AUSTRALIAN
RESEARCH
INDEPENDENT INVESTMENT RESEARCH

Diatreme Resources Limited

(ASX: DRX)

July 2025

INDEPENDENT
INVESTMENT RESEARCH

WHO IS IIR?

Independent Investment Research, "IIR", is an independent investment research house based in Australia and the United States. IIR specialises in the analysis of high quality commissioned research for Brokers, Family Offices and Fund Managers. IIR distributes its research in Asia, United States and the Americas. IIR does not participate in any corporate or capital raising activity and therefore it does not have any inherent bias that may result from research that is linked to any corporate/ capital raising activity.

IIR was established in 2004 under Aegis Equities Research Group of companies to provide investment research to a select group of retail and wholesale clients. Since March 2010, IIR (the Aegis Equities business was sold to Morningstar) has operated independently from Aegis by former Aegis senior executives/shareholders to provide clients with unparalleled research that covers listed and unlisted managed investments, listed companies, structured products, and IPOs.

IIR takes great pride in the quality and independence of our analysis, underpinned by high caliber staff and a transparent, proven and rigorous research methodology.

INDEPENDENCE OF RESEARCH ANALYSTS

Research analysts are not directly supervised by personnel from other areas of the Firm whose interests or functions may conflict with those of the research analysts. The evaluation and appraisal of research analysts for purposes of career advancement, remuneration and promotion is structured so that non-research personnel do not exert inappropriate influence over analysts.

Supervision and reporting lines: Analysts who publish research reports are supervised by, and report to, Research Management. Research analysts do not report to, and are not supervised by, any sales personnel nor do they have dealings with Sales personnel

Evaluation and remuneration: The remuneration of research analysts is determined on the basis of a number of factors, including quality, accuracy and value of research, productivity, experience, individual reputation, and evaluations by investor clients.

INDEPENDENCE – ACTIVITIES OF ANALYSTS

IIR restricts research analysts from performing roles that could prejudice, or appear to prejudice, the independence of their research.

Pitches: Research analysts are not permitted to participate in sales pitches for corporate mandates on behalf of a Broker and are not permitted to prepare or review materials for those pitches. Pitch materials by investor clients may not contain the promise of research coverage by IIR.

No promotion of issuers' transactions: Research analysts may not be involved in promotional or marketing activities of an issuer of a relevant investment that would reasonably be construed as representing the issuer. For this reason, analysts are not permitted to attend "road show" presentations by issuers that are corporate clients of the Firm relating to offerings of securities or any other investment banking transaction from that our clients may undertake from time to time. Analysts may, however, observe road shows remotely, without asking questions, by video link or telephone in order to help ensure that they have access to the same information as their investor clients.

Widely-attended conferences: Analysts are permitted to attend and speak at widely-attended conferences at which our firm has been invited to present our views. These widely-attended conferences may include investor presentations by corporate clients of the Firm.

Other permitted activities: Analysts may be consulted by Firm sales personnel on matters such as market and industry trends, conditions and developments and the structuring, pricing and expected market reception of securities offerings or other market operations. Analysts may also carry out preliminary due diligence and vetting of issuers that may be prospective research clients of ours.

INDUCEMENTS AND INAPPROPRIATE INFLUENCES

IIR prohibits research analysts from soliciting or receiving any inducement in respect of their publication of research and restricts certain communications between research analysts and personnel from other business areas within the Firm including management, which might be perceived to result in inappropriate influence on analysts' views.

Remuneration and other benefits: IIR procedures prohibit analysts from accepting any remuneration or other benefit from an issuer or any other party in respect of the publication of research and from offering or accepting any inducement (including the selective disclosure by an issuer of material information not generally available) for the publication of favourable research. These restrictions do not preclude the acceptance of reasonable hospitality in accordance with the Firm's general policies on entertainment, gifts and corporate hospitality.

DISCLAIMER

This publication has been prepared by Independent Investment Research (Aust) Pty Limited trading as Independent Investment Research ("IIR") (ABN 11 152 172 079), an corporate authorised representative of Australian Financial Services Licensee (AFSL no. 410381. IIR has been commissioned to prepare this independent research report (the "Report") and will receive fees for its preparation. Each company specified in the Report (the "Participants") has provided IIR with information about its current activities. While the information contained in this publication has been prepared with all reasonable care from sources that IIR believes are reliable, no responsibility or liability is accepted by IIR for any errors, omissions or misstatements however caused. In the event that updated or additional information is issued by the "Participants", subsequent to this publication, IIR is under no obligation to provide further research unless commissioned to do so. Any opinions, forecasts or recommendations reflects the judgment and assumptions of IIR as at the date of publication and may change without notice. IIR and each Participant in the Report, their officers, agents and employees exclude all liability whatsoever, in negligence or otherwise, for any loss or damage relating to this document to the full extent permitted by law. This publication is not and should not be construed as, an offer to sell or the solicitation of an offer to purchase or subscribe for any investment. Any opinion contained in the Report is unsolicited general information only. Neither IIR nor the Participants are aware that any recipient intends to rely on this Report or of the manner in which a recipient intends to use it. In preparing our information, it is not possible to take into consideration the investment objectives, financial situation or particular needs of any individual recipient. Investors should obtain individual financial advice from their investment advisor to determine whether opinions or recommendations (if any) contained in this publication are appropriate to their investment objectives, financial situation or particular needs before acting on such opinions or recommendations. This report is intended for the residents of Australia. It is not intended for any person(s) who is resident of any other country. This document does not constitute an offer of services in jurisdictions where IIR or its affiliates do not have the necessary licenses. IIR and/or the Participant, their officers, employees or its related bodies corporate may, from time to time hold positions in any securities included in this Report and may buy or sell such securities or engage in other transactions involving such securities. IIR and the Participant, their directors and associates declare that from time to time they may hold interests in and/or earn brokerage, fees or other benefits from the securities mentioned in this publication.

IIR, its officers, employees and its related bodies corporate have not and will not receive, whether directly or indirectly, any commission, fee, benefit or advantage, whether pecuniary or otherwise in connection with making any statements and/or recommendation (if any), contained in this Report. IIR discloses that from time to time it or its officers, employees and related bodies corporate may have an interest in the securities, directly or indirectly, which are the subject of these statements and/or recommendations (if any) and may buy or sell securities in the companies mentioned in this publication; may affect transactions which may not be consistent with the statements and/or recommendations (if any) in this publication; may have directorships in the companies mentioned in this publication; and/or may perform paid services for the companies that are the subject of such statements and/or recommendations (if any).

However, under no circumstances has IIR been influenced, either directly or indirectly, in making any statements and/or recommendations (if any) contained in this Report. The information contained in this publication must be read in conjunction with the Legal Notice that can be located at http://www.independentresearch.com.au/Public/Disclaimer.aspx.

THIS IS A COMMISSIONED RESEARCH REPORT.

The research process includes the following protocols to ensure independence is maintained at all times:

1) The research process has complete editorial independence from the company and this included in the contract with the company;
2) Our analyst has independence from the firm's management, as in, management/ sales team cannot influence the research in any way;
3) Our research does not provide a recommendation, in that, we do not provide a "Buy, Sell or Hold" on any stocks. This is left to the Adviser who knows their client and the individual portfolio of the client.
4) Our research process for valuation is usually more conservative than what is adopted in Broking firms in general sense. Our firm has a conservative bias on assumptions provided by management as compared to Broking firms.
5) All research mandates are settled upfront so as to remove any influence on ultimate report conclusion;
6) All staff are not allowed to trade in any stock or accept stock options before, during and after (for a period of 6 weeks) the research process.

For more information regarding our services please refer to our website www.independentresearch.com.au.

Contents

FNQ HPSS - Consolidation and Progress 1
Key Points 1
Swot Analysis 2
Overview 3
Strategy and Project Overview 3
Sibelco Partnership 4
Financial Position 5
Capital Structure 5
Activities Subsequent to Our December 2023 Initiation 5
Current and Upcoming Activities 7
Queensland Silica Projects - Diatreme 73.2%, 100% 8
Location and Tenure 8
Permitting, Stakeholder Engagement and Financing 9
Geology and Mineralisation 12
Resources and Reserves 13
Metallurgy 16
Development Studies 18
Valuation 23
NSP DCF Valuation 24
Board and Management 27
Appendix 1 - Silica Sands Markets 29
Background 29
Glass Specifications and Markets 29
PV HPSS Markets - Demand 29
PV HPSS Markets - Supply 31
Glass Markets Silica Sand Pricing 31

INDEPENDENT INVESTMENT RESEARCH

Diatreme Resources Limited (ASX: DRX)

Comprehensive Update - July 2025

Note: This report is based on information provided by the company as at 21 July 2025

Investment Profile	
Share Price as at 18 July 2025	A$0.019
2 month L/H	$0.016/$0.031
Per Share Valuation	A$0.067
Issued Capital:	
Ordinary Shares	5,008 m
Unlisted Options	70 m
Fully Diluted	5,078 m
Market Capitalisation	A$95.16 m
Cash Position	
DRX Cash as at 31/3/25	A$4.14 m
JV Cash as at 31/3/25	A$13.70 m

Board and Management
Mr Wayne Swan: Independent Chairman
Kara Keys: Independent Non-Executive Director, Deputy Chairperson
Brian Flannery: Non-Executive Director
Tom Cutbush: Non-Executive Director
William Wang: Independent Non-Executive Director
Michael Chapman: Independent Non-Executive Director
Neil McIntyre: Chief Executive Officer
Tuan Do: CFO and Company Secretary
Alastair Bauer: GM - Development Projects
Chris Wicks: GM - Commercial

Major Shareholders	
Sibelco	23.05%
Ilwella (Flannery Family Office)	22.29%
DELPHI and Associated Entities	9.40%
Board and Management	22.69%
Top 20	71.76%

Share Price Performance

The investment opinion in this report is current as at the date of publication. Investors and advisers should be aware that over time the circumstances of the issuer and/or product may change which may affect our investment opinion.

FNQ HPSS - CONSOLIDATION AND PROGRESS

The takeover of Metallica Minerals ("Metallica, ex-ASX: MLM), significant Resource Expansions and material progress in permitting (including the EIS process) and stakeholder engagement has marked the 18 months since our Initiation Report on Diatreme Resources (ASX: DRX, "Diatreme").

Diatreme holds 73.2% of the Northern Silica Project ("NSP", "the Project"), located at Cape Flattery in Far North Queensland ("FNQ"), with Sibelco, a major multinational industrial company holding the balance. The NSP is the main development focus of Diatreme, and also being granted "Major Project" status by the Federal Government, and a "Project of Regional Significance" by the Queensland State Government. This status, along with being a "Coordinated Project" under state legislation, should help with approvals, financing and ultimate development, with the Company looking for commencement of construction in 2026.

The recent completion of a resource expansion and upgrade (to 272.5 Mt, with 69% in the Measured category) forms a solid base for the recently commenced PFS, predicated on a 25 year, 3 Mtpa, moving to 5 Mtpa product operation. This comes at an ideal time, given forecast strong growth in the demand for solar panels (particularly if "Net Zero" targets are to be reached by 2030. The high purity silica sand ("HPSS") which Diatreme plans to produce, is a key ingredient in the manufacture of the PV glass. Metallurgical test work has shown that the product can meet the stringent quality requirements for this sector of the sand markets.

This follows on from a robust Scoping Study completed in 2023, based on a 25 year mine life, producing 3 Mtpa of HPSS for two years, and then 5 Mtpa for 23 years from 2026 and delivering an after tax NPV of A$829 million.

The NSP is located adjacent to Mitsubishi's current Cape Flattery Sands ("CFS") operations, which currently produces at ~3 Mtpa, and which is exported through a gazetted port adjacent to the mining and processing area. Although looking to develop their own facilities adjacent to, and then on the existing jetty, there may be the potential for infrastructure sharing with Mitsubishi.

The Company, through the Metallica takeover, picked up the advanced Cape Flattery Silica Sands Project ("CFS") adjacent to Mitsubishi's operation, with Ore Reserves of 47 Mt, and a DFS that was completed in 2023. Potential synergies between the projects, including in infrastructure and stakeholder engagement are being examined as a follow on from this logical consolidation of projects.

In addition to the NSP, Diatreme has the nearby Galalar Silica Project ("GSP") and adjacent exploration targets that have the potential to significantly add to any future mining inventory.

It also holds the Cyclone heavy mineral sands project in Western Australia, for which development options are being considered, and the Clermont Copper-Gold Project in Queensland.

We have a risked base case valuation for Diatreme of A$0.067/share, with A$0.039 being attributable to Diatreme's equity share in the NSP - Diatreme's unrisked equity share of the NSP is A$0.16/share.

We see upside to this valuation with ongoing activities (which include a current PFS and then DFS), and material advances in technical aspects, permitting and stakeholder, including Traditional Owner, negotiations.

KEY POINTS

Robust, high margin project : The Scoping Study has delivered a robust, high margin project, that is ideally placed to deliver into the forecast supply deficit in HPSS for photovoltaic glass.

Prime location: Being next to an existing port and a similar mining operation should have significant benefits, including costs, permitting and stakeholder engagement amongst others.

Delivering into the "green" economy: Solar power is one of the planks of the decarbonising economy and net zero aspirations - being part of that industry should give the NSP good green credentials.

Key cornerstones and major partner: Diatreme has a strong register with sticky investors, including the development partner, Sibelco.

Supportive governments: In addition to the "Project of Regional Significance", and "Major Project" status, the Queensland Government has introduced a critical minerals strategy, with the potential for Cape Flattery to become a "silica hub".

Strong news flow: We expect strong and steady newsflow going forward.

SWOT ANALYSIS

Strengths

- **Robust project in the right location:** The Scoping Study highlights a robust, relatively technically simple, long term base case project, with significant upside potential, being located next to an existing mining project and export port facility.
- **Large resources and exploration targets:** Work to date has defined high confidence resources, and exploration targets (that should readily be converted to resources), that have the potential to underpin a multi-decade operation.
- **HPSS supply deficits forecast:** Given the forecast take-up of solar panels as part of the decarbonising economy, over 90% of which are produced in traditional Australian export markets, Diatreme is ideally placed to deliver into the PV HPSS markets.
- **Metallurgy:** Work to date has indicated the suitability of the sands to be processed to meet the stringent physical and chemical requirements for sands to be used in PV glass.
- **Strong cash position, funded through to a final investment decision:** With total cash of ~A$18 million, both the JV and Diatreme are well funded, with Diatreme buffered from the capital markets until at least well into 2026. At the JV level, the remaining ~A$13.7 million should take the Project through to the FID.
- **Key partner and strong register:** Key investors, including the development partner Sibelco are very supportive, with this in part being demonstrated through buying on market subsequent to the last placement in 2022.
- **Supportive Governments:** This has been demonstrated through the Major Project status of the NSP, and the potential for a critical minerals hub.
- **Proven mining destination:** Queensland has a strong and recognised mining industry, and was ranked 13th globally in the 2023 Fraser Industry survey of mining companies. This flows onto required services and skills being readily available.
- **Experienced people with the necessary expertise:** Company personnel have the requisite skills to drive development.

Weaknesses

- **Location:** Although located next to an existing mine, the location, close to the FNQ wet tropics coast, and on aboriginal freehold land, may cause complexities and delays in permitting, as well as attracting adverse publicity from external parties.

Opportunities

- **Port access:** Although the Scoping Study is predicated on the Company constructing its own port and loading facilities, there may be the opportunity to access Mitsubishi's infrastructure, thus saving costs (potentially up to A$150 million) and time, including in permitting, due to significantly less potential for environmental disturbance.
- **Other markets:** Although the PV HPSS market has been targeted, there may be the potential to supply other markets, including the foundry sand and other glass markets - although products are generally of lower value, these could still provide acceptable margins on increased throughput.

Threats

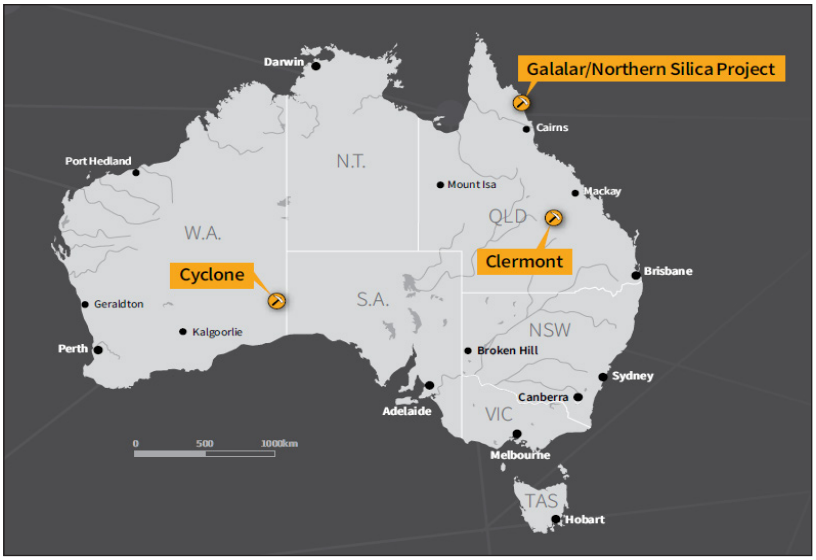
- **Permitting:** Given the location, and land ownership, permitting is the key risk; however in our view this relates more to timing and delays in approvals, rather than the project not being permitted.
- **Metallurgy, consistent mineralisation:** The specialist industrial minerals markets require the supply of consistently in-spec product over a long time period - the Company needs to ensure consistency in the resource over a large tonnage, and a metallurgical flow sheet to effectively treat the run of mine ("ROM") material.
- **Prices and markets:** These are constant threats to resource companies, and may affect the ability to raise capital - although expected capital requirements are modest in the short term, Diatreme will be looking to raise development capital in the medium term, with project capital markets still being tight.

OVERVIEW

STRATEGY AND PROJECT OVERVIEW

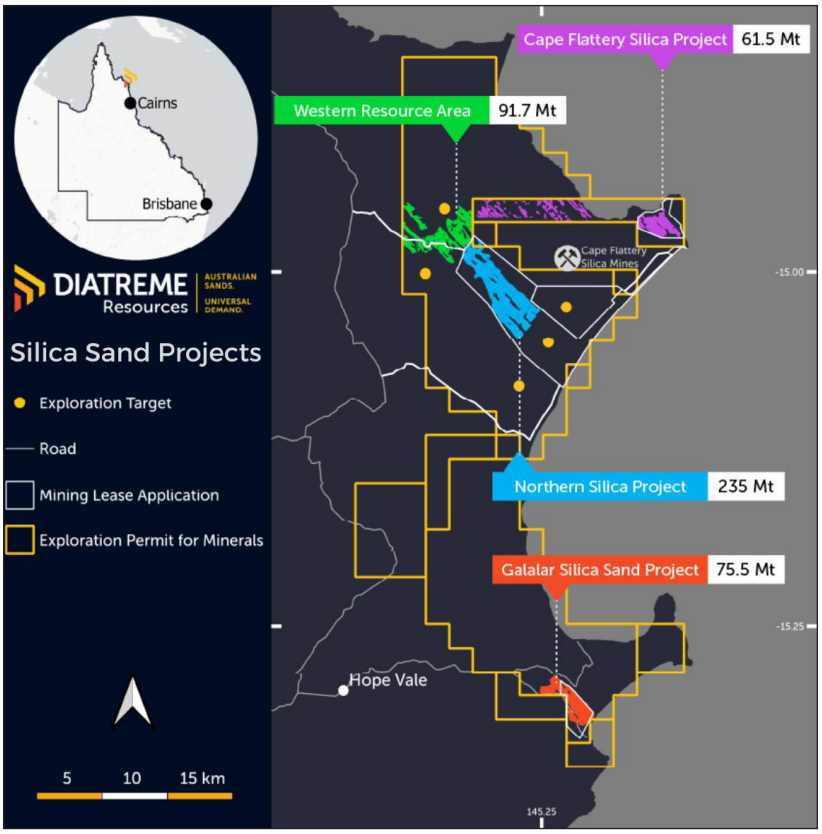
- Diatreme's focus is on the appraisal and development of high purity silica sand properties, located near Cape Flattery in Far North Queensland ("FNQ", Figures 1 and 2).
- Current activities are concentrated on the 272.5 Mt Northern Silica Project ("NSP"), for which a positive Scoping Study was completed in 2023.
- The Company has commenced work on a Pre-Feasibility Study ("PFS", including maiden Ore Reserves), which will then lead into a Definitive Feasibility Study.
- All going well, the Company, and 26.8% JV partner, Sibelco, are looking to first shipments in H1, 2027 (Figure 3), ideally timed to feed into forecast strong deficits in the HPSS markets, a vital component in PV glass used in solar panels.

Figure 1: Diatreme project location map



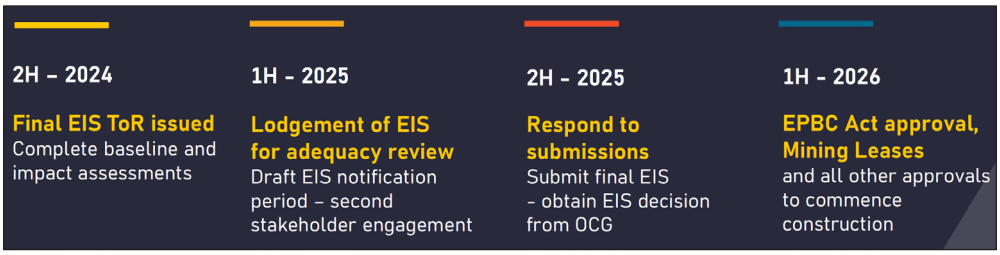
Source: Diatreme

Figure 2: Far North Queensland tenements



Source: Diatreme

Figure 3: Northern Silica development timeline



Source: Diatreme

- The second advanced silica project is the 61.5 Mt (47 Mt in Reserves) Cape Flattery Silica Project ("CFS"), acquired as a result of the 2024 takeover of Metallica Minerals (ASX: MLM, "Metallica").
- Metallica completed a DFS for a low cost 1.3 Mtpa saleable product operation in July 2023, and at the time of the takeover the Draft Terms of Reference for the EIS had been released, and Metallica was undertaking negotiations with the Traditional Owners.
- The Company is assessing potential synergies with the existing silica sand projects, including with respect to a streamlined assessment process and stakeholder engagement and infrastructure access.
- Also nearby is the 75.5 Mt Galalar Silica Sands Project ("GSP"), for which activities were largely concentrated until late 2022, when the Si2 silica sand discovery, which forms the basis of the NSP, was made.
- The GSP is more problematic as regards permitting and hence development, being located some 40 km south of the existing Cape Flattery operations of Mitsubishi (and the NSP), and attracting opposition from some Traditional Owners.
- Development of the GSP would either require a completely new port, or else as more recently investigated by the Company, ~40 km haulage to the existing port at Cape Flattery.
- Either way, there would be potential issues with several groups and organisations, including, amongst others, the TOs, Great Barrier Reef Marine Park ("GBRMP") and the public that uses the beaches in the vicinity of Cape Bedford.
- Notwithstanding the above, the metallurgical process designed for the GSP has been used as the basis of that for the NSP.
- Diatreme has two other projects which will not be discussed in detail - the Cyclone mineral sands deposit in Western Australia, for which options are being considered, including attracting a development partner or listing it separately in a spin out amongst others, and the Clermont Copper/Gold Project in Central Queensland, for which Metallica had earned 51% in a staged farmout, however which has reverted 100% to Diatreme given the takeover.
- The Company has recently undertaken metallurgical drilling at Cyclone, with a view to optimising and making improvements to the current spreadsheet.

SIBELCO PARTNERSHIP

- On June 27, 2022, Diatreme announced that it had entered into a partnership with Sibelco, a multinational industrial minerals company with operations in over 30 countries, and with a workforce of over 5000.
- Main mined and processed products include silica for the glass and foundry sectors, olivine and clays, with Sibelco also being a globally significant global glass recycler.
- In 2024 Sibelco generated an EBITDA of €471 million and FOCF of €125 million from revenues of €2,224 million.
- The partnership includes a project level investment of A$35 million, and a placement into Diatreme of A$14 million at A$0.025/share.
- The project level investment was made in two tranches (with both being received), with the funds expected to last until the completion of project financing and a decision to mine:
  - An initial payment of A$11 million, to earn 10% of an after money valuation of A$110 million; and,
  - A second tranche of A$24 million, based on taking ownership to 26.8% on an after money valuation of A$160 million.

FINANCIAL POSITION

- As of March 31, 2025, the Company had A$4.14 million in cash, and cash of A$13.70 million in the Northern Silica JV, which received the first A$11 million instalment of the Sibelco investment in the December 2022 Quarter, and the second, A$24 million tranche in October 2023, ahead of the agreed December 2023 timing.
- The last capital raising was a combined A$17.29 million placement to Sibelco and Ilwella (the Brian Flannery family office) at A$0.025/share in June/August 2022 - this included 559.47 million shares for A$13.99 million to Sibelco, and 132.11 million shares for A$3.30 million to Ilwella.
- Over the 12 months to March 2025 the Company spent A$1.89 million on exploration and evaluation of the non-JV projects, with the JV expenditure totalling A$10.5 million.
- Over the same period A$6.24 million was spent on staff and administration, with this including A$2.55 million on non-recurring costs related to the MLM acquisition.

CAPITAL STRUCTURE

- Diatreme currently has 5,008 million shares and 70 million unlisted options on issue, with all options being out of the money - the options have exercise prices of between A$0.025 and A$0.045 (with a weighted average of A$0.033), and expiry dates of between 27/05/26 and 8/08/28.
- The Company has a strong register, with the Top 3 holding 54.74% - these include Sibelco (23.05%), Ilwella (Flannery Family Office, 22.29%), and Delphi and associated funds (9.40%).
- Both Ilwella and Sibelco have bought on market since the 2022 placement, and were also significant shareholders in Metallica at the time of the takeover.
- The top 20 hold 71.76%, with insiders holding 22.69% - this includes the holdings of Mr Brian Flannery through Ilwella.

ACTIVITIES SUBSEQUENT TO OUR DECEMBER 2023 INITIATION

- The Company has made significant progress since our December 2023 Initiation Report, with key advances listed below, and expanded upon later in this report where applicable.

Metallica Minerals Takeover

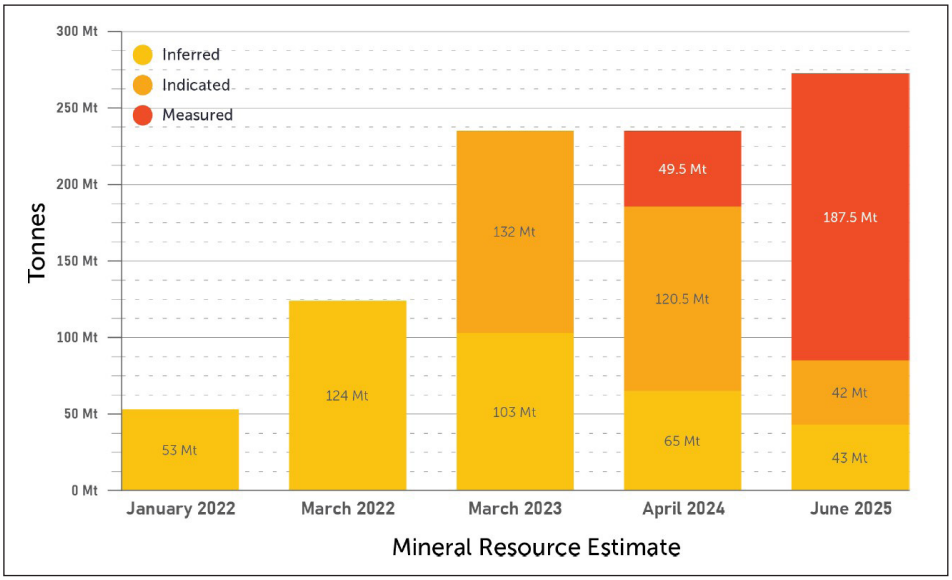
- On February 16, 2024, the Company announced a conditional all-scrip takeover bid for Metallica, offering 1.3319 fully paid ordinary Diatreme shares per Metallica shares.
- Based on Diatreme's current price at the time of A$0.022, this valued Metallica's shares at A$0.0293, a 22% premium to Metallica's then price of A$0.024/share, with a valuation of A$23.04 million for Metallica (Metallica had ~960 million shares on issue).
- Based on a cash position of A$4.8 million as of December 31, 2023, this implied an enterprise value of ~ A$18.2 million for Metallica's projects.
- Both Ilwella and Sibelco, major shareholders in Diatreme, were also major shareholders in Metallica at the time of the bid, and accepted the offer.
- Completion of the takeover was announced to the market on September 18, 2024, with the Metallica share price then at A$0.034, valuing MLM at A$32.6 million - in addition to the projects, the completion of the takeover brought ~A$2.3 million cash in from Metallica.
- This also resulted in the issue of 1.28 billion new shares as consideration for the Metallica shares.
- In our view the consolidation of the assets of Diatreme and Metallica was logical, with now only one group looking for approvals, development funds and infrastructure development in the region.

Drilling, Metallurgy and Resources

- Two infill and expansion drilling programmes, and two MRE upgrade have been completed in the 18 months, with the growth in Resources since the commencement of the Project shown in Figure 4.
- What this highlights is, in addition to the overall growth, the proportion of the MRE now in the Measured (68.8%) and Indicated (15.4%) categories, that will allow for the estimation of Reserves to support a high-throughput, long term operation, and be used as the basis for the PFS.

- Note that this is for the Si2 deposit only, and does not include resources for Galalar, the Western Resource Area ("WRA"), NSP exploration targets, and the Cape Flattery Silica Project Resource acquired through the Metallica takeover - these are detailed later in this report.
- The Company now has a total Resource base of 501.16 Mt of silica sand.

Figure 4: Si2 deposit growth



Source: Diatreme

- Drilling for the upgrades has included 242 aircore and 14 hand auger holes since August 2023, taking total drilling to 75 hand auger, 99 vacuum and 324 aircore holes over the Si2 deposit - the most recent programme included 152 aircore holes for 3,420 m.
- Metallurgical testwork has included beneficiation, and final product sizing, demonstrating that the material can be upgraded to a high silica/low deleterious element product, and has a size range suitable for the target applications, including photovoltaic glass.

Community and Stakeholder Relations

- Community and stakeholder relations are a key consideration in the potential successful development and operation of the Project, with continuous activities focussed on this front.
- On May 10, 2025, Diatreme announced that it had signed the Walmbaar Negotiation Protocol with the Walmbaar Aboriginal Corporation ("WAC"), the entity which represents the people of the Dingaal Clan - this follows on from the November 2023 signing of a Memorandum of Cooperation with the Hopevale Shire Council.
- The document outlines the framework and sets of principles to guide future negotiations between the parties, and to ensure that future agreements are mutually beneficial to the stakeholders.
- Also, as announced on May 29, 2024, the groups signed an updated Cultural Heritage Management Agreement - this replaced an earlier agreement, with more stringent and comprehensive cultural heritage protection provisions, and is associated with a Clearance and Aboriginal Cultural Heritage Avoidance Protocol.
- The Company is continuing to work towards agreements with the other Traditional Owner groups in the region, including those who engaged with Metallica.

Project Status and Permitting

- Significant activities have been concentrated on advancing the Environmental Impact Study ("EIS"), wit the most recent advance being receipt of the final Terms of Reference ("ToR") from the Office of the Coordinator General ("OCG").
- The Company aims to submit the draft EIS by the end of H2, 2025, at which time it will be reviewed, and displayed for public comment.
- The NSP has "Coordinated Project" status, with permitting activities being coordinated under the OCG, with this working towards both State and Federal approvals, and should result in a streamlined approvals process..

- As well, during the past 18 months, the Project has most recently been awarded "Major Project" status under the Federal Government, in addition to the preexisting "Project of Regional Significance" under theState regulatory regime.
- This granting of this status recognises the importance, including economically, of the NSP to the region, and nation as a whole.

Cyclone Zircon Project Drilling

- Although the Cyclone project will not be discussed in detail, the Company completed a 106 hole, 3,278 m drilling programme, aimed at updating the metallurgical test work and confirm previous drilling results.
- The metallurgical results will feed into the design of an improved flowsheet for the production of zircon, and TiO_2 products - this will look at improving the quality of the titanium oxide products, and the potential to produce a bespoke product for a potential customer.
- Metallurgical results are due within the curent quarter, and in parallel Diatreme is considering options, including bringing in a development partner.

CURRENT AND UPCOMING ACTIVITIES

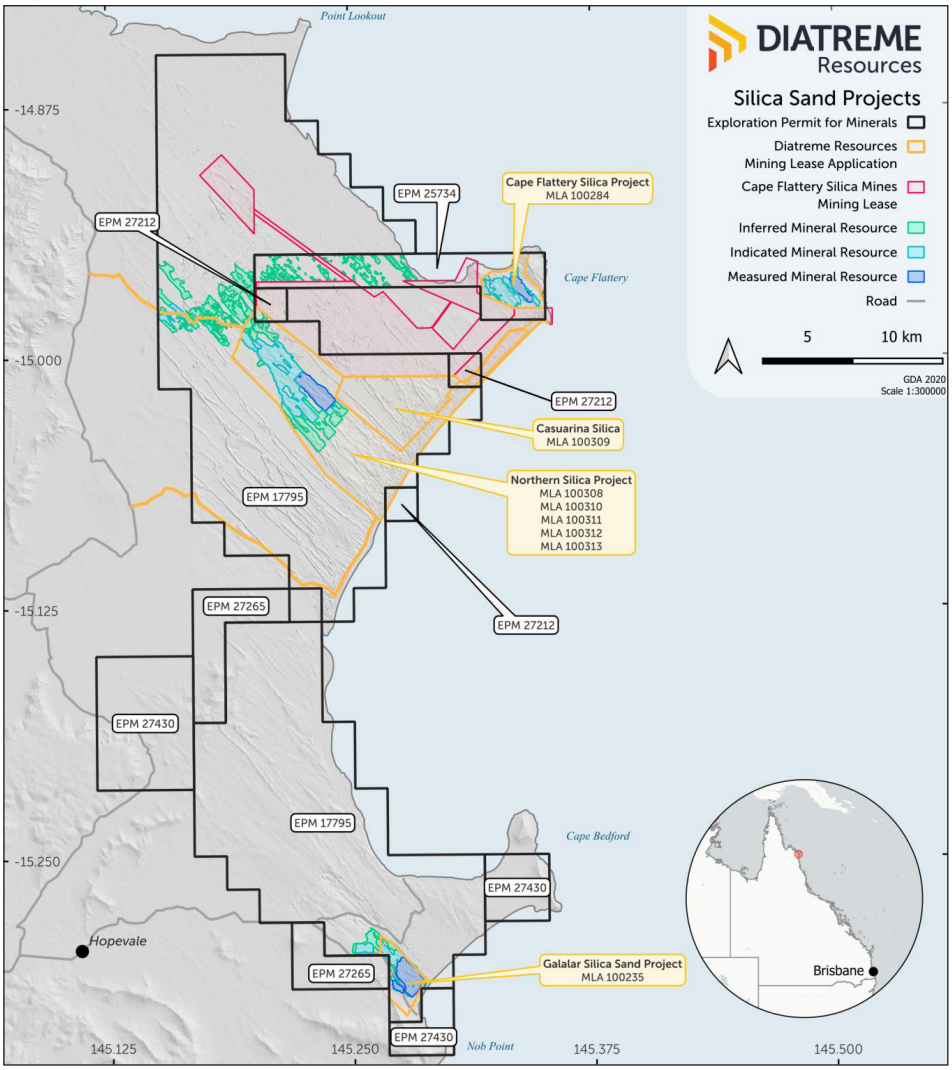
- Diatreme continues to advance the NSP, with activities focussed on the commencement of development by the end of 2026.
- Ongoing activities include:
  - Ongoing dialogue with the Traditional Owners, working towards the establishment of the formal agreements to allow for the development and operation of the Project,
  - Ongoing dialogue with other stakeholders, including government agencies and departments regarding permitting amongst others,
  - Completing the draft EIS, with a view to getting this out for public comment in the near future,
  - With the recent Resource update, commencement of the PFS, which will then led into a DFS; and,
  - Ongoing metallurgical optimisation testwork.
- The Company is continuing to assess the Cape Flattery project, including looking at potential synergies between it and the NSP.
- One key area where there could be synergies is through an infrastructure sharing arrangement.
- With regards to Cyclone, the Company is continuing to assess develop opportunities, including holding discussions with potential development partners, as well as considering other options to realise potential value, including through a possible spin-out.
- Technically, the Company is reviewing the previous DFS to reconfirm base assumptions, and metallurgical testwork continues to confirm the results of previous drilling.

QUEENSLAND SILICA PROJECTS - DIATREME 73.2%, 100%

LOCATION AND TENURE

- Diatreme's Queensland silica projects include the 73.2% owned Northern Silica and Galalar Silica Projects, the 100% owned Cape Flattery Silica Project (Figures 2 and 5) along with other earlier stage areas that Exploration Targets have been assessed for.
- Until late 2022 activities were focussed on Galalar, however, following the discovery of significant high grade silica sand Resources near Cape Flattery, the focus has moved to the Northern Silica Project.
- The project areas include five granted Exploration Permits - Minerals ("EPM") and eight Mining Lease Applications ("MLA") - the MLAs include those required for access roads and infrastructure corridors as well as mining and processing operations (Figure 5).
- The granted exploration permits, which cover an area of 627.8 km^2 are in good standing, with the MLAs covering an area of 77.2 km^2.

Figure 5: Queensland silica projects location and tenements



Source: Diatreme

- Neighbours include Mitsubishi's Cape Flattery Silica Mine ("CFSM") operations.
- The closest town is Hopevale, with a population of ~1,000, around 50 km by all weather dirt roads, albeit with some access issues during the summer wet season.
- Hopevale is 46 km by sealed road from Cooktown (population ~2,800), and 370 km from Cairns (population ~ 150,000); Cooktown is served by regular flights from Cairns, and Hopevale has a 1,000 m natural surface airstrip.
- There is no grid power to site, however there is available groundwater, and the Company will be applying for an allocation from the 25,000 ML strategic reserve held under the Cape York Water Plan (2019).

- Other key infrastructure includes the Ports North Cape Flattery Jetty and gazetted port area (Figures 6 and 15) - the bare jetty is owned by Ports North, a Queensland Government agency, with Mitsubishi the owner of the above deck infrastructure.
- As it stands the ship loading facility has the capacity to handle 8.5 mtpa, with Mitsubishi currently utilising ~3.1 mtpa.

Figure 6: Ports North jetty and Mitsubishi ship-loader

Source: Diatreme

PERMITTING, STAKEHOLDER ENGAGEMENT AND FINANCING

- Given the location of the Project, and land ownership, in our view stakeholder engagement and permitting are the keys to the successful development of the Project.

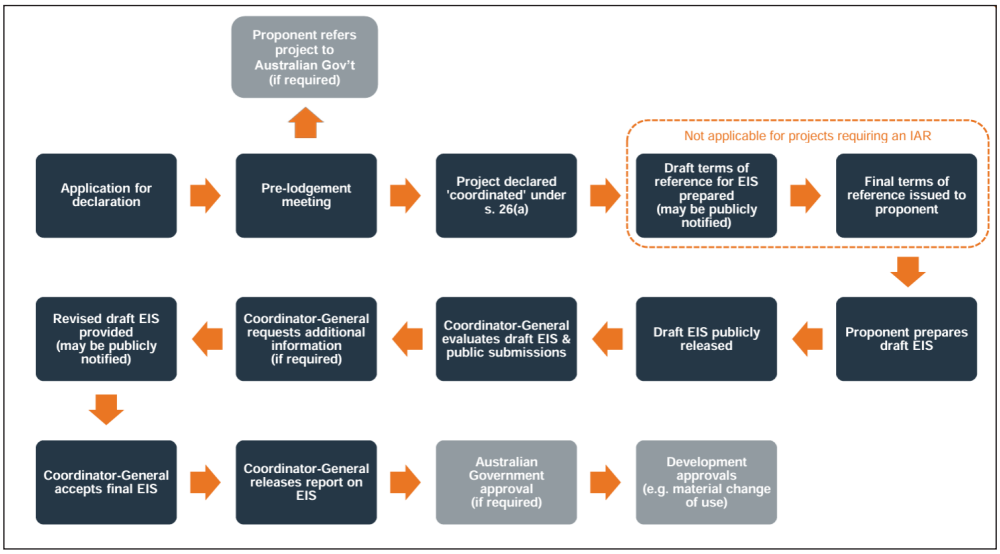
Traditional Owners and Agreements

- The projects are located within the Hopevale Aboriginal Shire, comprising freehold Aboriginal land held by the Hopevale Congress Aboriginal Corporation (a Registered Native Title Body Corporate, "RNTBC") in trust for the Traditional Owners.
- The region is the home to several clans of Traditional Owners, with these represented by the Hopevale Congress Aboriginal Corporation, Walmbaar Aboriginal Corporation (an RNTBC) and the Darrba Land Trust.
- The latter holds Aboriginal Freehold next to the Hopevale Congress's tenure, which will be impacted by the northern access route.
- In 2016 and 2017 the Company signed a "Conduct and Compensation Agreement" and a "Cultural Heritage Assessment Agreement" with the Hopevale Congress Aboriginal Corporation, which allows for the undertaking of exploration and assessment programmes.
- The Company is continuing to negotiate mining agreements with the relevant parties, and as mentioned earlier has, subsequent to our Initiation Note, signed the Walmbaar Negotiation Protocol, and a Cultural Heritage Management Agreement with the WAC.
- Diatreme, which maintains its operations office in Hopevale, recognises the critical nature of developing strong relationships with the local population and maintaining their rights, as well as using the planned operations to bring social and financial benefits to the region, including employment, training and cultural preservation amongst others.
- These factors are outlined in Company presentations and other public documents, and are reinforced by the recently announced co-operation agreement with the Hope Vale Shire Council (November 20, 2023) - key point to come out of this is maintaining the balance between economic viability and community benefits, including preservation of cultural aspects.
- In our view, another key aspect on the community side is the potential for the Project to develop into a very long term operation - this results in the longer term certainty of benefits and support for the local stakeholders.

EPBC Referral, Coordinated Project Status and the EIS

- As announced by the Company on June 16, 2023, the NSP has been determined a "controlled action" under the Environmental Protection and Biodiversity Conservation Act 1999 ("EPBC") following a referral within the Federal Government Department of Climate Change, Energy, the Environment and Water ("DCCEEW").
- This decision has been made with regard to the following matters:
  - World Heritage properties,
  - National Heritage places,
  - Listed threatened species and communities; and,
  - The Great Barrier Reef Marine Park.
- The NSP will be assessed through an EIS process, with this delivered under the accredited Queensland process, and will allow the single study to address both State and Federal factors, and be reviewed by both levels of government.
- The Project was granted "Coordinated Project" status under state legislation in early 2024, which results in the approvals stream being coordinated by the Office of the OCG - this has the aim of simplifying and streamlining the overall approvals process, including that of the EIS.
- The EIS approvals stream is shown in Figure 7 - note that "IAR" refers to an impact assessment report, a more streamlined, "fit for purpose" approvals process for well defined and low to medium risk coordinated projects, and not applicable here.
- Advances on the EIS to date have included:
  - Engagement of all technical personnel required for the drafting of the EIS,
  - Completion of the 12-month baseline study fieldwork, and reporting of the data and results,
  - Ongoing baseline monitoring,
  - Lodgement of the draft Terms of Reference ("ToR") for the EIS,
  - Public exposure, which resulted in additional requirements,
  - Lodgement of the updated draft Terms of Reference; and,
  - Receipt of final ToR from the OCG - this news was released to the market on September 29, 2024, and covers both State and Federal Requirements.
- The Company is looking at submitting the draft EIS for government review by the end of Q2, 2025, at which time it will be reviewed by the relevant agencies, and also displayed for public comment.

Figure 7: Diagrammatic EIS/IAR process



Source: Queensland Government EIS Fact Sheet, 2020

Project of Regional Significance and Federal Major Project Status

- The NSP has been recognised as a Project of Regional Significance by the Queensland Government - this was announced to the market on August 3, 2023, and Major Project Status under the Federal Government in June 2024.

- These reinforce the positive economic and social impacts that the Project will have nationally and on the region, including employment, with the region currently having an unemployment rate in the order of 40%.
- This will also allow Diatreme to apply for a water entitlement, for the life of the Project, from the 25,000 ML of unallocated water held in the strategic reserve under Cape York's Water Plan (2019).
- The Company will need to demonstrate that the allocation will satisfy the requirements of Cape York's Water Plan (1999) and the Cape York Water Management Protocol (2019).

Queensland Critical Minerals Strategy

- In June 2023 the Queensland Government announced the A$245 million "Critical Minerals Strategy", which is designed to foster investment in the mining and processing of critical minerals, to drive the transition to renewable energy and meet emission targets.
- One pillar of the strategy is the identification of critical minerals hubs, of which Cape Flattery has been identified as a potential silica minerals hub - these are planned to create an open environment for all potential producers.
- The rationale behind the hubs is to focus on efficiencies in supply chains from exploration through to shipping, with aspects including, amongst others, easing access to infrastructure, and developing pathways through permitting and approvals.
- That being said, environmental, social and governance ("ESG") standards, including environmental and traditional owner aspects amongst others will not be compromised in the activities under the strategy - these are key to the successful implementation of the planned project.

Port MoU, and Working Group

- The Company has a Memorandum of Understanding ("MoU") in place with the Queensland Government owned Far North Queensland Ports Corporation ("Ports North"), the owner of Cape Flattery Port.
- The agreement outlines the key terms of co-operation, to allow for the export of silica sand through the state-owned port.
- Diatreme, Ports North and Mitsubishi have also formed a working group to negotiate and progress the potential shared use of facilities, as well as the Company's current concept of extending the existing jetty structure by 260 m.
- The three parties already have in place a "Tripartite Entry Deed", allowing Diatreme access to the facilities for the purposes of environmental and development studies amongst others.
- Although the below deck facilities are owned by Ports North, the above deck facilities are owned and operated by Mitsubishi.

Offtake and Marketing

- Having offtake agreements in place is essential to the development of the Project, including in acquiring debt funding - developing the required relationships is therefore a key aspect of the Company's activities.
- One such relationship is the Sibelco JV, with Sibelco being a major multinational producer of speciality industrial minerals, including silica, clays, feldspathics and olivine.
- Sibelco, whose activities cover the value chain from mining through to the sale of processed goods, is also a significant global glass recycler.
- Also, on December 11, 2024, the Company announced the signing of a non-binding MoU with Mitsui & Co, to evaluate the potential offtake of silica sand products by the major Japanese trading and investment house.
- As part of marketing activities, the Company has also met with several of the Chinese PV glass manufacturers (remembering that China produces some 80% of solar panels globally) and undergone a comprehensive market study as part of the development studies.
- This has also been critical for price discovery, given that silica sand prices are not published in the open markets, and are set via contracts between buyers and sellers.
- One such target company is FLAT Glass, one of the world's largest PV grade glass producers, and with which Diatreme has signed a non-binding MoU (July 13 2023).
- The MoU covers several aspects, including the exchange of samples and information, and the potential for FLAT glass to establish an onshore PV glass production facility, to supply the growing domestic uptake of solar panels.

Financing

- Although relatively early days, the Company is looking at various funding options and structures, however expects, given the strong economics and long life nature of the Project, to be able to finance its share through a traditional structured finance package, with this to be finalised by the time of the Final Investment Decision ("FID").
- The strong cornerstone investors, who have been very supportive to date, are also possible participants in any development funding.
- On the debt side, in addition to the traditional banks, there is the potential to raise funds through the Northern Australian Infrastructure Fund ("NAIF"), a Federal Government agency tasked with providing relatively low cost debt to projects that include the development of infrastructure in the remote areas of Northern Australia.
- Our experience of looking at NAIF funding is that it does concentrate on the infrastructure aspects of mining project (utilities, transport), rather than the direct operations (mining, processing), however the early engagement between NAIF and the Company would suggest that the NSP meets all of the NAIF eligibility criteria.
- The "green" nature of the Project, given that it plans to supply a critical element of renewable generation, should also widen the potential sources of funding, including from "green" financiers.

GEOLOGY AND MINERALISATION

- The target silica sands are hosted in the Cape Bedford/Cape Flattery Dune field, which covers an area of some 700 km^2, and is one of several such features on the east coast of Cape York Peninsula.
- The source of the sand is believed to be Mesozoic quartz sandstones of the Gilbert River Formation and Dalrymple Sandstone to the west, with these already containing relatively pure pre-cursor material.
- At least two ages of the aeolian dunes have been recognised, with the older comprising a series of inactive and vegetated elongate NW-trending parabolic dunes, that have undergone podsolisation through the percolation of humic acid over 40,000 years, resulting in the development of a weathering/soil profile.
- The second set includes immature NE trending parallel dunes, which, in some areas have undergone some profile development.
- The dune development at the NSP can be seen in Figure 8, with the NW pointing apexes of the parabolic dunes reflecting the general SE wind direction - sections are shown in Figure 9.
- It is the upper "A" horizon that is of interest, and where impurities have been weathered out through the action of humic acid, and deposited lower in the profile in the "B" horizon.
- The B horizon is absent in places, with the A horizon resting directly on the groundwater basement - the base of the MRE is the bottom of the A horizon.
- The key parameters in defining what is "mineralisation" and what is not is the purity of the sands, and the grain size distribution - both of these are critical in determining what is marketable, and for what purposes the sands can be used for.
- For the HPSS PV glass target market, the following quality parameters are required:
  - SiO_2 >99.5%,
  - Particle size distribution of between 109 - 700 µm (24 - 140 mesh),
  - Fe_2O_3 < 120 ppm, however preferably < 100 ppm, or even 80 ppm for some markets,
  - TiO_2 < 400 ppm; and,
  - Al_2O_3 <1000 ppm.
- As can be seen in Table 1, the ROM quality is already quite close to the required specifications, with the metallurgical processing (discussed below) being shown to produce marketable products at both Si2 and Galalar.
- One necessary aspect is for the operation to produce the required quality consistently over the life of the mine, and for any potential customer, prior to signing any offtake, to be confident that the proposed operation will deliver .
- As such the Company is taking a very stringent approach to, and using a number of different methods in sampling and choosing what to sample, to ensure consistency in quality and, importantly, accuracy and repeatability.

RESOURCES AND RESERVES

- The silica projects host five Mineral Resources (Si2, WRA, Galalar and two at the CFS) totalling 501.16 Mt of silica sand, Ore Reserves of 32.53 Mt at Galalar and 47 Mt at CFS East, and Exploration Targets with a range of 250 Mt to 850 Mt @ 98.5% to 99.9% SiO_2 in the NSP area.
- Deposits and Exploration Targets are shown in Figure 2, with plans of the individual Resources shown in Figures 8 to 12.
- Resources for Si2 (2025), WRA (2023), Galalar (2021) and CFS East and West (2023) are shown in Tables 1, with Ore Reserves for Galalar (2021) in Table 2, those for CFS East (2023) in Table 3, and the Exploration Targets in Table 4.
- The Resources at Si2 should now be of a tenor to support the Reserves for the planned, long term 5 Mtpa operation.
- Resources for the WRA are a NW extension of those for Si2, and provide additional flexibility to any planned operation - these largely include the previously announced PLT Exploration Target.
- MRE boundaries are generally the top of the dunes (as measured by LIDAR), the base of the A horizon, the boundaries of the CFS mining areas, and incorporate a 1 km wide buffer from the shoreline.

Table 1: All deposits JORC 2012-Compliant MRE

All depositsJORC 2012-Compliant MRE - 2023						
Deposit	**Category**	**Silica Sand (Mt)**	**SiO_2 (%)**	**Fe_2O_3 (%)**	**TiO_2 (%)**	**Al_2O_3 (%)**
Galalar	Measured	43.12	99.21	0.09	0.11	0.13
	Indicated	23.12	99.16	0.09	0.13	0.10
	Inferred	9.22	99.10	0.11	0.16	0.11
	Total	**75.46**	**99.18**	**0.09**	**0.12**	**0.12**
Si2	Measured	187.5	99.24	0.10	0.14	0.11
	Indicated	42	99.15	0.12	0.16	0.11
	Inferred	43	99.11	0.11	0.15	0.11
	Total	**272.5**	**99.21**	**0.11**	**0.14**	**0.11**
WRA	Indicated	10.3	99.20	0.15	0.24	0.16
	Inferred	81.4	99.38	0.09	0.15	0.06
	Total	**91.7**	**99.36**	**0.10**	**0.16**	**0.07**
CFS West	Inferred	12	99.15	0.09	0.16	0.12
	Total	**12**	**99.15**	**0.09**	**0.16**	**0.12**
CFS East	Measured	16.1	99.20	0.08	0.12	0.22
	Indicated	33.2	99.05	0.10	0.18	0.25
	Inferred	0.2	99.00	0.12	0.27	0.28
	Total	**49.5**	**99.10**	**0.09**	**0.16**	**0.24**
Total Silica Sand	Measured	246.72	99.23	0.10	0.13	0.12
	Indicated	108.62	99.13	0.11	0.17	0.16
	Inferred	145.82	99.26	0.10	0.15	0.08
	Total	**501.16**	**99.22**	**0.10**	**0.15**	**0.12**

Source: Diatreme

Table 2: Galalar Deposit JORC 2012-Compliant Probable Ore Reserve

Galalar Deposit JORC 2012-Compliant Probable Ore Reserve									
Category	Silica Sand (Mt)	SiO_2 (%)	Fe_2O_3 (%)	TiO_2 (%)	Al_2O_3 (%)	LOI (%)	Silica Sand (Mm^3)	Density (t/m^3)	Waste (Mt)
Probable	**32.53**	**99.20**	**0.08**	**0.11**	**0.13**	**0.16**	**32.53**	**1.6**	**0.04**

Source: Diatreme

Table 3: CFS East JORC 2012-Compliant Probable Ore Reserve

CFS East JORC 2012-Compliant Probable Ore Reserve							
Category	Silica Sand (Mt)	SiO_2 (%)	Fe_2O_3 (%)	TiO_2 (%)	Al_2O_3 (%)	LOI (%)	Waste (Mt)
Probable	**47**	**99.11**	**0.09**	**0.14**	**0.15**	**0.24**	**0.04**

Source: Diatreme

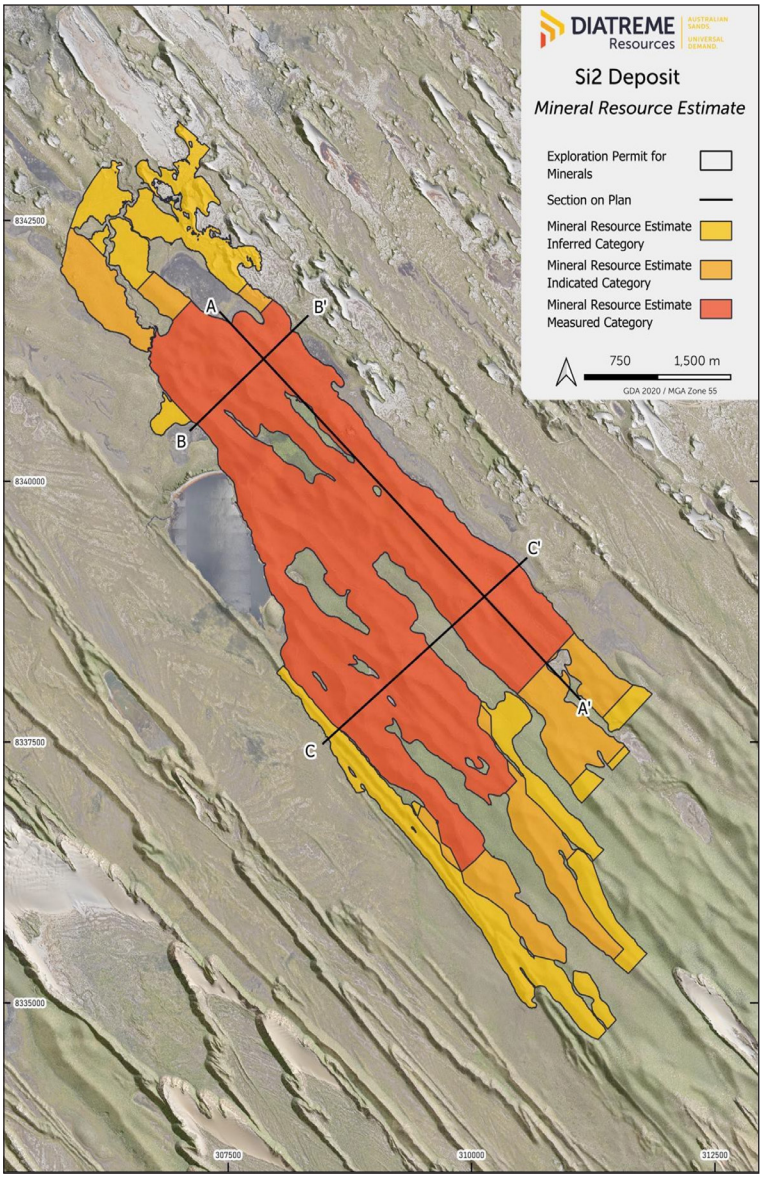
Table 4: NSP Exploration Targets - 2023

NSP Exploration Targets - 2023		
Exploration Target	**Tonnage Range**	**Grade Range**
Casuarina Silica Deposit	70 - 240 Mt	**98.5 - 99.9% SiO_2**
WDR Exploration Target	40 - 130 Mt	
Si2 Exploration Target	140 - 470 Mt	
Total	**250 Mt - 840 Mt**	

Source: Diatreme

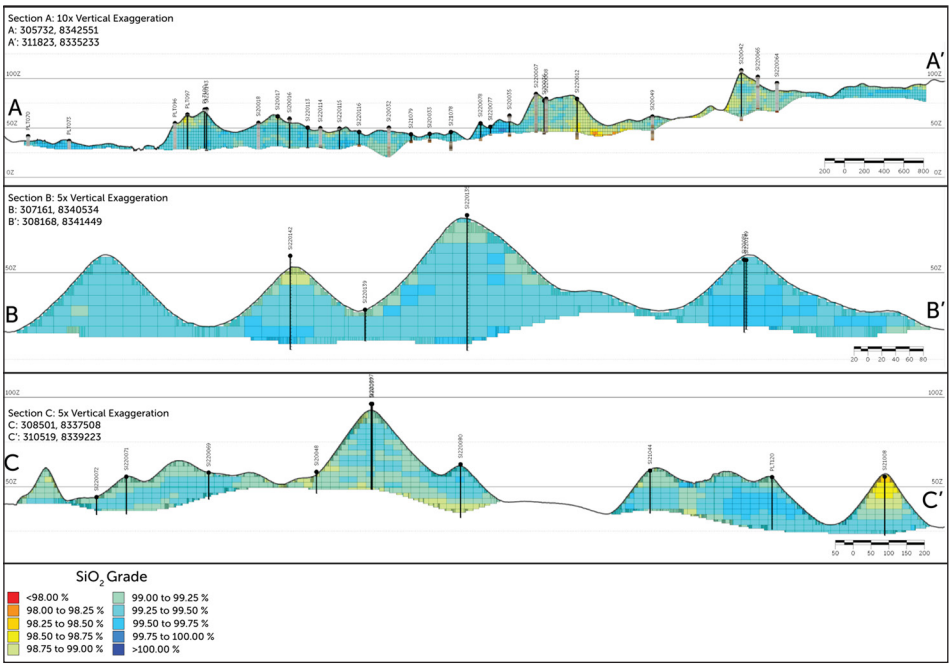
- A cross and long section for Si2 are presented in Figures 8 and 9 (note the vertical exaggerations) - this shows that the vertical extents of the mineralisation are controlled by the dune morphology, with the water table forming the base, and tops of the dunes the upper surface of the Resource.
- Plans for the other deposits are shown in the succeeding figures

Figure 8: Si2 deposit plan - refer to Figures 2 and 5 for location



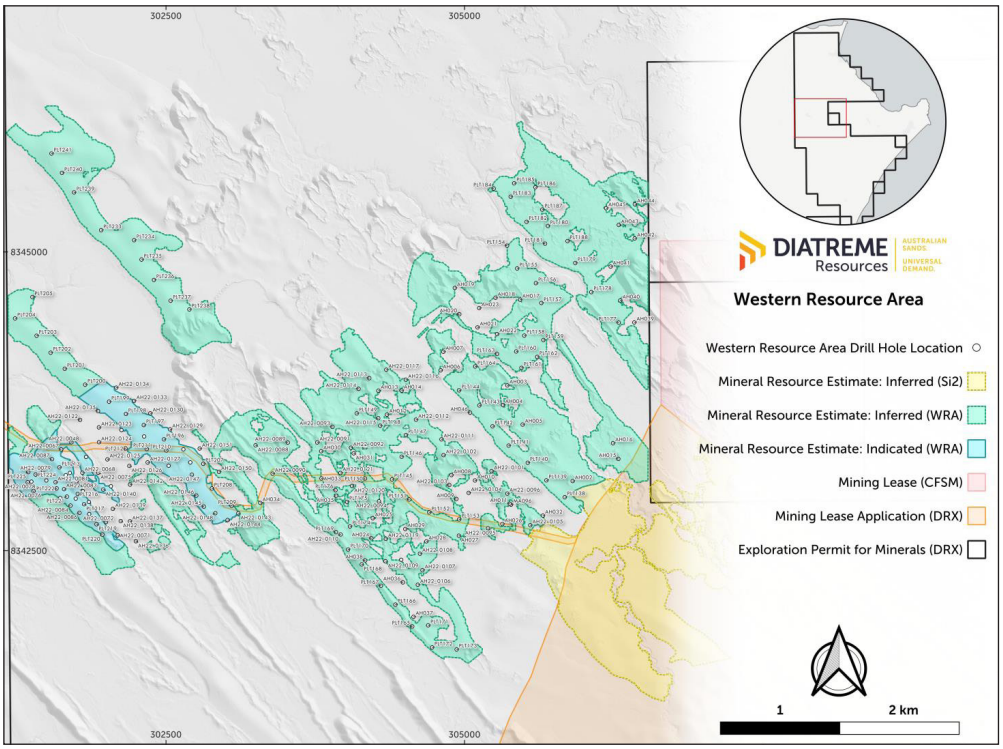
Source: Diatreme

Figure 9: Si2 deposit sections



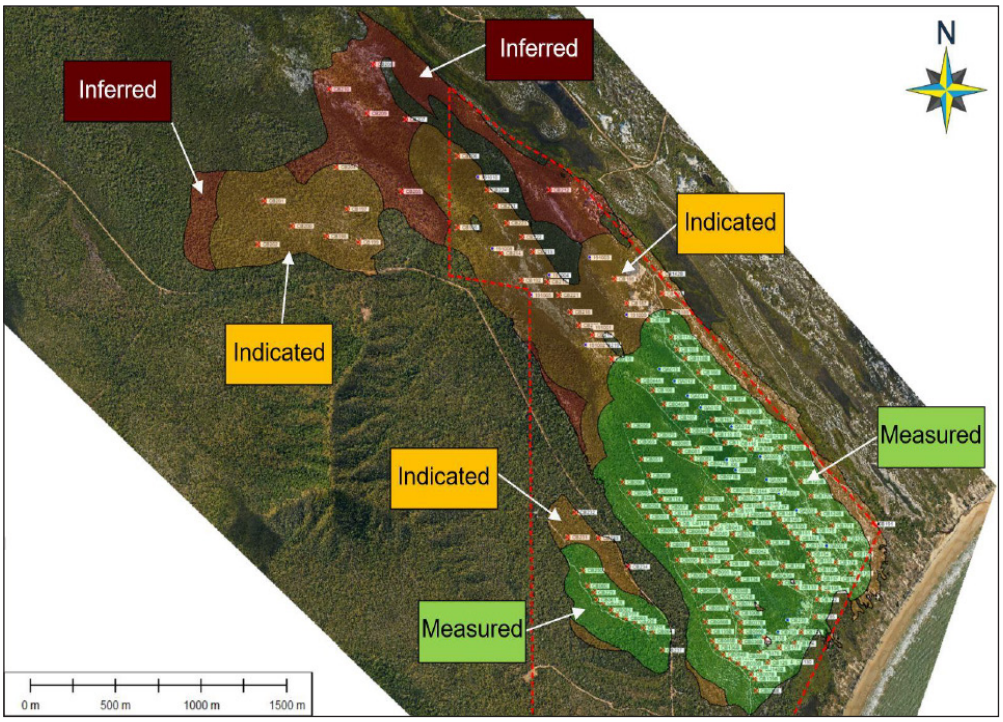
Source: Diatreme

Figure 10: WRA deposit plan - refer to Figures 2 and 5 for location



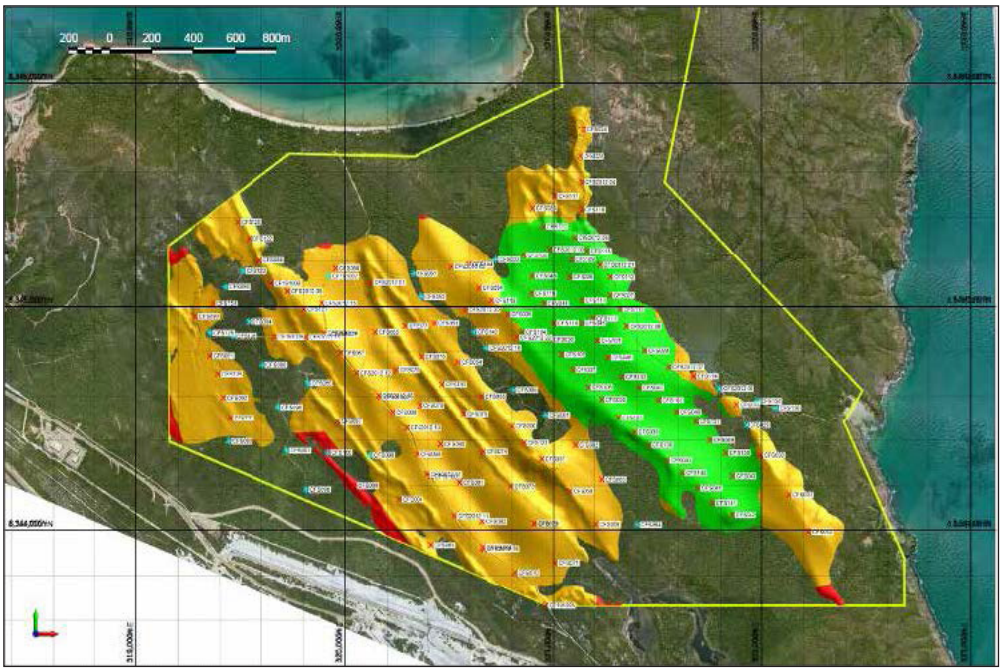
Source: Diatreme

Figure 11: Galalar deposit plan - refer to Figures 2 and 5 for location



Source: Diatreme

Figure 12: CFS deposit plan - refer to Figures 2 and 5 for location



Source: Diatreme

METALLURGY

- Subsequent to the metallurgy as discussed in the sub-section under "Development Studies" below, the Company has undertaken further metallurgical testwork, including on a one tonne bulk sample, with results reported in the March, 2025 Quarterly Report.
- This included benchtop characterisation work, which confirmed the ability to produce a HPSS with iron at 100 ppm, and meeting other criteria (Table 5, Figure 13).
- This demonstrated the capacity to produce silica suitable for the manufacture of PV glass, and satisfies the relevant standards whilst delivering a high silica recovery rate of 94.8%.
- Material intersected in the drilling also largely fell within the optimal 0.71 to 0.106 mm particle size (Figure 13), again meeting or exceeding required specifications.
- Optimization work is planned, and should result in lower iron levels, which will result in the delivery of a premium product.

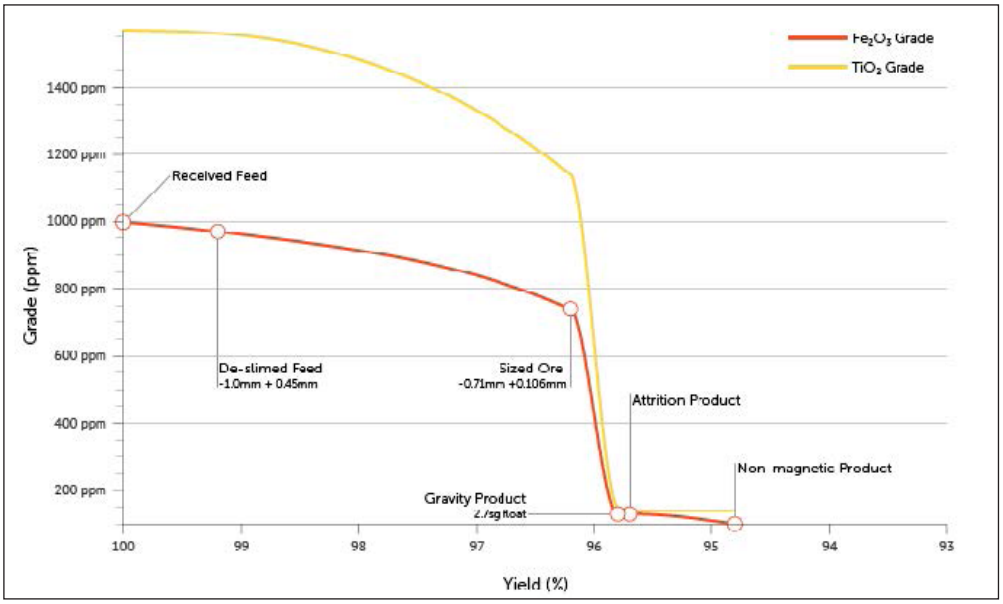
- A key aspect is that the bulk sample was collected over a broad area,and highlights the consistency of the mineralisation.
- This is a critical aspect, given that potential customers are after consistency of supply over a long time frame.

Table 5: Benchtop characterisation results

Benchtop characterisation results		
Chinese National Standard Criteria		Benchtop Characterisation Results
Fe_2O_3	<= 100 ppm	100 ppm
TiO_2	<+300 ppm	140 ppm
Cr_2O_3	<= 5 ppm	2 ppm
0.104 mm Fraction	<= 5%	0.3%

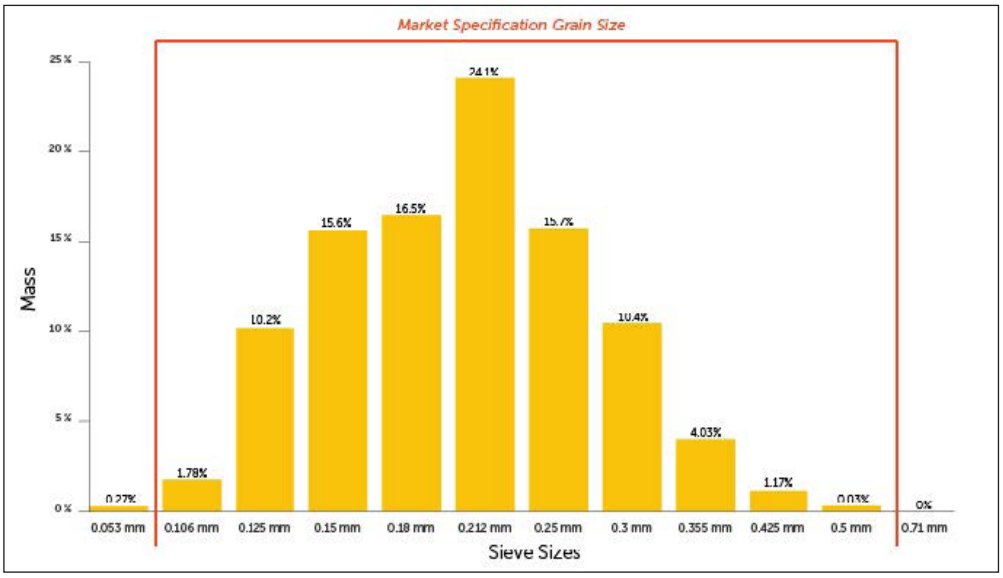
Source: Diatreme

Figure 13: Benchtop characterisation performance



Source: Diatreme

Figure 14: NSP product grain size



Source: Diatreme

DEVELOPMENT STUDIES

Background

- Three development studies have thus far been completed on the original Diatreme silica sand projects - a 0.75 mtpa Scoping Study (9/9/19) and 1.32 mtpa PFS (9/11/21) for the GSP, and the 3 mtpa, expanding to 5 mtpa Scoping Study for the NSP, with the latter discussed in detail below.
- The GSP studies will not be discussed in detail, except that the PFS had an expected capex of A$67.9 million, and total costs of A$34/t FOB.
- Initially, the plan was to barge from a transhipment facility at Nob Point south of Cape Bedford, however this was then changed to include trucking to Cape Flattery, with transhipment from the designated Cape Flattery Port area.
- Two studies were completed on the CFS by Metallica - a PFS in 2022, and a DFS, released to the market on July 17, 2023.
- The MLM DFS envisaged a 25 year operation, yielding 1.4 to 1.5 Mtpa of HPSS, with an upfront capital cost of A$165 million, and pre-tax NPV_{10} of A$437.3 million - the AISC was estimated at A$37.90/product tonne.
- This Study envisaged a transhipment facility to the north of the headland at Cape Flattery - as for the GSP Study, this will not be discussed further, and is currently being reviewed by the Company.

NSP Scoping Study

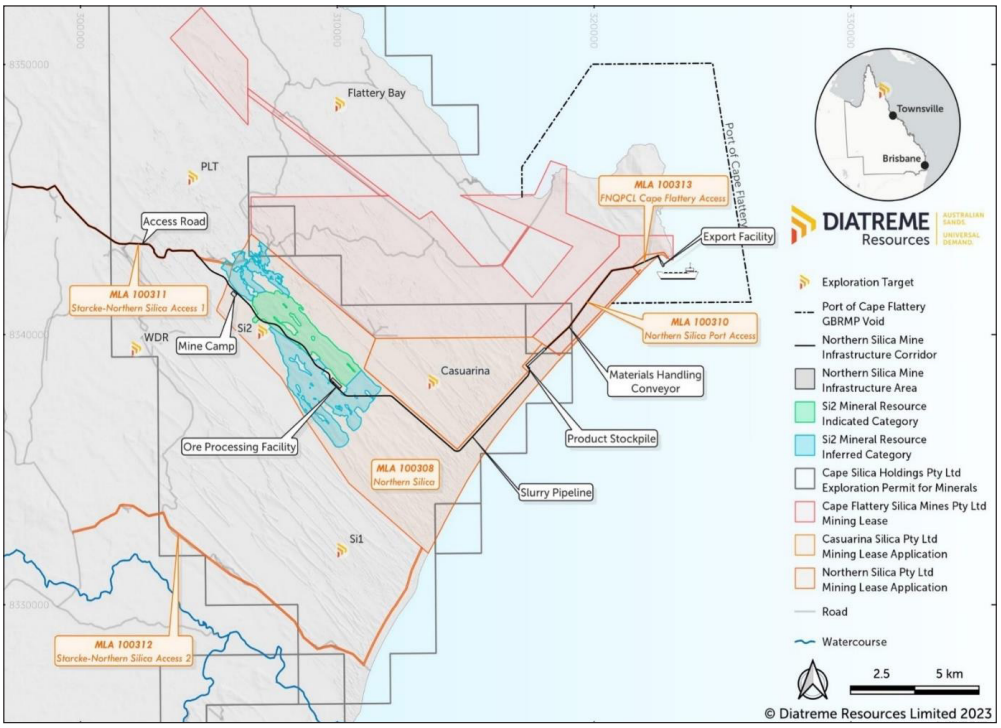
- This section reiterates what was presented in the Initiation Report - no updates have been made by the Company in the interim.
- The NSP Scoping Study was released to the market on June 14, 2023, and is based on an initial two year Phase 1 operation mining 3.75 Mtpa of sand, to produce 3.0 Mtpa of saleable HPSS, at a yield of 80%.
- This will then be followed by a 6.25 Mtpa mining operation, to produce 5 Mtpa of HPSS for a further modelled 23 years, for a total operational life of 25 years, preceded by a one year construction period - as shown in Figure 3, the target is to commence production late in CY2026.
- Key parameters are shown in Table 6, and the conceptual site layout in Figure 15.

Table 6: NSP Scoping Study parameters and outcomes

NSP Scoping Study parameters and outcomes		
Item	**Unit**	**Value**
NPV (pre-tax)	A$M	1,410
IRR (pre-tax)	%	33
NPV (post-tax)	A$M	829
IRR (post-tax)	%	32
WACC	%	10
Payback Years	Years	6
Mine Life	Years	25
LOM Net Revenue	A$M	9,783
LOM Opex	A$M	2,298
LOM Sustaining Capex	A$M	180
Total Capex	A$M	535
Sales Price (FOB)	A$/t	81
Shipping and Marketing	A$/t	24
FOB Cost (C1 Costs)	A$/t	27.40
Queensland State Royalty	A$0.90/wmt silica sand sold	
Traditional Owner Royalty	Estimated 2% of project revenue on a FOB basis (to be subject to agreement)	

Source: Diatreme

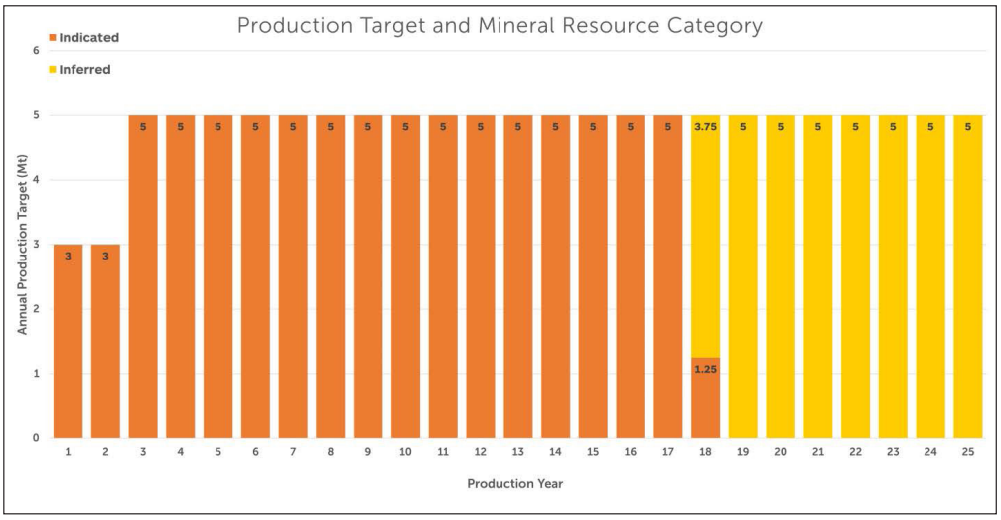
Figure 15: NSP conceptual site layout (note that the WRA is not shown here, but corresponds with PLT)



Source: Diatreme

- Figure 16 presents the modelled HPSS production and resource category as of the time of the Study.
- We note that this used 32% Inferred Resources, however the subsequent MRE update should allow for most of, or even all of this to be sourced from Measured Resources.

Figure 16: NSP production target and resource category



Source: Diatreme

- Tables 7 and 8 present the capital and operating costs estimates - we have reviewed and compared these with other similar projects (including heavy mineral sands), and our view is that they are reasonable.
- Given the previous work on the GSP, we would view the accuracy more akin to the +-20% for a PFS, rather than the +-35% as quoted.

Table 7: NSP capital cost estimates

NSP capital cost estimates			
Item	**3 Mtpa**	**5 Mtpa Expansion**	**5 Mtpa**
Mining	Equipment Leased	Equipment Leased	Equipment Leased
Processing	$ 93,500,000	$ 23,600,000	$ 117,100,000
Common Services	$ 8,900,000	$ 400,000	$ 9,300,000
On Site Infrastructure	$ 61,900,000	$ 1,800,000	$ 63,700,000

Off Site Infrastructure	$ 78,300,000	$ 97,600,000	$ 175,900,000
Pre-Production Cost	$ 9,700,000	$ 7,000,000	$ 16,700,000
Owners / Indirect Cost	$ 56,900,000	$ 25,300,000	$ 82,200,000
Subtotal	**$ 309,200,000**	**$ 155,800,000**	**$ 465,000,000**
Contingency	$ 46,400,000	$ 23,400,000	$ 69,800,000
Total	**$ 355,600,000**	**$ 179,200,000**	**$ 534,800,000**

Source: Diatreme

Table 8: NSP operating cost estimates

NSP operating cost estimates						
Item	**3 Mtpa**			**5 Mtpa**		
	AUD/y	**AUD/t Prod**	**AUD/t Ore**	**AUD/y**	**AUD/t Prod**	**AUD/t Ore**
Labour	$ 10,300,000	$ 3.43	$ 2.74	$ 12,000,000	$ 2.39	$ 1.91
Flights and Accommodation	$ 400,000	$ 0.08	$ 0.07	$ 400,000	$ 0.08	$ 0.07
Fuel	$ 4,100,000	$ 1.37	$ 1.10	$ 4,900,000	$ 0.97	$ 0.78
Maintenance	$ 8,900,000	$ 2.98	$ 2.38	$ 14,000,000	$ 2.79	$ 2.23
Reagents and Consumables	$ 200,000	$ 0.06	$ 0.05	$ 300,000	$ 0.06	$ 0.05
Equipment Hire/Lease	$ 26,500,000	$ 8.85	$ 7.08	$ 37,500,000	$ 7.49	$ 5.99
Transport and Logistics	$ 12,900,000	$ 4.29	$ 3.43	$ 16,000,000	$ 3.19	$ 2.56
Contract/General Expenses	$ 7,600,000	$ 2.53	$ 2.02	$ 7,700,000	$ 1.53	$ 1.22
Sustaining Capital	$ 7,400,000	$ 1.49	$ 1.19	$ 7,400,000	$ 1.49	$ 1.19
Total	**$ 78,300,000**	**$ 25.07**	**$ 20.06**	**$ 100,200,000**	**$ 19.99**	**$ 15.99**

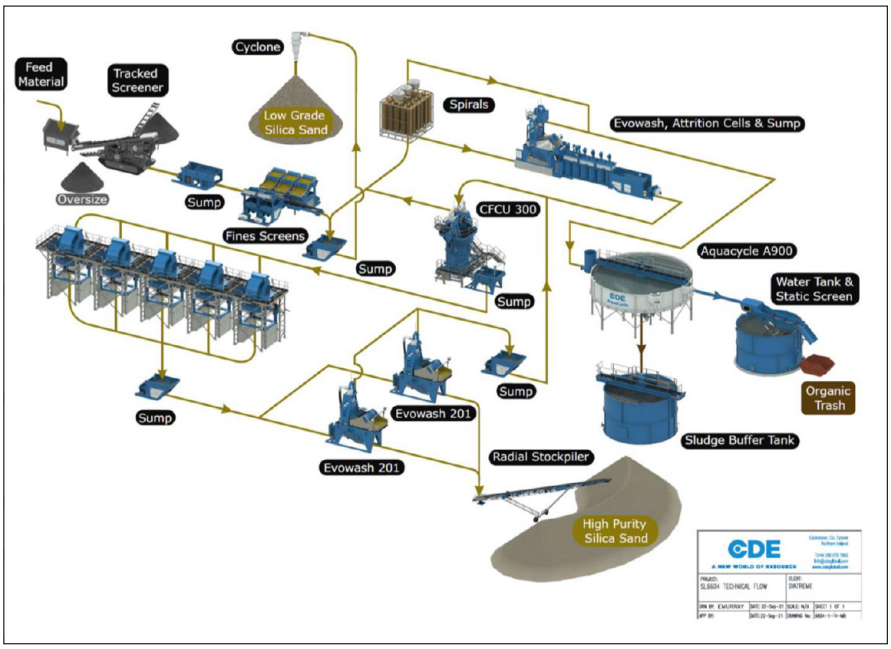
Source: Diatreme

Planned Operations

- All land based activities will be company run and managed, with mining activities using leased equipment.
- Personnel will include a mixture of FIFO (generally skilled labour and management) and local labour, with the local personnel being bussed into site on a daily basis.
- The planned operation and material handling includes:
  - Removal of vegetation by dozer, which will be stockpiled off the mining areas for use in rehabilitation,
  - Mining of the sand by front end loaders, with mined material fed directly into hopper-feeder units, which will feed into mobile mining units ("MMU") located in the mining areas,
  - The MMU will screen out oversize and vegetation, with a 100 mm grizzly and then a 4 mm vibratory wet screen/trommel; and,
  - The undersize slurry will then fall into a sump, and then piped to the fixed silica processing plant ("SPP").
- The SPP will be a maximum of ~5 km from the MMU.
- The purpose of the SPP is to process the feed from the MMU, including to size (classify) and remove deleterious minerals, such as iron and titanium - as such the main components will include:
  - Feed receival and top size control (through screening),
  - Gravity beneficiation,
  - Attritioning (for cleaning),
  - Classification,
  - Reject sand removal; and,
  - Water services.
- The product will then be piped to the drying and stockpile area as a slurry (10 km), with drying, and then stockpiling through a stacker reclaimer, which will also be used for feeding a 6 km conveyor from the stockpiles to the port for shipping.
- Waste material (tails) is planned to be placed back into the mining voids and used in site rehabilitation - mining will be progressive, with rehabilitation being undertaken in parallel.

- A conceptual representation of the processing plant layout is shown in Figure 17 - note that this is from the GSP PFS, and thus the layout and number of processing trains will differ, and also shows a radial stacker adjacent to the plant, rather than a linear stacker 10 km from the plant.
- Major components will be modular, allowing for the ready upgrade to Phase 2, and for any future expansions.

Figure 17: Conceptual processing plant layout

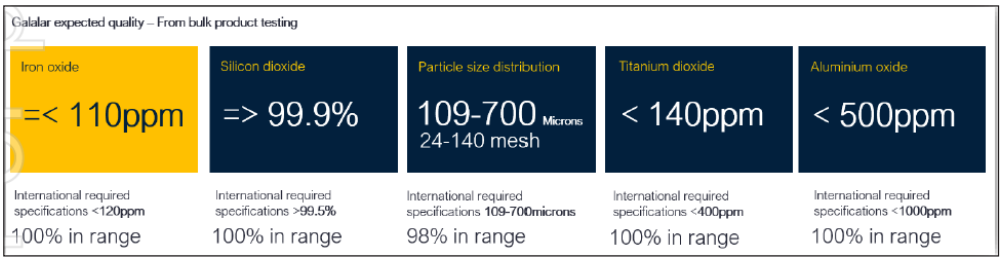


Source: Diatreme

Metallurgy

- This is the critical technical aspect of the planned operation, with the requirement to consistently produce an in-spec product over a long period of time.
- As discussed, the main contaminants include:
  - Iron, predominantly as oxides coating silica grains, and in iron-titanium oxides,
  - Titanium, in iron-titanium oxides; and,
  - Aluminium oxide, generally in clay materials.
- The combination of spirals (which will remove the heavy mineral fraction, including Fe-Ti oxide) and attritioning (which will remove iron oxide and clays coating the silica grains) has been demonstrated to largely produce a product to meet the 120 ppm Fe_2O_3 threshold.
- Further treatment through magnetic separation has the potential to remove further iron, that may allow the product to meet premium specifications with <80 ppm Fe_2O_3 - <110 ppm has been achieved in test work to date (Table 9).
- Table 8 presents results of test work on four samples - three of these met the target Fe_2O_3 grade of 120 ppm, with 100 ppm or lower reached after magnetic separation, and were within required specifications for the other parameters.
- We note the high yields of over 90% in the bench scale testwork, however the Company has used potential yields of ~80% from the commercial scale equipment in modelling.
- The Company is investigating the cost/revenue trade-off in producing higher grade products as part of the metallurgical optimisation in the ongoing PFS.
- As a comparison, Figure 18 shows the specifications achieved for the GSP, which again produced in-spec material from the test work completed.

Figure 18: GSP product specification



Source: Diatreme

Table 9: NSP metallurgical characterisation summary

NSP metallurgical characterisation summary						
	Fraction	% wt	SiO_2	Al_2O_3	Fe_2O_3	TiO_2
		to feed	%	ppm	ppm	ppm
Sample 1	-710+106µm	96.4	99.5	1020	1220	1960
	gravity float (-2.7sg)	95.9	99.9	330	110	150
	attritioned product (+106µm)	95.6	99.9	310	100	140
	non-magnetic product	94.8	99.9	310	100	140
Sample 2	-710+106µm	95.2	99.5	880	1020	1600
	gravity float (-2.7sg)	94.8	99.9	350	130	170
	attritioned product (+106µm)	94.2	99.9	320	110	150
	non-magnetic product	93.3	99.9	310	100	150
Sample 3	-710+106µm	97.7	99.7	700	570	870
	gravity float (-2.7sg)	97.5	99.9	260	140	150
	attritioned product (+106µm)	96.9	99.9	260	120	150
	non-magnetic product	95.9	99.9	250	110	150
Sample 4	-710+106µm	97.5	99.6	800	860	1250
	gravity float (-2.7sg)	97.2	99.9	340	230	180
	attritioned product (+106µm)	96.3	99.9	310	200	160
	non-magnetic product	90.6	99.9	310	190	160

Source: Diatreme

Site Infrastructure

- The ancillary infrastructure will include those facilities typical of a remote minesite, including an accommodation village, offices, workshops and utilities amongst others.
- The utilities will include onsite power generation (with expected power usage of 7 MW for the 3 Mtpa operation, and 10 MW for 5 Mtpa), water bores and reticulation, and an on-site commercial sewage treatment plant.
- With regards to power, the Company is investigating various options and undertaking optimisation studies, however it is likely that generation will include a mix of solar and wind generation, with diesel generator backup.

Transport and Port

- The current NSP Scoping Study is predicated on using Cape Flattery, utilising barge transshipment for the Phase 1, 3 mtpa operation, and then extending the existing jetty and installing additional ship loading facilities for the 5 mtpa Phase 2 operations.
- However there may be the option to use the current facilities from the start of operations - as mentioned earlier Diatreme, Mitsubishi and Ports North have formed a working group to investigate shipping options for Diatreme's products.
- The Company initially plans to construct a rock wharf and associated roll-on roll-off (RORO) landing craft loading and unloading area, to be used during construction, and also for supplies during operations.
- This will then be equipped with a radial arm barge loader for the two years of 3 Mtpa production, to load barges used for transhipping to vessels moored offshore in the port area.

- Whilst the initial operations are underway, a 260 m extension is planned for the existing jetty, with Diatreme's conveyor system being extended, and a new ship loader being installed, to directly load 55,000 t Supramax vessels for export.
- As mentioned previously, there may be the option to negotiate the use of the existing infrastructure for the life of operation, which has the potential to save up to ~ A$150 million in up-front capital costs.

Sales, Marketing and Offtake

- The Scoping Study has been predicated on sales to Asia, largely China, with prices on a FOB basis.
- Although the Chinese buy material on a CIF basis, costs ex-Cape Flattery Port have been subtracted from the CIF price, with a product price of A$81/tonne being used in the Scoping Study.
- This pricing used in the modelling was based on the midpoint of 500-600 RMB per tonne PV HPSS CIFFO, and shipping and marketing costs of A$24/tonne.
- There may also be the potential to share offtake and marketing with Mitsubishi.

VALUATION

- We have updated our valuation of Diatreme, still using a "sum of the parts" NAV method – this includes the projects and items as shown in Table 10.
- Changes since our 2023 report include:
  - Shares on issue have increased from 3.73 to 5.0 billion, largely through the Metallica takeover,
  - The cash position has changed,
  - We have included the CFS at $30 million - this was the enterprise value of MLM when the takeover was finalised; and,
  - We have increased the risk multiplier for the NSP given advances in the Project.
- The main effect has been the dilution, with the valuation decreasing ~10% from A$0.07/share to A$0.067/share, still 4x the current share price.
- This is a base case valuation, and we would expect this to increase with material advances and project derisking.
- This highlights a robust project, with an NPV at a 2x multiple of the expected two phase capex of A$535 million, and with an IRR of 34%.
- We also have a maximum EBITDA of ~A$300 million, implying a valuation of A$1.5 billion using a 5x multiple.

Table 10: Diatreme NAV valuation

Diatreme NAV valuation						
Item	**Tech Value**	**Equity Share**	**Risk Multiplier**	**Equity Risked**	**Per Share**	**Notes**
NSP	$1,062	73.2%	25%	$194	$0.039	NPV10
WRA	$435	73.2%	10%	$32	$0.006	NPV/Tonne
GSP	$358	73.2%	10%	$26	$0.005	NPV10
Exploration Targets	$2,586	73.2%	2%	$38	$0.008	NPV/Tonne
CFS	$30	100%	100%	$30	$0.006	Acquisition
Cyclone	$120	100%	10%	$12	$0.002	2018 DFS
Clermont	$5.00	100%	100%	$5	$0.001	JV Terms
Head Office	-$16.11	100%	100%	-$16	-$0.003	NPV10
Cash (Not inc NSP)	$4.14	100%	100%	$4	$0.001	Actual
Cash (in NSP)	$13.70	73.2%	100%	$10	$0.002	Actual
Total	**$4,597**			**$335**	**$0.067**	
Discount Rate	10.00%	Shares (m)	5,008	HPSS Price FOB	**$81**	

Source: IIR analysis

- We have applied the current share structure for the per share valuation, due to uncertainties in what the final capex may be (including whether an agreement is reached to use the existing loading facilities at Cape Flattery) and what the final funding and ownership structure may be.

- The discounting, both the discount rate used, and the project multiplier, also provide some buffer against change in per share values due to dilution.
- In broad terms, should project ownership stay the same, and a 30/70 equity/debt mix be used, we could expect dilution attributable to Diatreme shareholders in the range of 1,100 million shares (no new port) to 1,800 million shares (new port as included in the Scoping Study).

This implies a diluted per share value of between $0.049 to A$0.055/share using the current discount rate (10%) and risk multiple (25%) for the NSP, however an even modest derisking brings the diluted per share value to within reasonable agreement of the undiluted per share value as shown in our headline valuation.

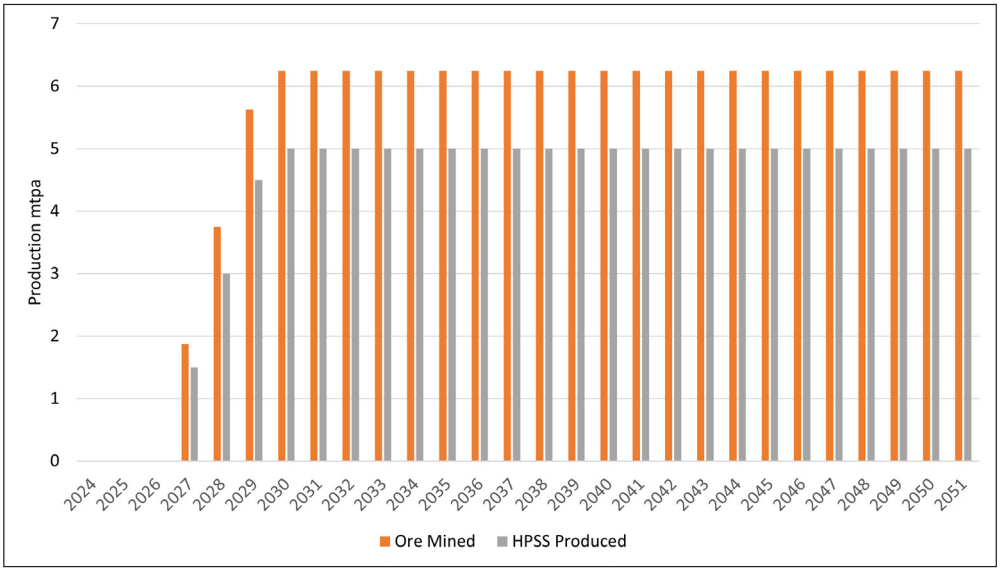
- This also assumes capital is raised at A$0.05/share, significantly above the current price, but we would expect the value to improve on material advances in the Project, including completion of a positive PFS and then DFS, successful permitting, to have the Project shovel ready.
- Brief notes on the methods used to calculate the overall technical valuations include:
  - NSP - after tax DCF at a 10% discount rate, largely using inputs as provided in the Company Scoping Study,
  - GSP - valued on the PFS results,
  - WRA - we have used an NPV per resource tonne based on the results of the NSP Scoping Study, and multiplied that by the total resource (not reserve) tonnage,
  - CFS - valued on the enterprise value of Metallica at completion of the takeover,
  - Exploration targets - likewise, the NSP, NPV/tonne multiplied by the mid-point of the exploration target tonnage,
  - Cyclone - NPV as provided in the most recent development study,
  - Clermont - Diatreme equity value as determined by the MLM farm-in terms,
  - Head Office - NPV_{10} of pre-tax costs of A$1.5 million pa, over the life of the modelled NSP project; and,
  - Cash - both that which is 100% attributable to Diatreme, and not including that in the Sibelco JV, and the cash within the JV.
- We have applied the ownership to the relevant items, and discounted these to arrive at a discounted value attributable to Diatreme, with risk multiples determined due to the stage or type the relevant item:
  - A rule of thumb is that fully funded, approved and "ready to go" projects have a value of around 40-50% of their technical value or NPV - the 25% and 10% applied respectively to the NSP and GSP reflect the earlier stage, and also, in the case of the GSP, the potential of a higher permitting risk,
  - Although the WRA has a lower Resource confidence as the GSP, we have applied the same risk multiple, to reflect what may be considered a lower permitting risk for the WRA; and,
  - The 2% applied to the exploration targets again applies a rule of thumb, is that these can be valued at between 1% and 5% of NPV.

NSP DCF VALUATION

- This is an unfunded after tax valuation, largely using costs, prices and other inputs as used in the Company's recent Scoping Study - our view is that the figures used are reasonable, and within the accuracy expected of a study of this type.
- As mentioned earlier we would expect it to be more accurate than the +-35% as quoted in the document, given the previous work on the GSP (to a PFS standard), and thus more akin to +-20% in accuracy.
- One difference in our modelling is that we have allowed for what may be considered conservative ramp-ups in production - we have allowed for 50% production in the first year of Phase 1 (1.5 Mtpa of product), and 50% of the difference between Phase 1 and Phase 2 in the first year of the Phase 2 production (therefore with production of 4 Mtpa).
- In reality these have a minimal effect on the overall valuation and project cash flows.
- Production and cash flow profiles are shown in Figures 19 and 20 - note that the cash outflows in the year after production ends represent tax paid.

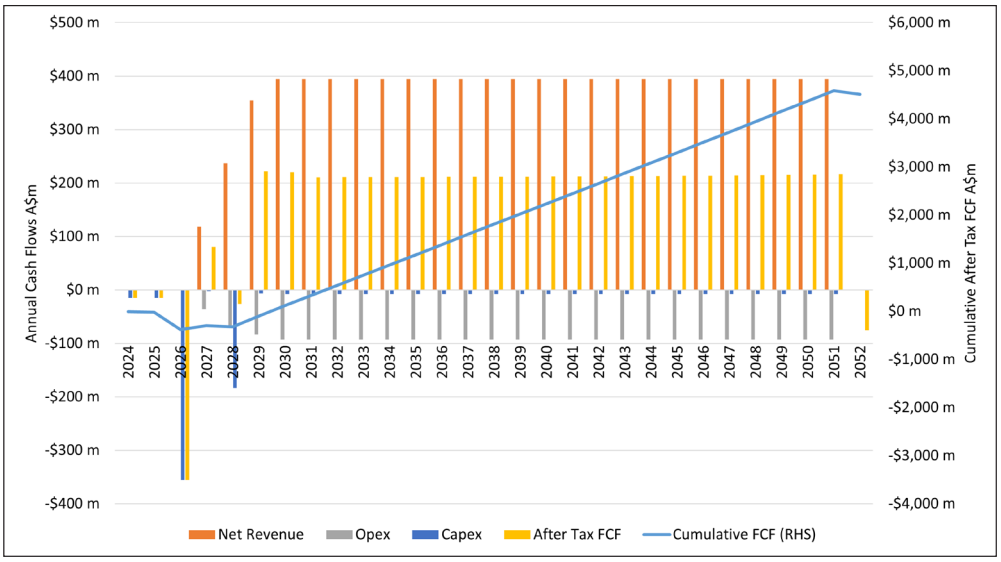
- We have not included any significant mine closure costs.

Figure 19: Conceptual NSP RoM and product tonnages - IIR modelling (100% basis)



Source: Diatreme

Figure 20: Conceptual NSP cashflows - IIR modelling (100% basis)



Source: Diatreme

Sensitivity

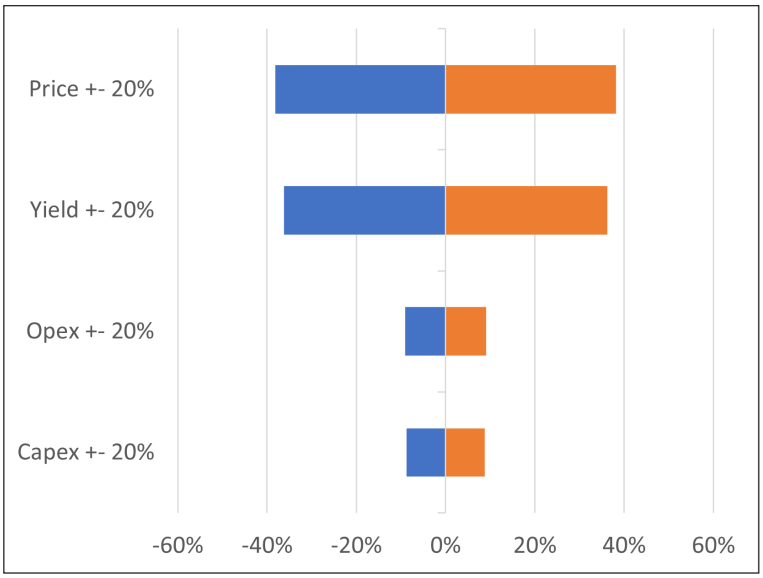
- Table 11 and Figure 21 present the sensitivity of our NSP modelling to up to 20% changes in key parameters.
- These can be split into two groups - costs (capex and opex), and revenue (yield, production, price and exchange rates).
- Changes in the different revenue inputs should largely have the same effect on valuations and cash flows, however there will be some minor differences.
- However, there are generally significant differences between the effect of changes in capex (generally relatively low on a project NPV basis) and opex (generally high).
- Changes in capex will however have a magnified effect on a per share basis, given dilution due to having to raise additional equity.
- However, in the case of the NSP, the effect of changes in opex are reasonably low, given the relatively high margin of the project.
- The similarity to the effect of changes in capex is largely due to capex being upfront, with only limited discounting of costs in the DCF, whereas opex is consistent throughout the project life, and thus is more strongly discounted.
- What this analysis does is, however, highlight a robust project.

Table 11: NSP NPV sensitivity - 100% basis

NSP NPV sensitivity - 100% basis				
Change	**Opex**	**Capex**	**Yield**	**Price**
-20%	$1,158	$1,154	$679	$657
-15%	$1,134	$1,131	$774	$758
-10%	$1,110	$1,108	$870	$859
-5%	$1,086	$1,085	$966	$961
0%	$1,062	$1,062	$1,062	$1,062
5%	$1,038	$1,039	$1,157	$1,163
10%	$1,013	$1,015	$1,253	$1,264
15%	$989	$992	$1,349	$1,365
20%	$965	$969	$1,445	$1,466

Source: IIR analysis

Figure 21: Conceptual NSP cashflows - IIR modelling (100% basis)



Source: IIR analysis

- We also measure the potential robustness of a project through the sensitivity analysis of coincident changes in inputs - in this case we have used product prices and operating costs, as shown in Table 12.
- This confirms a robust project, in that adverse 20% movements in both factors can be absorbed, and still result in reasonable returns.

Table 12: NSP NPV and IRR sensitivity - 100% basis

NSP NPV and IRR sensitivity - 100% basis						
		Change in Revenue Factors				
	NSP NPV_{10}	**-20%**	**-10%**	**0%**	**10%**	**20%**
Change in Operating Costs	**-20%**	$754	$956	$1,158	$1,360	$1,562
	-10%	$705	$908	$1,110	$1,312	$1,514
	0%	$657	$859	$1,062	$1,264	$1,466
	10%	$609	$811	$1,013	$1,216	$1,418
	20%	$561	$763	$965	$1,167	$1,370
	NSP IRR	**-20%**	**-10%**	**0%**	**10%**	**20%**
	-20%	27.5%	31.7%	35.8%	39.8%	43.7%
	-10%	26.4%	30.6%	34.8%	38.8%	42.7%
	0%	25.4%	29.6%	33.7%	37.8%	41.7%
	10%	24.3%	28.6%	32.7%	36.8%	40.7%
	20%	23.2%	27.5%	31.7%	35.8%	39.7%

Source: IIR analysis

BOARD AND MANAGEMENT

- **Mr Wayne Swan – Independent Chairman:** Mr Swan was appointed a Non-Executive Director and Chairman of Diatreme Resources in November 2021. Mr Swan enjoyed a lengthy career in Australian federal politics, serving as Treasurer of Australia from 2007 to 2013 and Deputy Prime Minister of Australia from 2010 to 2013. Since retiring from Parliament in 2019, Mr Swan has served as national president of the Australian Labor Party, Director of Stanwell Corporation, and Chairman of CBUS.
- **Ms Kara Keys – Independent Non-Executive Director, Deputy Chairperson:** With strong board and financial credentials, Ms Keys is an experienced company director. Ms Keys' is a consummate advocate for economic empowerment, First Nations justice, gender equity and health and safety at work. Ms Keys is a proud First Nations Australian, descending from the Yiman and Gangulu peoples of Central Queensland. Ms Keys has worked closely with Indigenous communities, including serving for six years as a National Campaign Director and prior to that as the National Indigenous Officer at the Australian Council of Trade Unions. She was appointed a Non-Executive Director of Diatreme Resources in July 2023. In October 2024, she was appointed Deputy Chairperson, reflecting Diatreme's strong commitment to stakeholder engagement, including Traditional Owners.
- **Mr Brian Flannery – Non-Executive Director:** A globally experienced mining business leader and executive, Mr Flannery was appointed a Non-Executive Director in October 2024 to help drive development of the Company's silica sand projects. With more than 40 years' global experience as a mining engineer, Mr Flannery has an outstanding track record of successful resources development, with expertise in all aspects of project management. He has recently focused on growing his own family office with interests spanning resources, energy and property development.
- **Mr Tom Cutbush - Non-Executive Director:** A globally experienced mining executive, Mr Cutbush brings more than 30 years of executive management and board experience in Australian and international companies, with a strong track record of delivering successful mining projects including in the global silica sands industry.

  Currently serving as a director of Sibelco Australia, Mr Cutbush's previous roles at the global material solutions leader include CEO of Sibelco Europe and Global Operations Manager, Sibelco Group. He also previously worked for 15 years at Exxon including in the Hunter Valley, NSW, before switching to industrial minerals with his appointment as Managing Director of Normandy Industrial Minerals, ultimately becoming Unimin Australia and Asia, before joining Sibelco.
- **Mr William Wang – Independent Non-Executive Director:** Mr Wang holds a finance major from The Chinese University of Hong Kong and has held senior management positions in several major Chinese state-owned companies. Based in Australia since 2002, Mr Wang has held directorships in a variety of Australian listed companies. He was appointed a Non-Executive Director of Diatreme Resources in May 2011.
- **Mr Michael Chapman – Independent Non-Executive Director:** Mr Chapman, an experienced mining engineer with more than 40 years' experience in the development, engineering, construction and management of open-cut and underground mining projects globally, including key roles at White Energy Company (ASX:WEC) and Felix Resources. He was appointed a Non-Executive Director of Diatreme Resources in August 2020.
- **Mr Neil McIntyre – Chief Executive Office:** Mr McIntyre, has over 30 years in mining and investment banking, has shaped resource companies in the Pacific region and holds recognition as an MBE for his contributions to commerce and finance in PNG. Mr McIntyre is a Member of the Australian Institute of Company Directors and held positions as Chairman, Executive Director, Director Finance and Non-Executive Director in various listed and unlisted minerals and petroleum exploration companies regionally.
- **Mr Tuan Do – Chief Financial Officer and Company Secretary:** Tuan Do, a key figure in Diatreme, with more than 30 years' practical finance and management experience across a variety of industries, brings a range of experience from financial reporting, treasury management, capital raisings, mergers and acquisitions, and establishment of systems and procedures. Mr. Do has a degree in Commerce & Business Administration and is a member of Chartered Accountants Australia and New Zealand.
- **Mr Alastair Bauer - General Manager, Development Projects:** Alastair Bauer is an established executive with over a decade in the resources sector, known for leading significant project developments and acquisitions across prominent mining companies in Australia. Previous roles include serving as General Manager/COO of a number of miners

operating across Queensland and the Northern Territory for private and listed companies on the ASX and TSXV. His experience includes delivering major project expansions, restarting mines and spearheading their development.

- **Mr Chris Wicks - General Manager - Commercial:** Chris Wicks, an expert in managing export-focused infrastructure, has a distinguished track record in commercial management and supply chain innovation across key Australia export terminals. Previous experience includes serving as General Manager for export facilities North Queensland Export Terminal and the Adani Abbot Point Terminal, while he has also driven commercial operations at Asciano, Pacific National and other organisations.

APPENDIX 1 - SILICA SANDS MARKETS

BACKGROUND

- Silica sand is a vital ingredient in a wide range of industries and applications, including, amongst others:
  - Glass,
  - Building products,
  - Foundry sands,
  - Fillers and extenders,
  - Chemicals; and,
  - Construction materials.
- Behind water, silica sand, with a global market of some 50 billion tpa (US$151 billion pa) in 2022, is the world's most consumed resource, being a vital ingredient in concrete and glass (and hence a key underpinning of the modern built environment), with resources now being harder to find in a time of rising demand.
- However "sand is not sand" - different specifications are required for different applications, with variables including grain size, sorting and purity amongst others.
- Diatreme is targeting the HPSS (high silica, low iron) markets, particularly for glass making, with Australia being a key supplier to the growing Asian Pacific markets, including China, Japan, Taiwan, South Korea, having exported some 4.2 Mt in 2022, including ~3.1 Mt from Mitsubishi's Cape Flattery operation.
- One issue with the markets are that they are not transparent, with, particularly in the HPSS market, price discovery being based on actual quotes from customers.

GLASS SPECIFICATIONS AND MARKETS

- One key use for HPSS is in PV glass in solar panels, a field that is forecast to grow strongly over coming years with the drive towards "renewable" energy sources - this is the market that Diatreme is targeting, and for which its sands largely meet the stringent specifications.
- However all glass markets in general require high quality sand, with both physical and chemical properties the keys to marketability, unlike construction sands, where physical properties are the key discriminant in applicability.
- Table A1-1 presents an example of specifications and markets (2019) for various glass types in the Pacific Asian markets (including PV glass), which all provide reasonable margin markets.

Table A1-1: HPSS glass uses and markets

HPSS uses and markets				
Use	**Spec - SiO_2**	**Spec - Fe_2O_3**	**Market in Asia**	**Growth in Asia**
Float (Plate) Glass	99.5% SiO_2	200 - 400 ppm	60 - 65 Mt	5% - 6%
Container Glass	99.5% SiO_2	300 - 500 ppm	70 - 75 Mt	5% - 6%
Cover Glass (Solar Panels)	99.5% SiO_2 & Low Fe	<100 ppm	5 - 6 Mt	+30%
Smart Glass (Ultra Clear)	99.5% SiO_2 & Low Fe	<100 ppm	1 - 2 Mt	5% - 6%

Source: VRX 2019 DFS, IIR analysis

PV HPSS MARKETS - DEMAND

- The Pacific Asian markets are the largest globally, producing, amongst others, some 50% of float glass and almost all of the PV glass - China produces 78% of solar panels globally, and as such is a key market for high specification HPSS.
- It is the PV HPSS demand that is forecast to grow the strongest, given the expected growth in demand for solar panels partly driven by legislative factors - the behaviour of the other glass applications can be considered more of a proxy for economic conditions.
- Overall, Asia produces some 93% of PV panels, with, at 6.4%, Vietnam being second behind China as shown in Table A1-2.
- Table A1-2 also shows actual and forecast annual solar panel production, and by inference, HPSS consumption in the manufacture of the panels; Figure A1-1 shows actual and forecast HPSS consumption out to 2030.

- Our previous note had the high end demand growing at 15% CAGR per annum, however the IEA more recently has noted an increase in demand of 35% from 2022 to 2023 (China alone added 260 GW of capacity according to the IEA), and, if Net Zero targets are to be met, the requirement for demand to continue at 30% out to 2030.
- Here we have assumed that the production share by country stays stable, and forecast growth from actual 2023 figures (as published by the IEA) at 10% CAGR and 30% CAGR - these are broadly in line with recent IEA forecasts, with total PV installed capacity to be 5,025 GW by 2030 for the base case, and ~8,800 GW for the accelerated case.
- The growth is presented in new installations of solar panels in GW, with silica sand tonnages based on an intensity of 36,000 tonnes per installed GW, or 50,000 tonnes of glass per installed GW with the PV glass containing ~72% HPSS.
- This results in a total increase in installed capacity of between 3 TW and 7 TW between 2022 and 2030, and total PV HPSS demand of between 106 and 250 Mt - total installed capacity in 2023 was, according to the IEA, 235.8 GW.
- Figure A1-1 shows estimated actual and forecast HPSS demand at the 10% and 30% CAGR growth rates.
- The figures that we have presented highlight the market opportunity, and our view is that actual demand will fall between the 10% and 30% CAGR cases.

Table A1-2: PV markets and forecasts

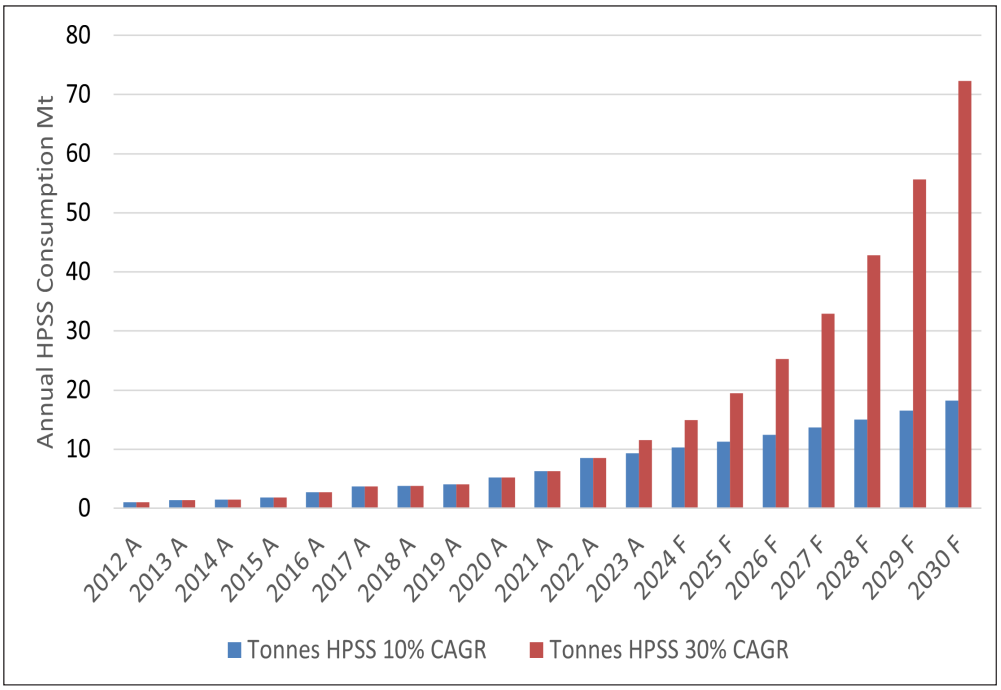
PV markets and forecasts							
Country	Market Share - Current	2022 Actual		2030 10% CAGR		2030 30% CAGR	
		GW - 2022[1]	HPSS kt est[2]	GW - 2030	HPSS est kt	GW - 2030	HPSS est kt
China	77.80%	183.6	6,610	393.2	14,157	1562.2	56,239
Vietnam	6.40%	15.1	544	32.3	1,165	128.5	4,626
Malaysia	2.80%	6.6	238	14.2	510	56.2	2,024
India	1.90%	4.5	161	9.6	346	38.2	1,373
United States	1.90%	4.5	161	9.6	346	38.2	1,373
South Korea	1.90%	4.5	161	9.6	346	38.2	1,373
Thailand	1.20%	2.8	102	6.1	218	24.1	867
Europe	0.60%	1.4	51	3.0	109	12.0	434
Taiwan	0.50%	1.2	42	2.5	91	10.0	361
Canada	0.40%	0.9	34	2.0	73	8.0	289
Singapore	0.30%	0.7	25	1.5	55	6.0	217
Japan	0.10%	0.2	8	0.5	18	2.0	72
Other	4.20%	9.9	357	21.2	764	84.3	3,036
Total	**100.00%**	**235.8**	**8,496**	**505.5**	**18,196**	**2008.0**	**72,286**
Asia	**92.90%**	**219.2**	**7,893**	**469.6**	**16,905**	**1865.4**	**67,154**

Source: IEA, IIR analysis

1: GW - new installed PV capacity in gigawatts

2: HPSS intensity = 36,000 tonnes per GW

Figure A1-1: Forecast PV HPSS demand



Source: IEA and IRR analysis

PV HPSS MARKETS - SUPPLY

- The main user of HPSS is China, with the country importing ~ 1.15 Mt of HPSS in 2022, with around 50% of this coming from Australia, and comprising some 18% of estimated total use of 6.5 Mt.
- The balance of demand (~5.5 Mt) is produced domestically, with a large proportion of this coming from crushed quartz, which is expensive, and environmentally unfriendly, including with a high carbon footprint.
- As shown in Table A1-2, China is forecast to require between 14 Mtpa and 56 Mtpa of HPSS by 2030, an additional 7.5 Mt to 49.5 Mt - this doesn't count the several millions of tonnes that may be required by other Asian markets listed in Table A1-1.
- It is doubtful that China will be able to grow its hard rock, acid-wash operations to cover the expected shortfalls in supply, and thus will be looking at increased imports to supply the solar panel industry.
- Another issue is that HPSS is a bulk commodity, and thus distance to ports and transport costs play a large part in project economics - here Diatreme is at an advantage, given the location adjacent to an exiting port.
- Australia is the ideal jurisdiction to feed into the expected supply shortfall, given location, and the projects that are looking to be developed.
- The estimated growth in demand should be sufficient to allow for full development of the NSP, as well as that planned by the other Australian developers.

GLASS MARKETS SILICA SAND PRICING

- As mentioned earlier, there is limited available pricing data, however publicly released development studies have some pricing.
- Prices are generally quoted in RMB on a CIF basis at a major Chinese port, with released studies by ASX-listed companies using an AUD FOB basis - this is arrived at by converting the RMB value to get an AUD CIF price, and then subtracting the estimated shipping cost to arrive at the AUD FOB price.
- DRX has used a CIF price of 500-600 CNY (US$78 to US$91) for PV HPSS, with a midpoint of A$81/tonne FOB using a shipping and marketing cost of A$24/tonne.
- In the 2019 Arrowsmith North DFS, VRX quoted a range of prices from A$54-79 FOB for a range of qualities, from F80 (80 ppm Fe_2O_3) down to F200 (200 ppm Fe_2O_3), also with different size distributions, however mostly within the 106µm to 600 µm range.

- MLM, in the 2023 Cape Flattery DFS has used FOB pricing of between A$75 and A$90.28/tonne, using real 2025 dollars for HPSS suitable for the PV markets - this has also used shipping costs of A$16/tonne.
- Prices used for PV HPSS in the various studies are all similar, with each of the companies either using external consultants to look at the marketing and prices, and/or visiting potential customers.
- Suvo, in a June 2021 presentation, presented the following prices, although the basis was not given:
  - Glassmaking - US$35 - US$53/tonne,
  - Foundry - US$38 - US$53/tonne,
  - Flour - US$90 - US$150/tonne; and,
  - AFS 60 - US$45 - US$70/tonne.
- If these are on an FOB basis, the glassmaking prices are in line with those from other sources.
- Note that Suvo has also included foundry sands - there is a range of specifications for these, largely relating to grain size distribution, designated using the "AFS" prefix.

DISCLAIMER

(a) Disclaimer

The information, reports, financial models, forecasts, strategies, audio broadcasts and other media (referred to as "Content" throughout this Legal Notice), provided on this web site has been prepared and issued by Altavista Research Pty Ltd trading as Independent Investment Research "IIR", Independent Investment Research Holdings Pty Ltd (ACN 155 226 074), as authorised to publish research under an Australian Financial Securities Licence (AFSL No 420170) which allows Independent Investment Research to offer financial service advice to retail and wholesale clients. Users of this web site should not act on any Content without first seeking professional advice. Whilst the Content contained on this web site has been prepared with all reasonable care from sources which we believe are reliable, no responsibility or liability is accepted by Independent Investment Research, for any errors or omissions or misstatements however caused. Any opinions, forecasts or recommendations reflect our judgement and assumptions at the date of publication or broadcast and may change without notice. Content on this web site is not and should not be construed as an offer to sell or the solicitation of an offer to purchase or subscribe for any investment. We are not aware that any user intends to rely on the Content provided or of the manner in which a user intends to use it. In preparing our Content it is not possible to take into consideration the investment objectives, financial situation or particular needs of any individual user.

Access by any user to this website does not create a client relationship between Independent Investment Research and the user. Users seeking to invest must obtain individual financial advice to determine whether recommendations are appropriate to their investment objectives, personal financial situation or particular needs, before acting on any recommendations. Any Content is not for public circulation or reproduction, whether in whole or in part and is not to be disclosed to any person other than the intended user, without the prior written consent of Independent Investment Research.

(b) Disclosure of Interest

General

Independent Investment Research, its officers, employees, consultants and its related bodies corporate have not and will not receive, whether directly or indirectly: any commission; fee; benefit; or advantage, whether pecuniary or otherwise, in connection with making any recommendation contained on this web site. Independent Investment Research, discloses that from time to time, it or its officers, employees and its related bodies corporate: may have an interest in the securities, directly or indirectly, which are the subject of these recommendations; may buy or sell securities in the companies mentioned in the Content; may effect transactions which may not be consistent with the recommendations in the Content; may have directorships in the companies mentioned in the Content; and/or perform paid services for the companies that are the subject of such recommendations.

However, under no circumstances, has Independent Investment Research been influenced, either directly or indirectly, in making any recommendations contained on this web site.

Corporate Research

Independent Investment Research has or may have, received a fee either directly by a company itself or by a third party, to provide coverage and/or corporate research (the "Fee"). Where a Fee has been received, Independent Investment Research does not publish:

Buy / Hold / Sell recommendations for the security or managed investment schemes.

(c) Copyright Protection

All Content at this web site is protected by copyright. Apart from any use permitted under the Copyright Act (Cth) 1968, you must not copy, frame, modify, transmit or distribute the material at this web site, without seeking the prior written consent of the copyright owner. Content on this web site is owned by the business Independent Investment Research. Users are prohibited from copying, distributing, transmitting, displaying, publishing, selling, licensing, creating derivative works or using any content on the web site for commercial or public purposes

(d) Trade Marks

The trade marks and logos displayed on this web site belong to Independent Investment Research or other parties. Such trade marks include registered trade marks and trade marks pending registration. Users are prohibited from using any of these trade marks, without seeking the prior written consent of IIR or such third party, which may own the trade mark content on this web site.

(e) Limitation of Liability

To the fullest extent permitted by the law, Independent Investment Research and any of its officers, employees, agents, consultants or related bodies corporate disclaim any liability, whether based in contract, tort, strict liability or otherwise, for any direct, indirect, incidental, consequential or special damages arising out of or in any way connected with the use of any Content made available on this web site by any person or entity.

(f) No Warranties

Independent Investment Research does not make any claims, promises, guarantees, representations or warranties regarding the accuracy, completeness or fitness for purpose of the Content made available on this web site. All information on this web site is provided to you on an as is basis, without warranty of any kind either express or implied. To the extent that research can be provided by third parties, Independent Investment Research makes no warranty or representation as to the accuracy or completeness of such information displayed on this site, and accepts no liability for errors or omissions arising from such third party information. To the fullest extent permitted by law, under no circumstances will Independent Investment Research be liable for any loss or damage caused by users reliance upon information obtained through this web site. It is the responsibility of the user to evaluate the accuracy, completeness or usefulness of any information, opinion, general advice or other content made available through this web site. Furthermore, Independent Investment Research does not warrant or represent that this web site is error free or free from viruses or defects. A user must do all that is necessary (including using virus checking software) to satisfy itself that accessing this website will not adversely affect its system.

For further information, please contact IIR at: client.services@independentresearch.com.au

Independent Investment Research LLC
Independent Investment Research (Aust.) Pty Limited

DENVER OFFICE
200 Quebec Street
Suite 200
Denver Colorado 80230 USA
Phone: +1 720 355 0446

NEW YORK OFFICE
Phone: +1 917 336 0818

SYDNEY OFFICE
Level 1, 350 George Street
Sydney NSW 2000
Phone: +61 2 8001 6693
Main Fax: +61 2 8072 2170
ABN 11 152 172 079

MELBOURNE OFFICE
Level 7, 20–22 Albert Road
South Melbourne VIC 3205
Phone: +61 3 8678 1766
Main Fax: +61 3 8678 1826

MAILING ADDRESS
PO Box H297 Australia Square
NSW 1215