole ID	Easting	Northing	Elevation	Azimuth	Dip	Hole TD	Sample Roof	Sample Floor
WL24041	473688.4	6811730	335.5	0	-90°	32	14	30
WL24042	473661.6	6811723	335.374	0	-90°	31	14	30
WL24043	473633.8	6811725	334.904	0	-90°	32	14	30
WL24044	473610.4	6811725	334.458	0	-90°	32	15	31
WL24045	473586.8	6811729	333.791	0	-90°	31	15	29
WL24046	473560.6	6811732	333.1	0	-90°	30	14	28
WL24047	473529.9	6811740	332.023	0	-90°	30	14	29
WL24048	473503.3	6811746	331.09	0	-90°	30	13	28
WL24049	473494.1	6811744	331.396	0	-90°	30	14	29
WL24050	473459.8	6811747	330.689	0	-90°	30	15	28
WL24051	473434.8	6811745	330.226	0	-90°	29	14	28
WL24052	473409.4	6811744	330.287	0	-90°	29	16	27
WL24053	473386.3	6811739	330.504	0	-90°	29	17	27
WL24054	473335.7	6811731	329.891	0	-90°	33	19	30
WL24055	473302.3	6811854	326.853	0	-90°	28	17	27
WL24056	473369	6811854	327.914	0	-90°	27	17	26
WL24057	473415.7	6811857	328.561	0	-90°	31	14	29
WL24058	473450.5	6811868	328.928	0	-90°	27	13	25
WL24059	473480.1	6811882	329.247	0	-90°	27	14	25
WL24060	473507.3	6811895	329.492	0	-90°	27	15	24
WL24061	473539	6811917	329.8	0	-90°	26	13	24
WL24062	473562.2	6811930	331.011	0	-90°	27	13	25
WL24063	473573.4	6811952	330.217	0	-90°	26	12	25
WL24064	473591.1	6811969	330.53	0	-90°	27	13	25
WL24065	473607.6	6811980	330.773	0	-90°	26	10	24
WL24066	473632.9	6811996	331.229	0	-90°	27	10	25
WL24067	473652	6812010	331.577	0	-90°	27	10	25
WL24068	473672.7	6812024	332.127	0	-90°	28	10	27
WL24069	473691.2	6812033	332.587	0	-90°	30	9	27
WL24070	473714.5	6812042	333.074	0	-90°	30	6	28
WL24071	473734.9	6812050	333.499	0	-90°	21	7	19
WL24072	473760.8	6812047	334.2	0	-90°	22	10	20
WL24073	473784.7	6812041	334.878	0	-90°	21	10	19
WL24074	473808.6	6812034	335.274	0	-90°	21	8	20
WL24075	473831.3	6812026	335.602	0	-90°	21	11	19
WL24076	473882.6	6812030	335.86	0	-90°	20	12	19
WL24077	473515.7	6811421	331.893	0	-90°	30	13	29



Hole ID	Easting	Northing	Elevation	Azimuth	Dip	Hole TD	Sample Roof	Sample Floor
WL24078	473538.8	6811426	332.176	0	-90°	33	16	32
WL24079	473567	6811432	332.338	0	-90°	30	11	29
WL24080	473589.6	6811443	332.57	0	-90°	32	13	30
WL24081	473612.3	6811459	332.94	0	-90°	31	12	29
WL24082	473629	6811472	333.218	0	-90°	32	14	30
WL24083	473651.6	6811486	333.555	0	-90°	32	12	30
WL24084	473669.5	6811499	333.831	0	-90°	34	12	32
WL24085	473693.2	6811511	334.326	0	-90°	33	14	32
WL24086	473717.3	6811517	334.773	0	-90°	33	13	32
WL24087	473721.3	6811517	334.881	0	-90°	34	17	33
WL24088	473742.5	6811521	334.92	0	-90°	33	13	32
WL24089	473767	6811522	334.952	0	-90°	33	13	32
WL24090	473790.8	6811525	334.827	0	-90°	33	13	32
WL24091	473812.3	6811528	334.712	0	-90°	33	10	32
WL24092	473838.5	6811532	335.039	0	-90°	33	10	31
WL24093	473862.9	6811535	335.337	0	-90°	33	10	31
WL24094	473896.1	6811542	335.691	0	-90°	33	10	31
WL24095	473933.3	6811551	336.092	0	-90°	33	10	31
WL24096	473963.6	6811557	336.441	0	-90°	33	11	31
WL24097	474010.9	6811564	336.965	0	-90°	33	11	32
WL24098	474061	6811575	337.686	0	-90°	36	10	34
WL24099	474113.6	6811588	338.851	0	-90°	30	11	30
WL24100	473666.8	6811157	332.5	0	-90°	32	13	30
WL24101	473717.7	6811180	333.105	0	-90°	33	10	31
WL24102	473770.5	6811190	333.375	0	-90°	33	11	31
WL24103	473820.9	6811193	333.57	0	-90°	35	11	33
WL24104	473868.2	6811203	334.25	0	-90°	39	11	37
WL24105	473919.4	6811216	335.01	0	-90°	39	12	37
WL24106	473969.2	6811228	335.595	0	-90°	39	10	37



Figure 5: 2024 Completed and historical drilling, Cyclone Project

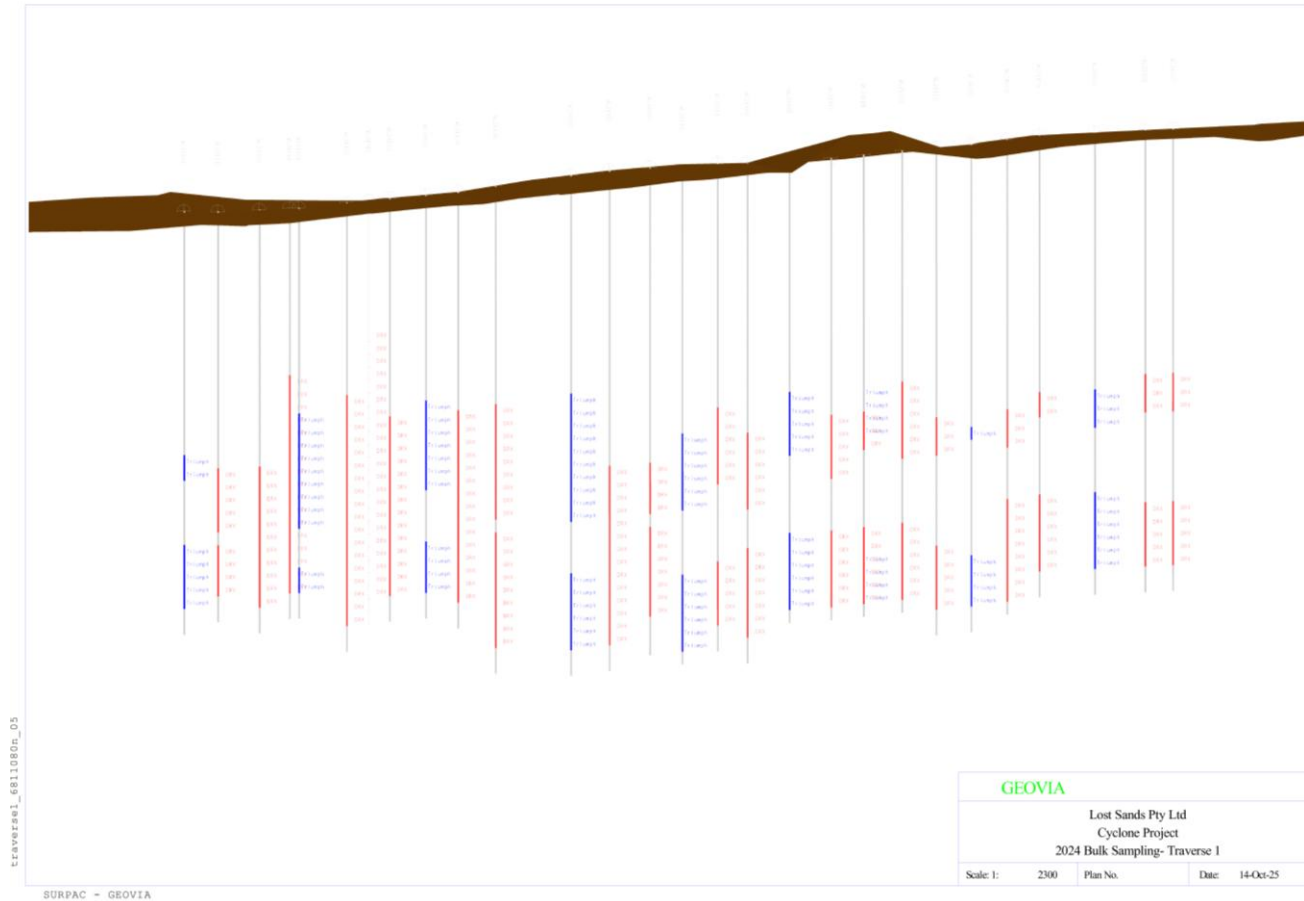


Figure 6: 2024 Bulk Sampling Traverse 1

Red Lines - MT bulk sample

Blue line - Third-party independent evaluation sample

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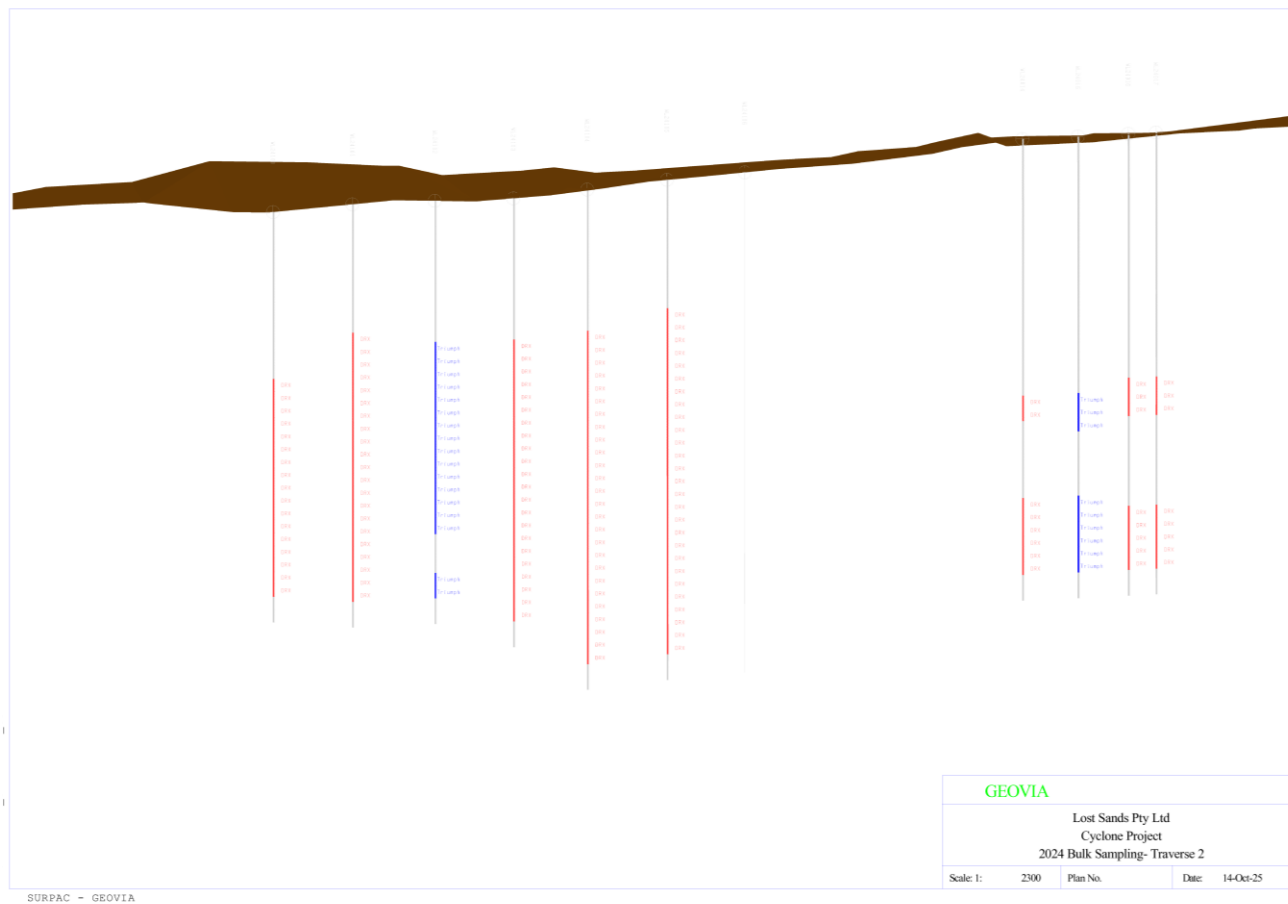


Figure 7: 2024 Bulk Sampling Traverse 2

Red Lines - MT bulk sample
Blue line - Third-party independent evaluation sample

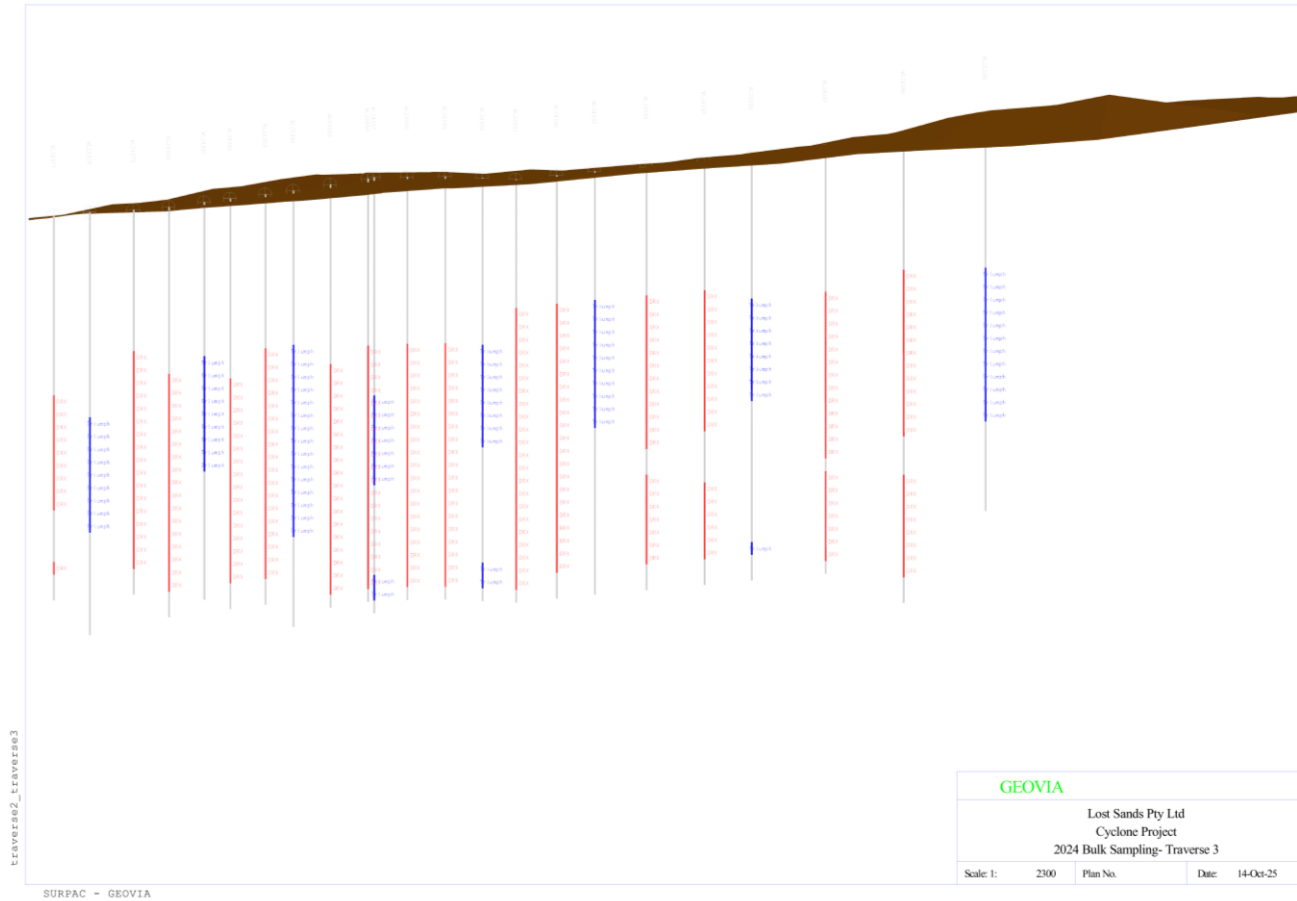


Figure 8: 2024 Bulk Sampling Traverse 3

Red Lines - MT bulk sample

Blue line - Third-party independent evaluation sample

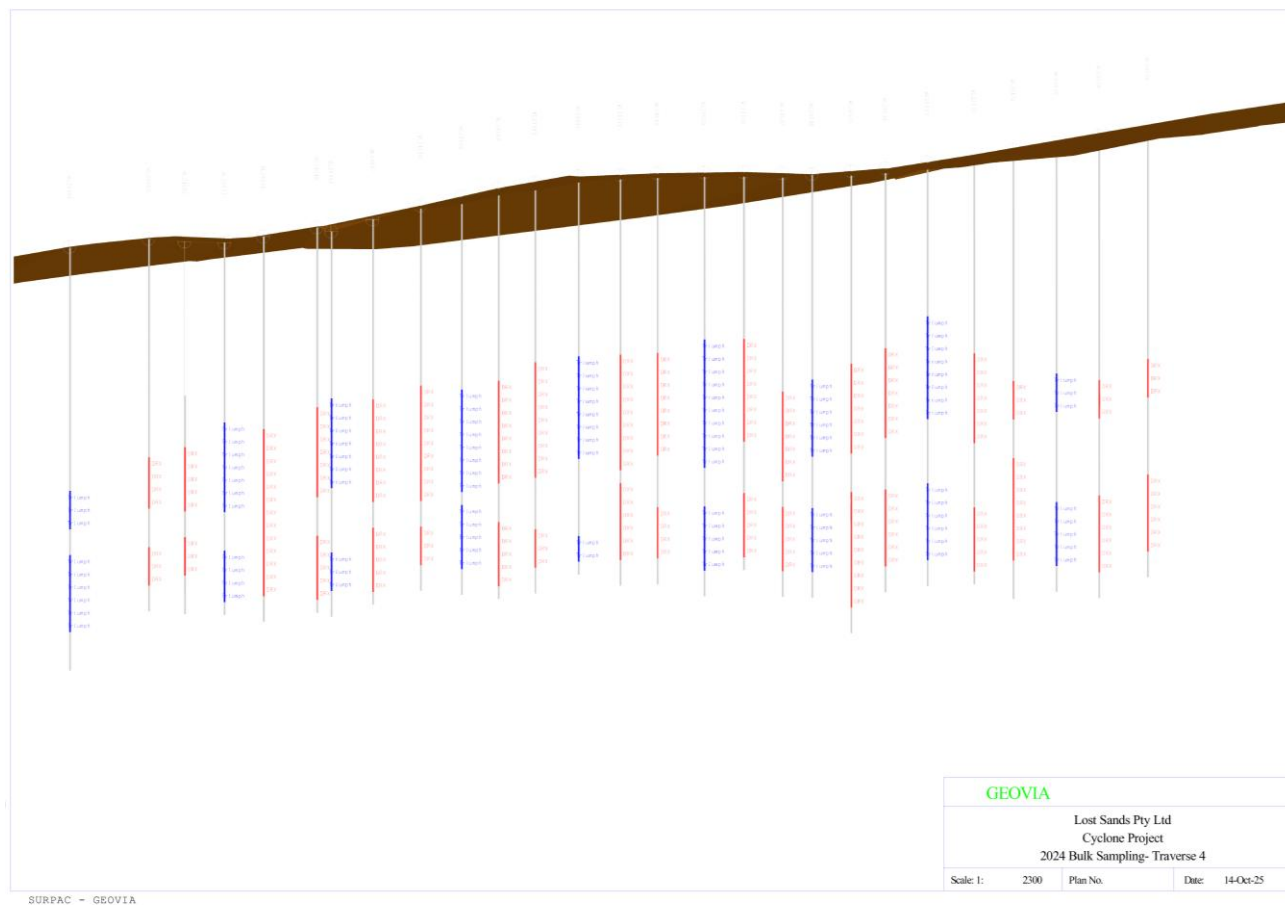


Figure 9: 2024 Bulk Sampling Traverse 4

Red Lines - MT bulk sample

Blue line - Third-party independent evaluation sample

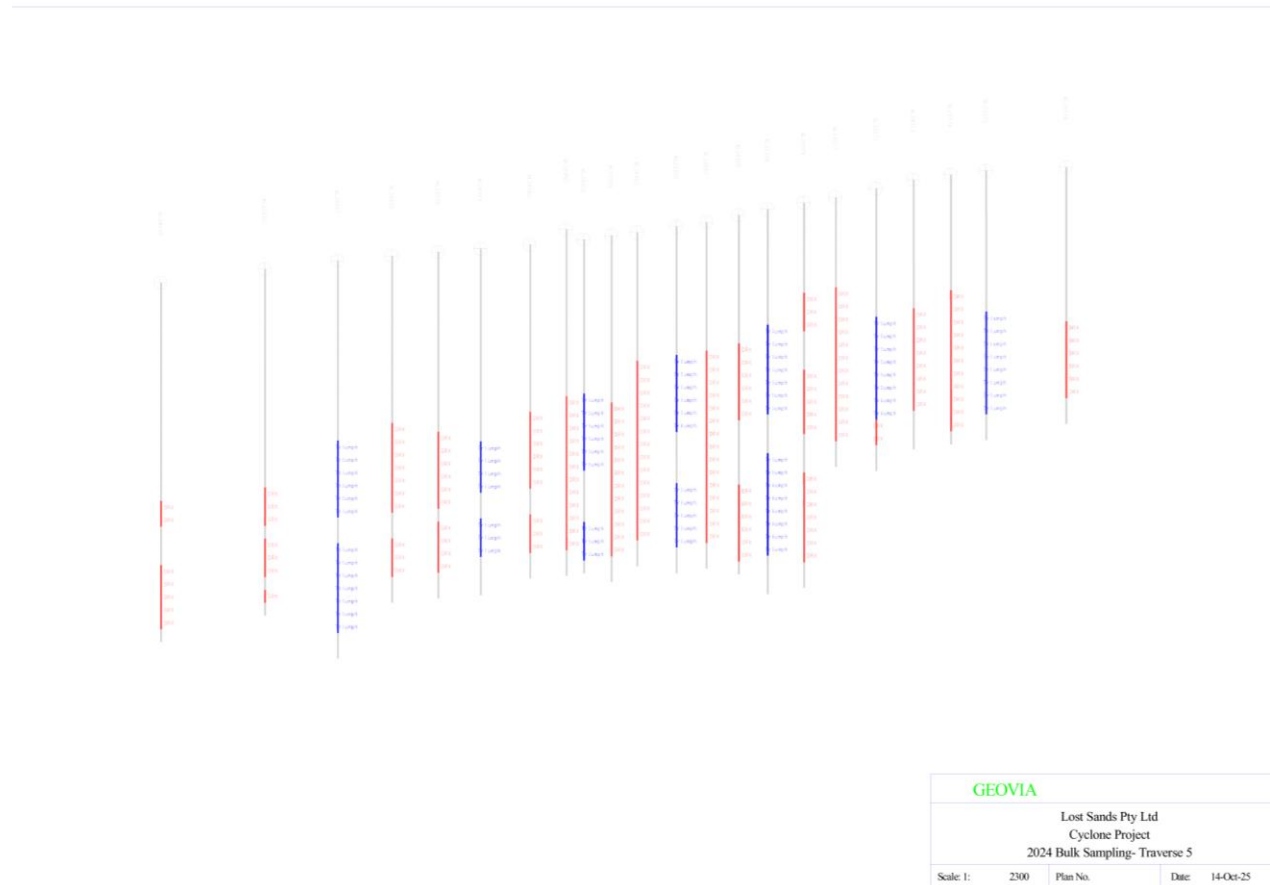


Figure 10: 2024 Bulk Sampling Traverse 5

Red Lines - MT bulk sample

Blue line - Third-party independent evaluation sample

This announcement is authorised for release by the Board.

Neil McIntyre
Chief Executive Officer

Wayne Swan
Chairman

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About Diatreme Resources

Diatreme Resources (ASX:DRX) is an emerging Australian producer of mineral and silica sands based in Brisbane. Our key projects comprise the Northern Silica Project and Galalar Silica Sand Project in Far North Queensland, located adjacent to the world's biggest silica sand mine at Cape Flattery, together with the Cape Flattery Silica Project. Both the Northern Silica and Cape Flattery projects have been designated “Coordinated Projects” by the Queensland Government and are strategically located near the export focused Cape Flattery Port.

The NSP has been designated a Major Project by the federal government, currently the only such Major Project declared for Queensland. This reflects the significance of the low iron, high purity silica sand project in the context of critical minerals, both for Queensland and Australia.

In Western Australia’s Eucla Basin, Diatreme’s Cyclone Zircon Project is considered one of a handful of major zircon-rich discoveries of recent decades. Diatreme also owns 100% of the Clermont Copper-Gold Project in central Queensland.

Global material solutions group Sibelco is Diatreme’s development partner on its silica projects portfolio. Sibelco has invested circa \$49 million into both the silica sands project and Diatreme at the corporate level.

Diatreme’s silica sand resources will contribute to global decarbonisation by providing the necessary high-grade, premium quality silica for use in the solar PV industry. The Company has a strong focus on ESG, working closely with its local communities and other key stakeholders to ensure the long-term sustainability of our operations, including health, safety and environmental stewardship.

AUSTRALIAN SANDS. UNIVERSAL DEMAND.

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Diatreme has an experienced Board and management, with expertise across all stages of project exploration, mine development and project financing together with strong community and government engagement skills.

For more information, please visit www.diatreme.com.au

Competent Person Statements

The information in this report that relates to Exploration Results is based on information reviewed and compiled by Mr. Neil Mackenzie-Forbes, a Competent Person who is a Member of the Australian Institute of Geoscientists. Mr. Mackenzie-Forbes is a director of Sebrof Projects Pty Ltd (a consultant geologist to Diatreme Resources Limited).

Mr. Mackenzie-Forbes has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr. Mackenzie-Forbes 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, insofar as it relates to Ore Reserve estimation is based on, and fairly represents, information and supporting documentation reviewed by Mr Philip McMurtrie, a Competent Person who is a Member of the Australasian Institute of Mining and Metallurgy. Mr McMurtrie takes responsibility for the Ore Reserve estimate reported within this announcement. Mr McMurtrie is a mining engineer and a consultant to Diatreme Resources Limited. Mr McMurtrie has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he has 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 McMurtrie consents to the inclusion in the report of the matters based on the information in the form and context in which it appears.

The information in this report, insofar as it relates to Bulk Sample Preparation and Metallurgical Testwork is based on, and fairly represents, information and supporting documentation reviewed by Mr Philip McMurtrie, a Competent Person who is a Member of the Australasian Institute of Mining and Metallurgy. Mr McMurtrie takes responsibility for the metallurgical testwork reported within this announcement. Mr McMurtrie is a mining engineer and a consultant to Diatreme Resources Limited. Mr McMurtrie has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he has 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 McMurtrie consents to the inclusion in the report of the matters based on the information in the form and context in which it appears.



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ASX releases referenced for this release:


- 30 July 2025 – Quarterly Activities Report
- 17 April 2025 – Annual Report to shareholders
- 31 October 2024 – Bulk sample drilling for Cyclone Zircon Project completed
- 25 September 2024 – Drilling program to unlock value from Cyclone Zircon Project
- 15 June 2016 – Cyclone Study Reaffirms Project Profitability

JORC CODE, 2012 EDITION – TABLE 1


SECTION 1 SAMPLING TECHNIQUES AND DATA

Criteria	JORC Code explanation	Commentary
Sampling techniques	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Sampling techniques are considered to be mineral sands "industry standard" for dry beach sands with low levels of induration and slime. Samples are down hole intervals of air-core drill cuttings collected from cyclone approximately 5 to 9 kg (representing ~100%) of drill material is sampled. Diatreme samples are 1m intervals with visibly mineralised zones typically sampled at 1m intervals. Sample representivity validated by historic twin drill holes, sample duplicate analysis and bulk sample testwork. For Diatreme samples Heavy Mineral (HM) is defined as mineral grains within 53 to 710 µm size range with an SG greater than 2.9
Drilling techniques	<ul style="list-style-type: none"> 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). 	<ul style="list-style-type: none"> Vertical NQ air-core drilling utilizing air-core bit, 3m drill runs
Drill sample recovery	<ul style="list-style-type: none"> Method of recording and assessing core and chip sample recoveries and results assessed. Measures taken to maximise sample recovery 	<ul style="list-style-type: none"> Visual assessment and logging of sample recovery and sample quality. Maximise return on sample size which was achieved through extra time waiting for sample return, and time for extra reaming to ensure sample

Criteria	JORC Code explanation	Commentary
	<p><i>and ensure representative nature of the samples.</i></p> <ul style="list-style-type: none"> <i>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.</i> 	<p>interval (1m) quality.</p> <ul style="list-style-type: none"> Sample chute cleaned between samples and regular cleaning of cyclone to prevent sample contamination. No relationship is evident between sample recovery and grade.
Logging	<ul style="list-style-type: none"> <i>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.</i> <i>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.</i> <i>The total length and percentage of the relevant intersections logged.</i> 	<ul style="list-style-type: none"> Geological logging of the total hole by field geologist, with retention of sample in chip for photography. The total hole is logged; logging includes colour, grain size, sorting, induration and estimates of HM, slimes and oversize utilizing panning. Logging is captured in data tables, with daily update of field database and regular update of master database.
Sub-sampling techniques and sample preparation	<ul style="list-style-type: none"> <i>If core, whether cut or sawn and whether quarter, half or all core taken.</i> <i>If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.</i> <i>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</i> <i>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</i> <i>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.</i> <i>Whether sample sizes are appropriate to the grain size of the material being sampled.</i> 	<ul style="list-style-type: none"> Sample was collected wholly to maximise sample recovery (as mineralization occurs above the water table). A small spear sample was taken to collect a 100 gram subsample for reference analysis if required. Sample size is considered appropriate for the material sampled for compositing into a bulk sample.. Mineralogy samples are typically down hole composites of HM from the mineralized zone(s) with multiple hole composites across section for some of the thinner mineralized zones.
Quality of assay data and	<ul style="list-style-type: none"> <i>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</i> <i>For geophysical tools, spectrometers, handheld</i> 	<ul style="list-style-type: none"> Qualitative lab based XRF analysis was conducted on samples with near the contact where the site geologist was uncertain. These XRF results were utilised only to determine if the sample was included within the bulk sample.



Criteria	JORC Code explanation	Commentary
<i>laboratory tests</i>	<p><i>XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.</i></p> <ul style="list-style-type: none"> <i>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.</i> 	
<i>Verification of sampling and assaying</i>	<ul style="list-style-type: none"> <i>The verification of significant intersections by either independent or alternative company personnel.</i> <i>The use of twinned holes.</i> <i>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</i> <i>Discuss any adjustment to assay data.</i> 	<ul style="list-style-type: none"> Significant intersections validated against geological logging and local geology / geological model Significant intersections verified by company personnel to ensure continuity with historic drilling. A number of twinned holes occur across the deposit and these have verified the sampling and assaying results. All data captured and stored in electronic format, with compilation and storage completed by external contractors.
<i>Location of data points</i>	<ul style="list-style-type: none"> <i>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.</i> <i>Specification of the grid system used.</i> <i>Quality and adequacy of topographic control.</i> 	<ul style="list-style-type: none"> All holes initially located using handheld GPS with an accuracy of 5m. Subsequent DGPS survey of drill hole collars, accurate to within 1m in X and Y as survey was often taken of rehabilitated drill site (i.e. estimated collar location). UTM coordinates, Zone 52, GDA94 datum. Topographic surface has been generated from processing Ikonos satellite imagery and DGPS control points, collar RL's levelled against this surface to ensure consistency in the database and with the block model.
<i>Data spacing and distribution</i>	<ul style="list-style-type: none"> <i>Data spacing for reporting of Exploration Results.</i> <i>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.</i> <i>Whether sample compositing has been applied.</i> 	<ul style="list-style-type: none"> Drilling was based on the First 3 years of operation in the current mine plan to generate sample for representative test work relating to initial mine product.



Criteria	JORC Code explanation	Commentary
<i>Orientation of data in relation to geological structure</i>	<ul style="list-style-type: none"> <i>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</i> <i>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.</i> 	<ul style="list-style-type: none"> The mineralisation displays an average strike around 340°, whereas the overlying Quaternary dune field has dune ridges dominantly trending 80° – 260°. Exploration data is therefore well orientated to sample the mineralised feature without bias.
<i>Sample security</i>	<ul style="list-style-type: none"> <i>The measures taken to ensure sample security.</i> 	<ul style="list-style-type: none"> Sample collection and transport from the field undertaken by company personnel following company procedures. Samples were secured in sealed timber pallet crates for transportation to Mineral Technologies for sampling.
<i>Audits or reviews</i>	<ul style="list-style-type: none"> <i>The results of any audits or reviews of sampling techniques and data.</i> 	<ul style="list-style-type: none"> A number of experienced mineral sands geologists have been involved in generation of the exploration methods, procedures and geological database.