Graymont

Oparure Quarry South-Western Pit

Substantive Application s53 comments, Waikato Regional Council

November 2026



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Your comments on the Oparure Quarry Southwestern Pit

Please include all contact details listed below with your comments and indicate whether you can receive further communications from us by email to substantive@fasttrack.govt.nz

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1. We will email you draft conditions of consent for your comment.			
✓	**I can receive emails and my email address is correct.**		I cannot receive emails and my postal address is correct.

1. Introduction

Waikato Regional Council (WRC) welcomes the opportunity to provide comments under s53 of the Fast Track Approvals Act 2024 (FTAA) in relation to the proposal by Graymont (NZ) Limited (the applicant) for the Oparure Quarry Southwestern Pit (the proposal) located on Oparure Road, north west of Te Kuiti.

The central issues addressed in this report are the robustness of the proposed consent conditions and the technical matters requiring further response from the applicant. Section 3 sets out my opinion on the balance between the proposal's environmental effects and its regional and national benefits. Sections 6 to 10 address dust management, the inferred groundwater divide, erosion and sediment control, water quality and aquatic ecology. Outstanding matters include alignment of the exposed-area figures, selection of erosion and sediment control guidance, the performance and maintenance of Infiltration Sediment Retention Ponds, and justification for the proposed 2,000 NTU turbidity trigger.

This report focuses on the aspects of the proposal that are particularly relevant to the Expert Panel's decision making and/or which are of some concern to WRC. In accordance with the request of the Expert Panel, this report also provides comments (including some edits) in relation to the proposed conditions of the resource consents presented by the applicant as Appendix T1 of the application.

This report, providing WRC's comments on the proposal under section 53 of the FTAA, has been prepared by Chris Dawson, a Principal Planner at the Hamilton office of Bloxam Burnett and Olliver (BBO). Chris's qualifications and experience are set out below:

- Bachelor of Social Science in Geography (First Class Honours) and a Post Graduate Diploma in Resources and Environmental Planning, both from the University of Waikato (conferred in 1997).
- Full Member of the New Zealand Planning Institute and Resource Management Law Association.
- Accredited hearing commissioner under the Ministry for the Environment's Making Good Decisions programme (valid until 2029).
- More than 30 years' experience as a Resource Management Planning Consultant.
- Experience in both preparing and processing applications for aggregate extraction activities in the Waikato and Bay of Plenty including sand, rock, limestone and coal extraction projects.

This report has been reviewed and endorsed by Sheryl Roa – Principal Consents Advisor in the Hamilton office of the Waikato Regional Council. Sheryl's qualification and experience are summarised as follows:

- Master of Science degree in Freshwater Ecology and Ecotoxicology from the University of Waikato.
- Sheryl's role at the Waikato Regional Council is as Principal Advisor – Consents, which involves consenting and monitoring of Infrastructure and Mines within the Waikato Region.
- More than 26 years' experience as a consenting and monitoring officer.
- Certified Commissioner under the Ministry for the Environment's 'Making Good Decisions' course – Chair endorsement.
- Appeared as an Expert Planning Witness in numerous Council Hearings and in Environment Court hearings

Of relevance to the current application, Sheryl has extensive experience in the processing of resource consent applications and the associated monitoring for mineral extraction activities. By way of a recent example, Sheryl was the Project Manager and lead for the Waihi North Project under the FTAA in Waihi. Sheryl remains the monitoring officer of the Waihi Goldmine site.

Chris was responsible for processing the previous application by Graymont (NZ) Limited for the Oparure South Western Pit under the Resource Management Act 1991 (RMA) including the review of the application, site visits to the project site at Oparure, discussion over technical reviews and draft consent conditions and engagement with Mana Whenua. Chris was responsible for both the applications submitted to Waitomo District Council and those submitted to Waikato Regional Council by Graymont (NZ) Ltd.

Although this application is not before the Environment Court, Sheryl and I confirm that we have read the Code of Conduct for expert witnesses as contained in Section 9 of the Environment Court Practice Note 2023. We agree to comply with that Code. Our qualifications as experts are set out above. We are satisfied that the matters addressed within this report are within our areas of expertise, except where we state that we are relying on information provided by another person or expert. We have not omitted to consider material facts known to us that might alter or detract from the opinions expressed in this report.

WRC has engaged a number of technical experts to review documents submitted in support of this application by Graymont (NZ) Ltd. The reports of each of these technical experts are presented as technical memos included as Appendices to this report.

Following the Introduction, the report is structured as follows:

- Section 2 outlines the consents required under the Waikato Regional Plan for the proposal.
- Section 3 discusses the regional and national benefits of the proposal.
- Section 4 discusses the implications of Plan Change 1 to the Waikato Regional Plan on the proposal.
- Section 5 discusses the compliance history of the existing quarry with reference to the latest June 2026 monitoring report from the WRC.
- Section 6 discusses the air quality issues (dust) associated with the proposal and some proposed amendments to the Waikato Regional Council consent conditions proffered by the applicant.
- Section 7 discusses the cave and karst effects associated with the proposal along with some proposed amendments to the Waikato Regional Council consent conditions.
- Section 8 discusses the erosion and sediment control effects associated with the proposal along with some amendments to the WRC consent conditions.
- Section 9 discusses the water quality effects associated with the proposal along with some amendments to the WRC consent conditions.

- Section 10 discusses the aquatic ecology effects associated with the proposal along with some questions and some recommended amendments to the WRC consent conditions.

- **Appendices 1 to 7** contain the latest WRC monitoring report for the existing Oparure Quarry operation along with a series of technical memos from the WRC Technical reviewers.

- **Appendix 8** contains a track changed version of the proposed Waikato Regional Council conditions based on the recommendations of the WRC technical reviewers set out above in this report. All references to condition numbering in this report are in reference to the numbering in the track changed version of the WRC conditions in Appendix 8. The condition numbering and cross referencing have been reviewed and updated as much as possible but a final check of the accuracy of the numbering is recommended prior to the finalisation of this condition set.

Unless otherwise addressed within this report, WRC agrees and accepts the applicant's assessment of the proposal in relation to the relevant provisions of the Waikato Regional Plan (WRP) and the RMA.

2. Consents required under the Waikato Regional Plan

The applicant has identified that the following consents are required under the Waikato Regional Plan which WRC agrees with:

Planning Instrument	Rule	Activity status	Activity
Waikato Regional Plan	3.4.5.5	Restricted Discretionary Activity	The use of water for dust suppression that cannot comply with Rule 3.4.5.4.
	3.5.11.8	Discretionary	The discharge of stormwater to surface and groundwater that cannot achieve all of the standards set out in Rule 3.5.11.4.
	3.5.11.6	Controlled	The proposed discharge of stormwater to land that cannot meet all of the standards associated with Rule 3.5.11.5.
	3.6.4.14	Discretionary	The proposed use of diversion bunds, silt fences, sediment pits, check dams, swales in the haul road and sediment detention ponds and their associated diversions, takes and discharges that cannot achieve all of the standards associated with Rule 3.6.4.4 (1).
	3.6.4.13	Discretionary	The diversion of both surface and groundwater that is not associated with the impoundments (and all of the associated discharges) are not permitted and therefore default to Discretionary.
	5.1.4.17	Discretionary	The removal of overburden and the quarrying of limestone (and all associated discharge of sediment and compounds to water and air) falls under this rule.
	5.2.5.3	Discretionary	The discharge (deposition) of overburden into the Pit from the project (including construction and maintenance of the haul road) falls under this rule.

3. Regional and National Benefits of the Proposal.

The executive summary of the application summarises the regional and national benefits of the proposal as follows:

Graymont's lime and limestone products are essential inputs across the New Zealand economy, including for clean drinking water treatment, steel manufacturing, construction and roading, agriculture, and environmental remediation. Graymont operated as an essential service during COVID-19, highlighting the strategic importance of maintaining secure domestic supply of these products. As the biggest limestone quarry in New Zealand (by output), Graymont is critical to the country's capability in these essential limestone products.

The Project is essential to protect the domestic supply of calcium based solutions, support local jobs and regional development, and meet New Zealand's needs for decades to come.

The Project contributes to the following indicative (rather than absolute) gross economic impacts on the local and wider economy once direct, indirect and induced transactions are accounted for:

- Around $29 Million per annum spent with goods and services suppliers (based on quarry and kiln expenditure only, with regional office expenditure additional which translates to an indicative $42.7 to 46.5 Million in total value added (GDP) per annum, and
- Sustains up to an indicative 262 FTE jobs per annum.

Based on the above information, in conjunction with the Economic Assessment prepared by Savvy Consulting and included as Appendix R to the Substantive Application report, it is my opinion that the environmental effects of the proposal are not sufficient to outweigh the regional and national benefits of the proposal. Therefore, the application does not need to be declined under section 85 of the FTAA.

However, it is important that the proposed conditions of consent are robust and appropriately lock in the proposed environmental benefits put forward by the applicant. This is therefore the primary focus of the remaining sections of this s53 report comprising the technical review comments from the review team on behalf of WRC and the recommended amendments to the draft WRC consent conditions.

4. Plan Change 1 (PC 1) to the Waikato Regional Plan

Te Ture Whaimana, the Vision and Strategy, for the Waikato and Waipa Rivers, is the primary direction setting policy document for the catchment. Plan Change 1 (PC1) is one tool (amongst others) to set this policy direction which has been prepared to give effect to Te Ture Whaimana.

PC1 Decisions Version 2020 is the relevant version that applies now and if applicable, is required to be assessed when a resource consent for point source discharges have been applied for:

- where those discharges may contain or affect the contaminants Nitrogen, Phosphorus, Suspended solids and/or Microbial pathogens; and
- where that application is located within the catchment of the Waikato or Waipa Rivers (from the Taupo gates and downstream).

PC1 Decisions Version 2020 is the "proposed plan" version which must also be considered under RMA s104(1)(b) alongside the operative WRP in terms of objectives and policies only (it contains no general discharge rules for point sources). Parts of PC1 apply now as the proposed plan, being those objectives and policies relating to point source discharges, an interim permitted activity rule for most land use, and rules

for land use change. PC1 Environment Court 'final decision' 2026 version is not the proposed version but may be an "other matter" to be considered when relevant under RMA s104(1)(c) until PC1 becomes operative. However, PC1 is currently subject to a High Court challenge.

Once operative, after appeals are resolved, large parts of PC1 have had the "relevant date" for application of land use rules requiring consents delayed to a future date via an amendment to the RMA to enable the advancement of the Natural Environment Plan for the region to be progressed.

The discharge of stormwater to surface and groundwater under rule 3.5.11.8 is not a point source discharge rather it is diffuse discharge associated with the operations. The application does not include an application for a point source discharge activity therefore, an assessment of the objectives and policies within the operative parts of PC1 is not required.

5. Compliance History of the Oparure Quarry

Appendix 1 contains the most recent WRC monitoring report, compiled by WRC staff in June 2026 and covering the period from 1 July 2021 to 3 June 2026. Although not strictly relevant to consideration of the proposal, the report demonstrates that the existing Oparure Quarry is being consistently operated to a high standard. It records one non-compliant discharge event in 2025. The Consent Holder has adopted the feedback arising from that event, and no further non-compliances have been recorded.

This demonstrates that the Consent Holder (in relation to the existing Oparure Quarry operation) is able to manage the site to achieve compliance with the relevant consent conditions in a similar cave and karst environment as that which exists at the adjacent South Western Pit site.

There are no matters relating to compliance action under the RMA to have regard to when considering this consent application.

6. Air Quality (Dust)

WRC has engaged Peter Stacey (Air Quality Scientist) to review and provide technical comment on the air quality matters associated with the operation of the proposed South Western Pit. A memo from Mr Stacey setting out his review comments is included as Appendix 2 to this report.

Mr Stacey's assessment notes the following in relation to the air quality assessment prepared by PDP on behalf of the applicant:

- The 2026 air quality assessment largely adopts the 2022 assessment methodology in terms of its approach to sensitive receptors, meteorological factors, dust amenity effects, particulate matter health effects, cumulative effects and dust mitigation approaches. However several amendments have been made in the 2026 assessment report which are important to note.
- The 2026 assessment considers the reduced quarry footprint (59.6 ha of disturbed land as opposed to the original 88 ha) and notes that this changes the location and extent of potential dust sources relative to the identified sensitive receivers.
- The 2026 assessment incorporated additional meteorological data collected between July 2023 and March 2026, which indicated a shift in prevailing wind direction and average wind speed. Those changes could not be verified. PDP therefore retained the original wind speed data from October 2019 to June 2022. It is recommended that the on-site meteorological instruments be calibrated and verified before monitoring of the SW pit operations commences.
- The 2026 assessment introduced an explicit assessment of potential health effects associated with respirable crystalline silica (RCS), a matter that was not investigated in 2022. The report concluded

that RCS emissions from the new SW pit were unlikely to result in adverse health effects at any off site receptors. Mr Stacey concurs with this assessment and agrees that adverse PM10 health effects at off site receptors are unlikely.
- The 2026 assessment reviewed the potential for ecological effects arising from dust deposition on vegetation and ecological receptors.
- The 2026 assessment also incorporated an assessment of water availability and demand for dust suppression including responses to the original review of the 2022 water demand assessment. Mr Stacey agrees with this conclusion and considers that sufficient water is available for effective dust management in the SW pit operations.

- Mr Stacey concludes that the 2026 dust assessment methodology remains appropriate and that the revised assessment does not materially alter the conclusions of the previous reviews, subject to the effect implementation of the dust mitigation measures through robust consent conditions.

It is also noted that the application does not seek a new water take consent but instead has applied to utilise the applicant's existing on site water supply more efficiently and across a larger area. Existing water take consent AUTH140823 authorises the applicant to take up to 200 m3 of water per day for dust suppression. Proposed Water Permit AUTH 148506.01.01 has therefore set a consent duration that expires on 31 October 2039, which for consistency, is the same date as the existing water take consent expires.

Consent conditions:

Several amendments are recommended to the consent conditions relating to air quality:

- Amend condition 70 (now 73) of the WRC conditions to align the wording with the MfE guidance on what constitutes an adverse effect. This clarifies that the presence of dust beyond the boundary of the site does not necessarily constitute an adverse effect, it is whether that dust emission causes an adverse effect that is noxious, dangerous, objectionable or offensive.
- Correct some cross reference mistakes.
- The applicant is invited to reconcile the maximum exposed area of 59.6 ha specified in condition 73 (now 76) with the exposed area recorded in the Air Quality Management Plan. The applicant's response is requested to explain the difference and identify the consistent figure to be used in both documents.
- Include an additional matter in the Air Quality Management Plan to ensure the on site meterological instruments are calibrated and verified prior to commencing operations.

I agree with these proposed amendments to the draft WRC conditions on the basis that they will make the conditions more robust and enforceable. These amendments have been included in the draft WRC conditions included as Appendix 6 to this report and are shown as amendments to WRC conditions 73 and 75.

7. Cave and Karst Systems

WRC has engaged Dr Paul Williams from Auckland University to provide technical comment on the cave and karst issues arising from the proposed SW pit. A memo from Dr Williams setting out his review and findings is included as Appendix 3 to this report. A summary of Dr Williams conclusions is set out below:

Dr Williams notes that the area to be covered by the SW Pit is located in a karst landscape that is considered to be of national scientific importance due to the well displayed unusual landforms (polygonal karst) and because karst is a very rare landscape, covering only about 3% of New Zealand.

The key matters that Dr Williams raises is that the current active Oparure Quarry impacts only one groundwater basin that feeds the Camelot Cave stream. The proposed SW pit is located over an upstream section of the same groundwater basin meaning any potential impacts on groundwater quality will be confined to the Camelot catchment. However the adjacent groundwater basin to the north, that feeds the Upper Mangawhitikau catchment, is currently unaffected by quarrying activity. The Upper Mangawhitikau catchment flows into the Spellbound tourist cave, which is known as the location of internationally recognised glowworms. The decision by the applicant to limit quarrying activities to those areas which are within the watershed of the Camelot cave groundwater basin is therefore supported. This will ensure that the proposed SW Pit does not impact the groundwater basin for the Upper Mangawhitikau catchment to the north.

However Dr Williams notes that the northern boundary of the new SW Pit depicted in the application, should only be taken as an approximate boundary limit and should be subject to confirmation by the applicant. This is on the basis that "*surface topography is an unreliable indicator of subsurface water movement in the karst environment*" as quoted in Appendix I, Water, section 2.3 from the application. The flow divide between the Camelot Cave and Upper Mangawhitikau catchments is also referred to as an "*inferred flow divide*" pointing to a need to confirm this boundary.

Dr Williams comments on the effects of the use of the lime products from the new SW Pit in relation to the emission of carbon dioxide. While this effect is acknowledged, the downstream process effects associated with the use of the limestone products from the new SW Pit are not matters that can be taken into account in this FTAA process.

Consent Conditions

Dr Williams recommends some amendments to the draft consent conditions to confirm the location of the groundwater divide between the Camelot Cave and the Mangawhitikau spring to ensure that any adverse quarry effects arising from the SW Pit are confined to the Camelot Cave system. Dr Williams also recommends an additional permanent water quality sampling station established upstream of the Spellbound Cave.

I concur with some of the recommendations from Dr Williams and have included new conditions 4 and 5 in the draft WRC conditions included as Appendix 6 to this report.

- New condition 4 requires the survey and physical marking of the position of the southernmost inferred location of the groundwater divide by a registered surveyor prior to commencing earthworks.
- New condition 5 ensures that no quarry excavation, overburden placement or blasting is to occur northwards of the groundwater divide defined and surveyed under condition 4.

I agree with these recommendations as they add more certainty to the proposal from the applicant to keep the quarrying activity within the Camelot Cave groundwater basin. These conditions assist to clearly define and mark the boundary and keep the quarrying activity out of that area.

Dr Williams also recommended that an additional water sampling location be required upstream of the entrance to the Spellbound cave. In my opinion, conditions 61 to 64 already address this issue:

- Condition 61 requires continuous water quality sampling at the Gate Spring/Mangawhitikau Stream confluence for a number of environmental parameters including deposited fine sediment (condition 62 a)) that will become the baseline data for the project.
- Condition 63 d) then requires those monitoring samples to be compared against the relevant regional and national standards, guidelines and compliance standards.

- Condition 64 then requires an independent expert to compare the results from the monitoring with a set of minimum compliance standards set out in condition 64 a) to d) where condition 64 a) specifically limits any increase in deposited sediment percentage cover to ≤ 20%.

Conditions 61 to 64 impose a robust monitoring and reporting regime and no additional water quality monitoring conditions are considered necessary.

8. Erosion and Sediment Control

WRC has engaged Kerry Pearce from Bryant Environmental Solutions Ltd to provide a technical review on the erosion and sediment control matters arising from the proposed SW Pit. A memo from Mr Pearce is included as Appendix 4 to this report and a summary of Mr Pearce's comments is set out below:

The application refers to two erosion and sediment control guidance documents: the Waikato Regional Council Guidelines (WRC Guidelines) and Auckland Council's GD05. Mr Pearce identifies the need to clarify which guidance applies. The choice of guidance was extensively considered during the previous RMA consent processes for Oparure Quarry. Through those processes, it was agreed that, for many aspects of erosion and sediment control, GD05 provided a more well-regarded and well-understood toolbox of measures for appropriately managing sediment discharges across New Zealand.

Questions

- *The applicant is requested to clearly state which guidance is preferred (GD05 or WRC Guidelines) and apply this guidance through the consent conditions; or*
- *If it is appropriate to use different guidance for parts of the site operations the applicant is requested to clarify why and clearly articulate which one applies and when.*

Mr Pearce notes that the proposed SW Pit is unique in terms of its location over a significant cave and karst system with the subsequent risk of enabling sediment laden water to discharge through fissures below the quarry pit and enter the subsurface cave system beneath. The ESC Toolkit proposed by the applicant and included as Appendix U3 in the Substantive Application contains a series of measures that are site specific to the SW Pit.

While the construction of standard Sediment retention ponds (SRP) is proposed to address sediment laden runoff from surrounding cropped fields and to manage sediment laden runoff from topsoil stockpile areas, a different approach is proposed for managing runoff within the new SE Pit involving Infiltration Sediment Retention Ponds (ISRP).

Questions

- *Mr Pearce raises questions about the efficiency of these proposed ISRP, how long the filter medium will last and what the maintenance and monitoring requirements associated with these types of ponds will be. He also raises the potential for limits to open/exposed areas across the quarry as an additional measure to manage sedimentation levels if required along with the inclusion of additional contingency options over and above flocculation, now considered a standard approach. The applicant is requested to respond to these questions in their invited comments later in the Fast Track process.*
- *Mr Pearce also raises some questions around how the proposed initial trigger of 2,000 NTU was determined and considers it to be a very high trigger for surface water quality. He notes that it is unclear how the 2,000 NTU trigger relates to the 100 mg/litre proposed for Erosion and Sediment Control measures or the 100 mm clarity provided in GD 05.*

9. Water Quality

WRC has engaged Andrew Rumsby from EHS Support to provide a technical review on the water quality matters arising from the proposed SW Pit. A memo from Mr Rumsby is included as Appendix 5 to this report and a summary of Mr Rumsby's comments is set out below:

Mr Rumsby concludes that the 2026 Water Quality report provides significantly improved water quality assessments and mitigation options in comparison to the previous water quality assessment provided under the previous RMA process. However, he also concludes that the 2026 Water Quality Assessment report still contains some gaps and mistakes as follows:

- The Water Quality Assessment treats the ANZG (2018) default guideline values and the Waikato Regional Council (WRC) water quality categories as chronic aquatic toxicology thresholds which is not strictly correct. The ANZG (2018) guidelines simply indicate that the water quality differs from a typical reference state, that potential environmental stressors may be present and that further investigation is required. On this basis, the Water Quality report's reference to "chronic effects thresholds" and conclusions over the absence of chronic impacts is an incorrect use of the quoted guidelines.
- The actual ecological effects have not been assessed and while a turbidity trigger of 2,000 NTU has been put forward, no justification has been provided for this very high trigger level on a long-term project in a sensitive receiving environment.
- Table 3 in the PDP report (Water Assessment 2026) should include the raw monitoring data and that the absence of this data means that it is not possible to independently review the data nor the robustness of the conclusions drawn from it. This is particularly relevant given the proposed turbidity trigger of 2,000 NTU and whether this is appropriate in relation to baseline conditions or would provide adequate protection against quarry related effects. He also recommends a full year of monitoring data to provide a more robust basis for characterising the baseline conditions for the site. A more appropriate trigger value would be based on changes relative to upstream conditions rather than a fixed absolute threshold. A more commonly adopted approach to manage turbidity is to set a limit of 10-20% change from an upstream control site which provides a better reflection of ecological risk than a fixed 2,000 NTU criteria.
- The Water Quality report does not consider the effect of elevated suspended or deposited sediment could affect local invertebrate fauna such as glowworm populations in the cave and karst environment around the site. These effects could manifest through reduced aquatic prey populations, long term changes in cave hydraulics and flood related effects on glowworms.
- The Water Quality reports reliance on turbidity concentration it does not adequately assess factors such as duration of exposure, frequency, particle size and particle characteristics. This is relevant when considering the over riding concern with the 2,000 NTU trigger level and the lack of justification for the derivation of this limit and whether it is scientifically robust and ecologically protective enough of the sensitive environment within which the proposed SW Pit is located.
- Nitrogen concentrations should be added to the list of monitoring requirements given the remaining nitrogen after erosion and sediment control measures have been put in place will be dissolved inorganic nitrogen.

Consent Conditions

Mr Rumsby has recommended the following amendments to the conditions of consent. My comments in relation to each recommendation are included below.

- *The physical survey and marking of the inferred groundwater divide separating the SW Pit site from the Upper Mangawhitikau catchment.*
  Response: This has been implemented through new condition 4.

- *No quarry excavation, overburden placement or blasting to occur north of this surveyed line*.
  Response: This has been implemented through new condition 5.

- *The development of an Initial Development Sediment Management Plan covering the first 5 years of the SW Pit operation to lock in maximum exposed areas, stabilisation timeframes and contingency controls for major rainfall events.*
  Response: The applicant is invited to comment on this proposal and suggest some amended conditions if appropriate.

- *An active disturbance area limit.*
  Response: This has been implemented through new condition 7.

- *Water quality compliance conditions so that the operation of the SW Pit does not cause water quality effects at Potea Spring, Pumphouse Spring or the Mangawhitikau Stream to exceed baseline conditions by more than 20%.*
  Response: Conditions 61 to 66 in Appendix 6 set out the Water quality and aquatic ecology monitoring requirements proffered by the applicant. In my opinion, these provide sufficient monitoring parameters including minimum compliance standards of $\leq$ 20% increase in deposited sediment, MCI and QMCI scores to remain in the same NPSFM attribute bands, $\leq$ 20% increase in periphyton percent cover and $\leq$ 20% increase in daily mean turbidity. The conditions include the requirement to have the monitoring results reported on by an experienced and qualified independent expert and for those recommendations to be provided to WRC in an annual report.

- A lower turbidity trigger limit.
  Response: Justification for the proposed 2,000 NTU limit and a lower alternative have been requested from the applicant. The applicant has been invited to address both matters in its comments.

10. Aquatic Ecology

WRC has engaged Mark Hamer from E3 Scientific to provide a technical review on the aquatic ecology matters arising from the proposed SW Pit. A memo from Mr Hamer is included as Appendix 6 to this report and a summary of Mr Hamer's comments is set out below:

The review considers the aquatic ecology assessment broadly sound but finds insufficient support for its conclusions of no net loss and low ecological effects. The review makes a number of recommendations on additional work as set out below.

- Targeted surveys are needed to establish whether rare or threatened fauna occur at Pōtea Spring, and the ecological values assigned to Pōtea Spring and the Mangapu River require reconsideration.
- Sediment effects on Camelot Stream, Pōtea Spring and the Mangawhitikau Stream may be understated, while uncertainty in the sediment-reduction modelling undermines confidence in the Betterment Plan.
- The applicant should justify the ecological values and effect ratings, explain why additional fine sediment is not expected to accumulate downstream, and demonstrate how cumulative effects will be managed.

- Clarification is also needed on blasting charge restrictions within 8–25 m of Camelot Cave, whether sediment ponds could be lined, and why stormwater is directed towards tomo/dolines.
- Staging plans should clearly demonstrate compliance with the proposed 200 m cave buffer.

Recommendations:

- Most consent conditions are considered appropriate, but the 2000 NTU turbidity trigger is not considered ecologically protective and requires revision, particularly under Condition 20 of the draft WRC conditions.
- A robust assessment of the Potea Spring is also recommended to target rare or threatened macroinvertebrates to determine whether or not any of these species are present.
- Deposited sediment should be monitored and controlled separately from turbidity.
- The review also recommends revising erosion and sediment controls after cave mapping with a particular emphasis on justifying why stormwater is directed to tomos/dolines when this risks additional sediment being directed into the Camelot Cave Stream and downstream watercourse. I have recommended an addition to the proposed Erosion and Sediment Control Plan (ESCP) WRC condition 50 e) to address this matter.
- The review recommends considering bank regrading as an additional mitigation option to improve bank stability and reduce sediment contributions from the watercourse.

The applicant is invited to consider these recommendations and provide some amended conditions to address these matters.

11. Terrestrial Ecology

Mr Gerry Kessels from Bluewattle Ecology has been engaged to provide a technical review on the terrestrial ecology matters arising from the proposed SW Pit. While the matters associated with terrestrial ecology primarily sit within the jurisdiction of the Waitomo District Council, there is some overlap with the matters within the jurisdiction of the Waikato Regional Council. This is primarily in relation to the requirement for an Ecological Betterment Plan which is required in both District and Regional consent conditions.

Mr Kessels review confirms general agreement with the principles set out in the terrestrial ecology reporting but recommends more explicit conditions to lock in the monitoring and reporting requirements associated with the various betterment commitments proffered by the applicant.

Recommendations

- Amend the Ecological Betterment Plan (EMP) condition to expressly require the provisions of the Bat Management Plan, Bird Management Plan, Lizard Management Plan, Pest Management Plan as certified sub-plans under the EMP.

12. Summary

The main findings of this report and associated actions are summarised below:

- Benefits and consent conditions: The report concludes that environmental effects do not outweigh the proposal's regional and national benefits.
  Action: Retain robust, enforceable consent conditions that secure the proposed environmental benefits.

- Dust management: The assessment is supported, subject to effective mitigation and robust conditions; the maximum exposed-area figures remain inconsistent.
  Action: Implement the recommended condition amendments, calibrate and verify on-site meteorological instruments before operations, and obtain the applicant's reconciliation of the 59.6 ha limit with the Air Quality Management Plan.

- Groundwater divide: The SW Pit boundary relies on an inferred groundwater divide.
  Action: Apply new conditions 4 and 5 to survey and physically mark its southernmost inferred location before earthworks and prohibit excavation, overburden placement and blasting north of that line.

- Erosion and sediment control: The applicable guidance and the performance of the proposed Infiltration Sediment Retention Ponds remain unresolved.
  Action: Obtain the applicant's preferred guidance (GD05 or WRC Guidelines), reflect it in the conditions, and seek details of pond efficiency, filter life, maintenance, monitoring, exposed-area limits and additional contingency measures.

- Water quality evidence: The assessment has improved but contains guideline interpretation errors, missing raw data and gaps in ecological-effects assessment.
  Action: Seek corrected interpretations, raw monitoring data, a full year of baseline monitoring, assessment of sediment effects on cave fauna and exposure characteristics, and consideration of nitrogen monitoring, as recommended by the reviewer.

- Aquatic Ecology: The assessment is broadly sound, but its conclusions on no net loss and low ecological effects require further support. Key uncertainties concern threatened fauna at Pōtea Spring, sediment and cumulative effects, cave buffers, blasting, stormwater discharge to tomos/dolines, and the Betterment Plan.
  Action: Obtain targeted fauna surveys and revised ecological-value and effects assessments; require staging plans to demonstrate the 200 m cave buffer; review blasting restrictions, pond lining and stormwater routing after cave mapping; separately monitor deposited sediment; replace the 2,000 NTU trigger with an ecologically protective limit; and strengthen the Betterment Plan, including consideration of bank regrading.

- Turbidity trigger: The proposed 2,000 NTU trigger lacks justification for the sensitive receiving environment.
  Action: Obtain the applicant's justification and a lower alternative, including how the trigger relates to baseline and upstream conditions, the proposed 100 mg/litre criterion and GD05's 100 mm clarity measure.
- Monitoring and initial development controls: The report considers conditions 61 to 66 sufficient for water quality and aquatic ecology monitoring.
  Action: Retain independent expert review and annual reporting to WRC.

I have also deleted former condition 22 e) which required a management plan or other documents to be "deemed certified" if no written confirmation of that certification is received from WRC within 40 working days of being submitted. This is inappropriate and works should not commence until the respective Management Plan is certified.

Following the provision of the requested information set out above, the draft WRC consent conditions can be finalised to ensure effects are effectively and efficiently managed.

Appendix 1

Site Compliance Report

Site Compliance Report

Site No:	REG602822	**Non Dairy**
Site Owner:	Graymont (NZ) Limited	
Site Name:	Oparure Quarry: Te Anga-Te Kumi Rd, Oparure	
Date:	3 June 2026	

1 INTRODUCTION

The following resource consents are held for the site:

Resource Consent	Status	Description	Commenced	Expiry
AUTH138937.01.01	Current	To discharge overburden to land in association with a limestone quarry	9/02/2018	31/01/2038
AUTH140690.01.01	Current	To dam and divert water and the discharge of stormwater into water, and/or into or onto land in association with the Oparure Quarry expansion	23/10/2019	31/10/2039
AUTH140690.02.01	Current	Damming and diversion of water in association with overburden removal and quarrying.	23/10/2019	31/10/2039
AUTH140690.03.01	Current	Bed disturbance activities relating to the removal of spring-fed seeps and vegetation in association with quarrying activities	23/10/2019	31/10/2039
AUTH140690.04.01	Current	Soil disturbance in karst landscapes	23/10/2019	31/10/2039
AUTH140823.01.01	Current	To take up to 200m3 per day of water from stormwater ponds within the Oparuru Quarry site for dust suppression purposes.	23/10/2019	31/10/2039
AUTH142709.01.01	Current	Discharge contaminants to air from the operation of Oparure Quarry including dust discharges and discharges as a consequence of burning coal to aid the processing of limestone	20/07/2023	18/07/2058
AUTH142709.02.01	Current	Discharge stormwater from the quarry operation to surface water and groundwater	20/07/2023	19/07/2058
AUTH142709.03.01	Current	Discharge kiln sludge from Graymont's Otorohanga and TeKuiti lime processing plants to land within the Oparure Quarry pit	20/07/2023	18/07/2058
AUTH142709.04.01	Current	Discharge overburden to land within the Oparure Quarry Pit, in association with the operation of Oparure Quarry and from the proposed Pakeho Pit.	20/07/2023	18/07/2058
AUTH142709.05.01	Current	Discharge human wastewater and greywater from the staff facilities to ground	20/07/2023	18/07/2058
AUTH142709.06.01	Current	Quarrying of limestone within the catchment of, or 10 metres ('m') of, whichever is the lesser, a sinkhole or	20/07/2023	18/07/2058

		cave entrance; and earthworks within High Risk Erosion Areas in association with the operation of Oparure Quarry		
AUTH142709.07.01	Current	Take up to 100m3 per day of groundwater for dust suppression and use in the processing plant.	20/07/2023	18/07/2058
AUTH142709.08.01	Current	Dam and divert stormwater at locations within the Oparure Quarry footprint in association with quarry activities and stormwater management	20/07/2023	18/07/2058
AUTH143737.01.01	Current	To undertake earthworks in High Risk Erosion Area (HREA) and karsts landscapes in association with the installation of fencing and its ongoing maintenance, at 806 Opārure Road, Lot 2 DPS 77130, Te Kuiti.	27/10/2021	27/10/2041
AUTH146873.01.01	Current	To discharge drilling fluids to surface water.	13/08/2024	31/12/2027
AUTH147408.01.01	Current	To undertake soil disturbance and vegetation removal in a karst landscape	20/05/2025	31/10/2039
AUTH147408.02.01	Current	To discharge stormwater to land	20/05/2025	31/10/2039
AUTH147408.03.01	Current	To discharge stormwater to surface water and/or ground water	20/05/2025	31/10/2039
AUTH147408.04.01	Current	To temporarily impound water behind diversion bunds in association with earthworks	20/05/2025	31/10/2039

This report examines the level of compliance of Graymont (NZ) Limited with the selected conditions of the resource consents.

2 BACKGROUND

Oparure Quarry has been operated to a consistently high standard with the only non-compliance occurring during the 24/25 reporting period due to a non-compliant discharge of suspended solids from the treatment pond to the Mangawhitikau Stream.

Graymont undertook an independent review of the ESC in 2025 and have followed the advice received from that review. There have not been any reported exceedance in this reporting period following rain events that trigger the sampling requirement.

Date Period	Site Compliance
1 July 2025 to 3 June 2026	Full Compliance
1 July 2024 to 24 March 2025	Low Risk Non-Compliance
1 July 2023 to 28 May 2024	Full Compliance
1 July 2022 to 28 April 2023	Full Compliance
1 July 2021 to 17 November 2021	Full Compliance

3 COMPLIANCE ASSESSMENT

- The 2025/26 audit has been compiled using information gathered from WRC site visits of the quarry, along with the required reporting provided by Graymont.

- Considering the level of compliance observed in the previous reporting year, this year's WRC compliance report has been conducted as a high-level overview of compliance.

Unless otherwise specified in this document this assessment covers the period from 1 July 2025 to 3 June 2026 state relevant assessment period or inspection date.

This compliance assessment has been undertaken based on the submitted annual report by the consent holder, monitoring data supplied throughout the compliance period and any site inspections undertaken. Some administration, duplicate or irrelevant conditions have been omitted for brevity.

Please note that a description of the classification system used to describe compliance status is given in Appendix 1 of this report.

AUTH138937.01.01 - Land - solid waste

Activity Authorised: To discharge overburden to land in association with a limestone quarry		
Condition No.	**Description**	
4	The consent holder shall appoint a representative(s) prior to the exercise of this resource consent who shall be the Waikato Regional Council's principal contact person(s) in regard to matters relating to this resource consent. The consent holder shall inform the Waikato Regional Council of the representative's name and how they can be contacted, prior to this resource consent being exercised. Should that person(s) change during the term of this resource consent, the consent holder shall immediately inform the Waikato Regional Council and shall also give written notice to the Waikato Region Council of the new representatives name and how they can be contacted.	
Evidence	Daisy Jose - djose@graymont.com	
Status Reasoning		
Action Required	**No action required**	**Full Compliance**
6	The E&SCP shall be certified in writing by the Waikato Regional Council acting in a technical certification capacity prior to any works authorised by this consent commencing and the consent holder shall undertake all earthworks authorised by this consent in accordance with the certified E&SCP. Any changes proposed to the E&SCP shall be confirmed in writing by the consent holder and the Waikato Regional Council, acting in a technical certification capacity, prior to the implementation of any changes proposed. ***Advice Note:*** *The locations of overburden placement areas will be in general accordance with the application. Any proposed overburden placement areas additional to the footprints outlined in the application must be approved in writing by the Waikato Regional Council in accordance with Condition 6. Any additional overburden placement locations will be within the same catchment and consistent with the effects assessment for the initial proposal which outlines two overburden placement footprints (T1 and PW).*	
Evidence	Graymont provided Waikato Regional Council with updated AQMP, ESCP and WMP in October 2023 in relation to the granting of the new northern pit Resource Consents.	

	Erosion and Sediment Control Plan #27551062. Erosion and Sediment Control Plan is in place. Certification Doc Id 27550268	
Status Reasoning		
Action Required	**No action required**	**Full Compliance**
7	**Certification of Erosion and Sediment Control Structures** Prior to bulk earthworks commencing on any area, the consent holder shall submit to the Waikato Regional Council 'As Built Certification Statements', signed by an appropriately qualified and experienced person to certify that erosion and sediment controls have been constructed in accordance with the certified Erosion and Sediment Control Plan. Certified controls shall include sediment retention ponds, decanting earth bunds, silt fences and diversion channels/bunds. The 'As Built Certification Statement' shall include all information as specified in the 'As Built Certification Sheets' located on the Waikato Regional Council website (*www.ew.govt.nz/earthworks*) and supplied to the Waikato Regional Council within 5 working days of the completion of the construction of those controls.	
Evidence	Review of file 60 28 22A	
Status Reasoning	As Built Certification provided 27344901, 27346485, 27345595 ,27347286	
Action Required	**No action required.**	**Full Compliance**
9	The consent holder shall be responsible for the structural integrity and maintenance of the overburden disposal area, and for the provision and maintenance of any erosion control works that become necessary to control erosion as a result of the exercise of this consent. In that respect the consent holder shall retain suitably qualified and experienced person(s) to design and supervise the development, construction and operation of the overburden disposal site. Any such works shall be in accordance with accepted engineering practices and geotechnical standards and to the satisfaction of the Waikato Regional Council.	
Evidence	Review of file 60 28 22A	
Status Reasoning	Oparure Limestone Quarry Overburden Stockpile Geotechnical inspection 2025 Doc Id 31974949 Confirms structural integrity, site inspections undertaken by WRC monitoring officer confirm maintenance of the erosion control. Doc Id 33033646	
Action Required	**No action required**	**Full Compliance**
10	The consent holder shall ensure that soil erosion and sediment discharges to natural waters arising from the exercise of this resource consent are minimised during the term of this consent and that discharges from the overburden site are managed. In this respect, appropriate erosion and sediment control practices shall include, but not be limited to; 1. Measures which are in general accordance with the Waikato Regional Council document titled *"Erosion and Sediment Control – Guidelines for Soil Disturbing Activities" (Technical Report No. 2009/02 – dated January 2009)*; and 2. The Erosion and Sediment Control Methodologies and practices submitted as part of the Erosion and Sediment Control Plan required under condition 5.	

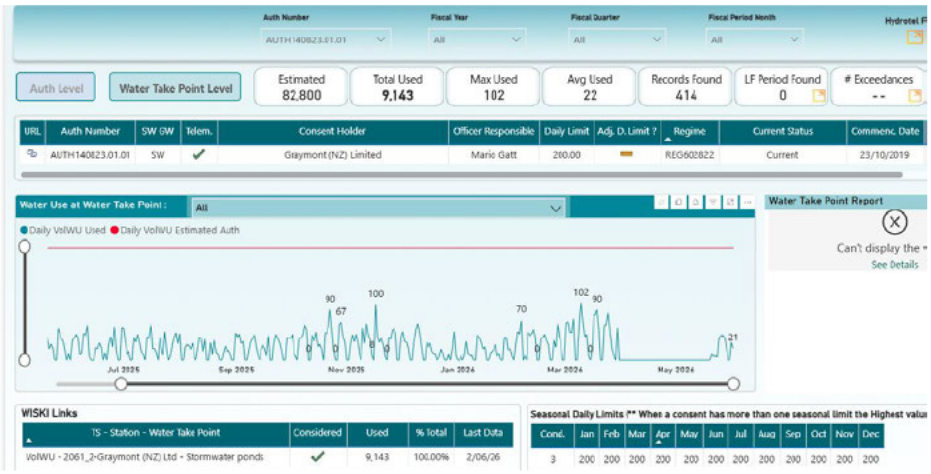
Evidence	Review of file 60 28 22A	
Status Reasoning	There have been no reports of discharge exceeding limits in this reporting period	
Action Required	**No action required**	**Full Compliance**
11	The consent holder shall ensure that all sediment laden run-off from the site is treated by sediment retention structures. These structures are to be fully operational before bulk earthworks commence and shall be maintained to perform at least at 80% of their operational capacity.	
Evidence	Review of file 60 28 22A	
Status Reasoning	The audit for the 24/25 reporting period identified a Low-Risk Non-Compliance for this condition. The action arising from that incident was that Graymont would have an independent assessment of the ESC/SRP and follow the directions resulting from that review. System review Report - Doc Id 36198917 Follow up actions have been undertaken as suggested in the review, desludging of forebays and increasing capacity of the forebay. Confirmation document received from Daisy Jose 36217089	
Action Required	**No action required.**	**Full Compliance**
12	There shall be no discharge of contaminants (oil, grease, fuel, or detergents) from any storm water settling pond as a result of the exercise of this resource consent. An impervious bund shall be provided and maintained around any on-site bulk fuel storage facility and shall provide an impoundment capacity of not less that the volume of fuel stored onsite.	
Evidence	Review of file 60 28 22A Site Inspection file note Doc Id 33033646 Media batch Doc Id 33034404	

		
Status Reasoning	No conspicuous discharges were present during site inspections undertaken in this reporting period, and none have been reported to Waikato Regional Council. Diesel/Re-fuel area had all appropriate controls in place to intercept and capture any potential discharge before entering the stormwater system	
Action Required	**No action required.**	**Full Compliance**
13	The consent holder shall ensure that the site is appropriately stabilised by 30 April of each year unless otherwise approved in writing by the Waikato Regional Council. Stabilisation shall be undertaken by providing adequate measures (vegetative and/or structural and including, pavement, metalling, hydroseeding, re-vegetation and mulching) that will minimise erosion of exposed soil to the extent practical.	
Evidence	Winter works has been applied for and granted. Doc Id 34939531	
Status Reasoning		
Action Required	**No action required**	**Full Compliance**
14	**Water Sampling** Unless otherwise approved in writing by the Waikato Regional Council, the consent holder shall monitor the suspended solids concentration, turbidity and pH levels following commencement of overburden placement at all sites (A, B, C & D) in the event rainfall exceeds 50 mm/24-hour period. Sampling shall be undertaken within 24 hours of the rainfall event. **Sampling Point Location GPS Coordinates A Upstream Mangawhitikau Stream E 1783130 N 5755362 B Gillespies Gate Spring E 1783193 N 5755270 C Gillespies Farm Spring E 1783120 N 5755349 D The discharge points of the final sediment retention structures**	

Evidence	Review of file 60 28 22A	
Status Reasoning	There has been one rainfall trigger, the discharge from the treatment Pond did not exceed the consented limit. Notification Doc Id 33538769	
Action Required	**No action required.**	**Full Compliance**
25	**Dust** There shall be no discharge of airborne particulate matter that is objectionable to the extent that it causes an adverse effect at or beyond the boundary of the subject property. Appropriate procedures and measures shall be put in place to control the discharge of particulate matter as a result of the activities authorised by this resource consent. ***Advice Note:*** *Chapter 6.4 of the Waikato Regional Plan provides guidance on the assessment of the effect of odour and dust emissions*	
Evidence	WRC have not received any dust complaints in this reporting year.	
Status Reasoning		
Action Required	**No action required**	**Full Compliance**
	Authorisation Compliance:	**Full Compliance**

AUTH140823.01.01 - Surface water take

Activity Authorised: To take up to 200m3 per day of water from stormwater ponds within the Oparuru Quarry site for dust suppression purposes.		
Condition No.	**Description**	
2	The water taken pursuant to this consent must only be used for dust suppression.	
Evidence	Review of file 60 28 22A	
Status Reasoning	No evidence that water is used for anything other than dust suppression. Site inspection Doc Id 33033646	
Action Required	**No action required.**	**Full Compliance**
3	The total combined daily take volume across all stormwater ponds must not exceed 200 cubic metres. Advice Note This surface water take is categorised as a zero net take in the Waikato Regional Council ("WRC") water allocation calculator. The rationale for this categorisation is set out in an email – identifier	

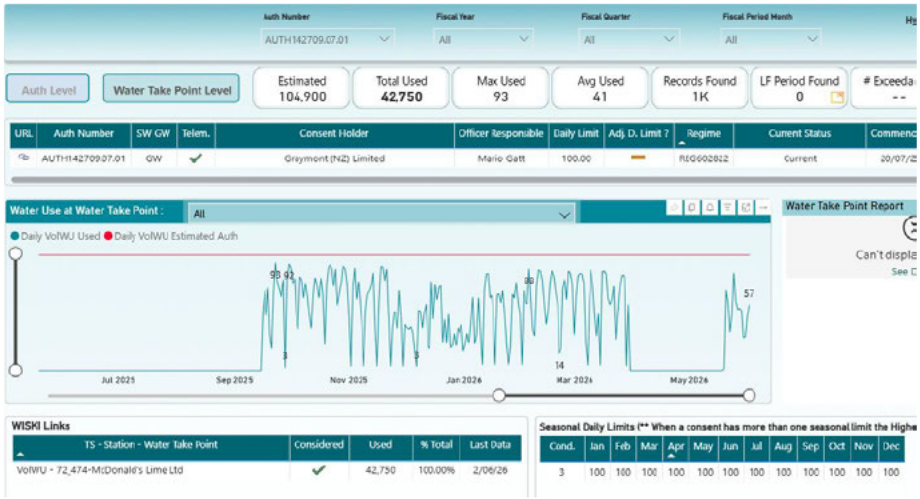
	14719866 – stored in the WRC document management system.	
Evidence	Review of WRC Power BI water usage report	
Status Reasoning	Power BI confirms that daily water take has been under the consented limit. 	
Action Required	**No action required.**	**Full Compliance**
4	A system must measure on a continuous basis the combined daily take volume across all stormwater ponds. The system must have a reliable calibration and must be maintained to an accuracy of +/- 5 percent. Within one month of first exercising this consent, evidence of calibration to an accuracy of +/- 5 percent must be provided in writing to Waikato Regional Council.	
Evidence	Review of file 60 28 22A	
Status Reasoning	Water meter verification report Doc Id 15934352/15934446	
Action Required	**No action required.**	**Full Compliance**
	Authorisation Compliance:	**Full Compliance**

AUTH142709.04.01 - Land - solid waste

Activity Authorised: Discharge overburden to land within the Oparure Quarry Pit, in association with the operation of Oparure Quarry and from the proposed Pakeho Pit.	
Condition No.	**Description**
2	The consent holder shall be responsible for the structural integrity and maintenance of the overburden disposal area, and for the provision and maintenance of any erosion control works that become necessary to control erosion as a result of the exercise of this consent. In that respect the consent holder shall retain suitably qualified and experienced person(s) to design and supervise the development, construction and operation of the overburden disposal site. Any such works shall be in accordance with accepted engineering practices and geotechnical standards and to the satisfaction of the Waikato Regional Council.

Evidence	Overburden report Doc Id 31974949	
Status Reasoning		
Action Required	**No action required.**	**Full Compliance**
	Authorisation Compliance:	**Full Compliance**

AUTH142709.07.01 - Ground water take

Activity Authorised: Take up to 100m3 per day of groundwater for dust suppression and use in the processing plant.		
Condition No.	**Description**	
3	The daily net take volume combined across all uses must not exceed 100 cubic metres.	
Evidence	Review of WISKI water usage confirms that the consent limits have been complied with.	
Status Reasoning		
Action Required	**No action required**	**Full Compliance**
6	The consent holder must engage a suitably qualified person to undertake – during March of 2025 and at a frequency of no less than five yearly from March 2025 – verification of the accuracy of the system required by condition 5. Evidence documenting each verification must be forwarded to WRC within one month of each verification being completed.	
Evidence	Ground water verification Doc Id 36208772	
Status Reasoning		
Action Required	**No action required**	**Full Compliance**
7	The consent holder must telemeter – via a telemetry system developed after liaison with the WRC to ensure that the telemetry system is compatible with WRC telemetry system standards and data protocols – continuous 15-minute values of net take volume in units of cubic metres. The data must be reported once daily to WRC via the telemetry system and there must be 96 values per daily report. When no groundwater is being taken the data must specify the net take volume as zero.	
Evidence	WIKI IRIS Water Usage confirms data is sent via a telemetry system.	
Status Reasoning		

Action Required	**No action required**	**Full Compliance**
	Authorisation Compliance:	**Full Compliance**

4 SUMMARY OF COMPLIANCE

Based on the conditions selected for monitoring, compliance has been assessed as:

Authorisation	Authorisation Description	Compliance Status
AUTH138937.01.01	To discharge overburden to land in association with a limestone quarry	Full Compliance
AUTH140823.01.01	To take up to 200m3 per day of water from stormwater ponds within the Oparuru Quarry site for dust suppression purposes.	Full Compliance
AUTH142709.04.01	Discharge overburden to land within the Oparure Quarry Pit, in association with the operation of Oparure Quarry and from the proposed Pakeho Pit.	Full Compliance
AUTH142709.07.01	Take up to 100m3 per day of groundwater for dust suppression and use in the processing plant.	Full Compliance

Overall Site Compliance: Full Compliance

5 DISCUSSION AND CONCLUSIONS

- Site inspections conducted by WRC staff during this reporting period, along with documentation provided by Daisy Jose, indicate that the Graymont Oparure site is being operated to a high standard. All recommendations from the PDP report dated 15 November 2024 have been fully implemented. Since that time, no non-compliant discharge events have been recorded.

6 SUMMARY OF ACTIONS REQUIRED

- There have been no actions identified throughout the course of this audit.

7 RECOMMENDATIONS FOR WAIKATO REGIONAL COUNCIL

- Graymont Oparure quarry site to remain FA1 to allow monitoring of the recently granted Northen Pit extension.

Mario Gatt **Date: 04/06/2026**
Monitoring Officer
Resource Use

7.1 Decision

I have reviewed this audit report and agree with the recommendations.



Gareth Read **Date: 5 June 2026**
Team Leader - Consents Monitoring
Resource Use

APPENDIX 1
Compliance Rating System

Compliance Status	Compliance Grade
	Not Assessed
	Full Compliance Full compliance with all relevant consent conditions, plan rules, regulations and national environmental standards.
	Low Risk Non-Compliance Non-compliance with some of the relevant consent conditions, plan rules, regulations and national environmental standards. Non-compliance carries a low risk of adverse environmental effects or is technical in nature (e.g. failure to submit a monitoring report).
	Moderate Non-Compliance Non-compliance with most of the relevant consent conditions, plan rules, regulations and national environmental standards, where there are some environmental consequences and/or there is a moderate risk of adverse environmental effects.
	Significant Non-Compliance Non-compliance with many of the relevant consent conditions, plan rules, regulations and national environmental standards, where there are significant environmental consequences and/or a high risk of adverse environmental effects.

Appendix 2

Air Quality
Peter Stacey
technical review

AIR QUALITY CONSULTING NZ

MEMORANDUM

To: Sheryl Roa (WRC) and Chris Dawson (BBO)

From: **Peter Stacey (Air Quality Consulting NZ Limited)**

CC:

Date: 23 October 2026

Re: **Graymont Oparure Quarry South-Western Pit – Air Quality Assessment**

1 Introduction

Graymont (NZ) Limited (Graymont) operates the Oparure Quarry limestone extraction and processing facility. Graymont is seeking approval under the Fast-track Approvals Act 2024 to expand the existing quarry via development of the Oparure Quarry South-Western Pit (SW Pit). Waikato Regional Council (WRC) engaged Air Quality Consulting NZ Limited (AQCNZ) to undertake a technical review of the application documents specifically focusing on the assessment of environmental effects (AEE) associated with air discharges and the accompanying Dust Management Plan (DMP) prepared by Pattle Delamore Partners Limited (PDP) in July 2026. The review also includes providing comments and recommendations on the draft consent conditions relevant to the proposed expansion[1].

1.1 Project background

1.1.1 Application related to Oparure Quarry Pakeho Pit

AQCNZ reviewed the draft AEE and DMP, providing comments and recommendations in a tracked-changes document dated 9 May 2022 to the WRC.

AQCNZ subsequently reviewed an updated AEE report, dated 14 October 2022, and submitted a formal request for clarification (under section 92 of the Resource Management Act) on 15 November 2022. The request focused on the availability of a sufficient water supply for effective dust suppression. In response, PDP provided a memorandum addressing these queries on 22 May 2023.

On 14 February 2025, AQCNZ prepared a technical memorandum summarising its review of the updated AEE, DMP, section 92 response and proposed conditions relating to discharges to air. AQCNZ concluded that the potential air quality effects could be appropriately managed through the proposed mitigation measures and suitable consent conditions.

1.1.2 Fast-track application related to Oparure Quarry SW Pit

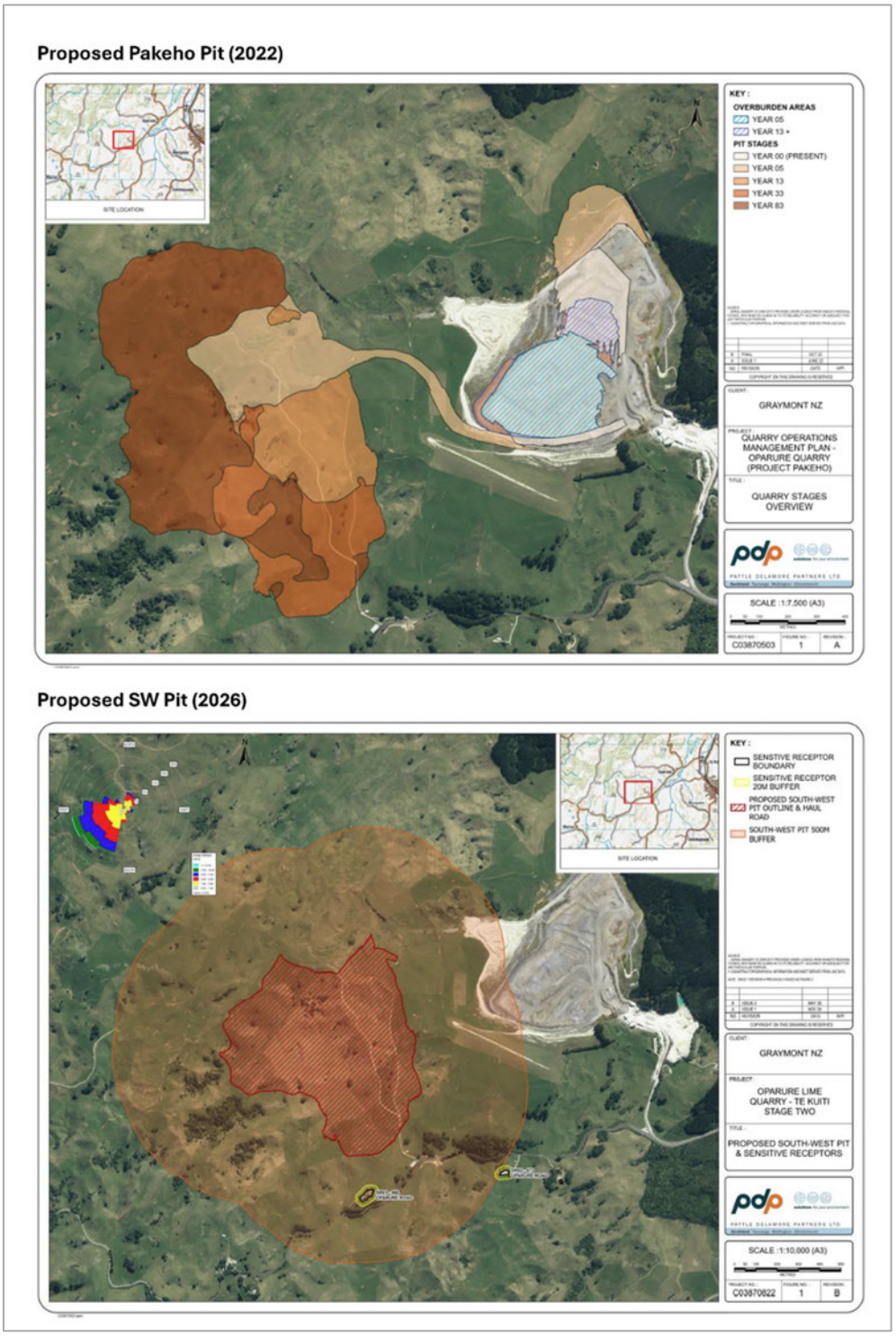
In July 2026, PDP prepared an AEE for the proposed SW Pit in support of the Fast-track Approvals application, which included an assessment of discharges to air. It is understood that, once developed, the proposed SW Pit is smaller than the earlier proposed Pakeho

[1] Substantive application documents for the Oparure Quarry South-Western Pit project.

Pit which PDP assessed dust effects from in 2022. Figure 1 shows the extents of the proposed Pakeho Pit and SW Pit.

This memorandum outlines AQCNZ's review of the Fast-track application, including an assessment of the AEE, DMP and consent conditions related to the proposed SW Pit.

Figure 1: Extents of the proposed Pakeho Pit (2022) and SW Pit (2026)



2 Summary of assessment approach

The following sub-sections summarise the assessment methodologies retained from the 2022 assessment and the additional or updated assessments presented in the 2026 assessment.

2.1 Retained assessment methodologies

The 2026 air quality assessment largely adopts the same methodology as the 2022 assessment. In particular, the following assessment approaches have been retained:

- **Sensitive receptors:** Both assessments identify residential dwellings within 500 m of the proposed quarry footprint as sensitive receptors, with reference to the Victoria Environment Protection Agency (Vic EPA) and the Institute of Air Quality Management (IAQM) recommended separation distances for quarrying activities. The two residential receptors identified in the 2022 assessment remain the focus of the 2026 assessment, although their separation distances and potential exposure have been considered in relation to the revised SW Pit footprint. Written approvals had also been obtained from the owners of both residential properties.
- **Meteorological assessment:** Both assessments use site-specific meteorological data to evaluate the frequency and duration of conditions favourable for dust transport towards sensitive receptors. The 2026 assessment retains the October 2019 to June 2022 on-site meteorological dataset used in the earlier assessment.
- **Dust amenity effects:** Both assessments apply the Frequency, Intensity, Duration, Offensiveness and Location (FIDOL) framework in accordance with the Ministry for the Environment (MfE)'s *Good Practice Guide for Assessing and Managing Dust* (2016) (GPG Dust). This is supported by the Source–Pathway–Receptor (SPR) approach outlined in the IAQM's *Guidance on the Assessment of Mineral Dust Impacts for Planning* (2016). The combined methodology considers the potential for dust generation, local meteorological conditions, separation distances, receptor sensitivity and the effectiveness of proposed mitigation measures.
- **Particulate matter health effects:** Both assessments consider the potential health effects associated with particulate matter (PM_{10}), using background air quality information and published monitoring data from quarrying operations to estimate the likely contribution from the proposed activity. The 2026 assessment retains the general approach used in 2022 to assess PM_{10} health effects, including consideration of published quarry monitoring studies and the relationship between particulate concentrations and distance from quarrying activities, although the supporting health effects discussion has been expanded in 2026.
- **Cumulative effects:** Both assessments consider the potential cumulative dust effects associated with concurrent operations at the existing Oparure Pit and the proposed new pit, particularly in the area between the two operations.
- **Dust mitigation:** Both assessments identify water suppression, meteorological monitoring, visual dust inspections and operational controls as the principal measures for managing fugitive dust emissions.

AQCNZ previously considered the combined FIDOL and IAQM assessment methodology appropriate for evaluating potential dust effects at nearby sensitive receptors.

2.2 Changes and additional assessments in 2026

While the fundamental dust assessment methodology remains unchanged, Appendix L incorporates several changes and additional assessments.

- **Revised quarry footprint:** The 2022 assessment considered a proposed quarry footprint of approximately 88 ha. The 2026 assessment considers a reduced SW Pit footprint, comprising up to 40 ha of exposed limestone and approximately 61 ha of disturbed land, including highwalls and rehabilitated areas. The reduced footprint changes the location and extent of potential dust sources relative to surrounding sensitive receptors. PDP considers that aspects of the earlier assessment remain conservative when applied to the reduced SW Pit footprint.
- **Additional meteorological data review:** PDP reviewed additional on-site meteorological data collected between July 2023 and March 2026, which showed an approximately 30° shift in prevailing wind direction and a reduction in average wind speed of approximately 0.5 m/s compared with the October 2019 to June 2022 dataset. PDP investigated the differences by reviewing the monitoring data and site maintenance records but was unable to identify the cause. PDP therefore retained the October 2019 to June 2022 dataset for the dust assessment, on the basis that the wind direction patterns were more consistent with those recorded at the Te Kūiti monitoring station and that the higher average and peak wind speeds provided a more conservative basis for assessing dust effects. PDP acknowledged that the discrepancies between the datasets remain unresolved and recommended further field and/or laboratory calibration of the on-site meteorological instrument.
- **Respirable crystalline silica:** The 2026 assessment introduces an explicit assessment of potential health effects associated with respirable crystalline silica (RCS), which was not separately assessed in 2022. The assessment considers the reported crystalline silica content of the limestone, published ambient RCS monitoring data from other quarrying operations, and occupational dust and RCS monitoring undertaken at the existing Oparure Quarry. PDP compares the available information with health-based ambient assessment criteria, including an annual criterion of 3 µg/m³ adopted from the California Office of Environmental Health Hazard Assessment Reference Exposure Level (OEHHA, 2005) and Texas Commission on Environmental Quality (TCEQ, 2020) 24-hour criterion of 24 µg/m³. The assessment concludes that RCS emissions from the proposed SW Pit are unlikely to result in adverse health effects at off-site receptors. The assessment is based on available monitoring information and published studies.
- **Ecological effects:** Both assessments recognise the potential for deposited dust to affect vegetation and ecological receptors, with detailed ecological effects considered in a separate technical assessment. The 2026 assessment includes an expanded discussion of ecological impact criteria, including the potential effects of deposited dust on vegetation. However, it does not introduce a separate quantitative dust deposition assessment.

- **Updated water suppression assessment**: The 2026 assessment includes an updated assessment of water availability and demand for dust suppression, incorporating historical water-use records from October 2023 to December 2025.

  The assessment estimates water demand for the existing Oparure Pit, the proposed SW Pit and a combined operating scenario. It also considers the available water supply from the existing stormwater pond and groundwater bore.

  This updates the water availability assessment previously reviewed by AQCNZ, including the additional information provided by PDP in response to the section 92 request raised during the earlier consent process.

2.3 Summary

Overall, the 2026 assessment retains the principal methodology used in the 2022 assessment for evaluating dust amenity, particulate matter health effects and cumulative dust impacts. The most significant new component is the explicit assessment of RCS, while other changes primarily relate to the reduced quarry footprint, revised water suppression requirements and expanded supporting assessments.

3 AQCNZ review of 2026 assessment of dust discharges

3.1 Dust Amenity and Cumulative Effects

The 2026 assessment retains the FIDOL and Source–Pathway–Receptor (SPR) methodology previously reviewed by AQCNZ. The revised SW Pit has a smaller footprint than the original Pakeho Pit, with two residential receptors identified within 500 m of the proposed pit.

PDP concludes that the risk of dust impacts at these receptors remains low to very low, based on the low frequency of adverse wind conditions, separation distances and proposed mitigation measures. The assessment also considers cumulative dust effects from concurrent operations at the existing Oparure Pit and SW Pit.

AQCNZ considers that the assessment methodology remains appropriate and that the revised proposal does not materially alter the conclusions of the previous review, subject to effective implementation of dust mitigation measures.

3.2 Meteorological Assessment

PDP reviewed additional on-site meteorological data collected between July 2023 and March 2026, which showed an approximately 30° shift in prevailing wind direction and a reduction in average wind speed of 0.5 m/s compared with the earlier dataset. The cause of these differences remains unresolved.

PDP retained the October 2019 to June 2022 dataset for the dust assessment, as its wind direction patterns were more consistent with those recorded at Te Kūiti, while the higher wind speeds provided a more conservative basis for assessing dust effects.

AQCNZ considers this approach reasonable for the assessment. However, as the proposed AQMP relies on real-time meteorological monitoring to trigger dust mitigation

measures, AQCNZ recommends that the on-site meteorological instrument be calibrated and its performance verified before commencement of SW Pit operations.

3.3 Particulate Matter Health Effects

The 2026 assessment retains the qualitative approach used in 2022 to assess PM_{10} health effects, drawing on published quarry monitoring studies, background air quality and separation distances. PDP concludes that adverse PM_{10} health effects at off-site receptors are unlikely.

AQCNZ considers that the previous review conclusions remain applicable, given the reduced quarry footprint and proposed dust mitigation measures.

3.4 Respirable Crystalline Silica

The 2026 assessment includes an assessment of RCS, drawing on published literature and occupational exposure monitoring undertaken at the existing Oparure Quarry by Paragon Health and Safety Limited in 2022 and 2024. RCS was not detected in the occupational air samples collected during either monitoring programme.

AQCNZ considers that these results provide qualitative supporting evidence for PDP's conclusion that the potential for adverse off-site health effects from RCS is low, given that occupational exposures are generally expected to be higher than those experienced at off-site receptors.

3.5 Water Availability for Dust Suppression

The 2026 assessment updates the water balance using historical water-use records from October 2023 to December 2025. PDP estimates that 258 m^3/day is available for dust suppression, compared with a maximum estimated demand of 215 m^3/day under the scenarios assessed. The proposed AQMP includes a prioritised approach to water suppression, with active haul roads and other significant dust sources receiving priority.

AQCNZ considers that the updated water balance, together with the prioritised water suppression measures in the AQMP, provides reasonable assurance that sufficient water will be available for effective dust management. No further recommendations are considered necessary.

3.6 Review summary

Overall, AQCNZ considers that the 2026 assessment does not identify any material changes to the predicted off-site air quality effects that would alter the conclusions of its February 2025 memorandum.

The assessment methodology remains appropriate, and the reduced quarry footprint supports the conclusion that adverse dust effects are unlikely to be significant, provided the proposed mitigation measures are implemented effectively.

4 Review of consent conditions

AQCNZ has reviewed the proposed air quality consent conditions (Conditions 70–74) in Appendix T1. Overall, AQCNZ considers the conditions provide an appropriate framework for managing dust emissions from the SW Pit, including requirements for an Air Quality Management Plan (AQMP), control of exposed surfaces and implementation of corrective measures when visible dust crosses the site boundary.

The following amendments to conditions are recommended.

4.1 Condition 70

Condition 70 requires that airborne particulate matter does not cause offensive or objectionable visible plumes or deposited dust beyond the site boundary.

AQCNZ notes that this differs from the model condition recommended in the MfE *Good Practice Guide for Assessing and Managing Dust* (2016), which recognises that the presence of dust beyond a site boundary does not necessarily constitute an adverse effect. AQCNZ therefore recommends that Condition 70 be amended to align with the MfE guidance as follows:

The consent holder shall ensure that the implementation of this resource consent does not result in ~~a discharge of airborne particulate matter that causes offensive or objectionable visible plumes or deposited dust beyond the boundary of the Site~~ ***noxious, dangerous, objectionable, or offensive dust to the extent that it causes an adverse effect at or beyond the boundary of the Site.***

4.2 Conditions 71 – 74

Conditions 71 and 72 require the preparation and implementation of an AQMP, including dust mitigation measures, visual and meteorological monitoring, and reporting requirements. Condition 73 limits the maximum area of exposed unconsolidated land, while Condition 74 requires corrective action when visible dust crosses the site boundary.

AQCNZ considers these requirements appropriate for managing potential off-site dust effects, subject to the following amendments:

- **Condition 72(a)(vii):** Remove the reference to Condition 75, which relates to pest and weed control rather than dust management.
- **Condition 73:** Reconcile the maximum exposed area of 59.6 ha specified in the condition with the 61 ha stated in Table 2 of the AQMP.

AQCNZ also recommends amending Condition 72 to require the AQMP to include procedures for calibration and verification of the on-site meteorological monitoring instrument, with calibration and verification completed before commencement of SW Pit operations.

4.3 Review Summary

Subject to the recommended amendments, AQCNZ considers that the proposed consent conditions, together with the dust mitigation measures outlined in the AQMP, are sufficient to avoid or mitigate adverse off-site air quality effects associated with the SW Pit.

5 Conclusion

AQCNZ has reviewed the updated 2026 air quality assessment, proposed AQMP and consent conditions for the SW Pit, with reference to its previous review memorandum dated 14 February 2025.

Overall, AQCNZ considers that the 2026 assessment adopts an appropriate methodology and that the reduced quarry footprint and additional assessments do not materially alter the conclusions of its previous review. AQCNZ agrees with PDP that the potential adverse off-site dust amenity and health effects are expected to be low, provided the proposed dust mitigation measures are effectively implemented.

AQCNZ considers that the proposed AQMP and consent conditions provide an appropriate framework for managing dust emissions, subject to the following recommendations:

- Amend Condition 70 to align with the wording previously recommended by AQCNZ.
- Amend Condition 72 to require calibration and verification of the on-site meteorological monitoring instrument before commencement of SW Pit operations, and correct the cross-reference to Condition 75.
- Reconcile the maximum exposed area specified in Condition 73 with the AQMP.

Subject to these recommendations, AQCNZ considers that the conclusions of its February 2025 memorandum remain applicable and that the proposed mitigation measures and consent conditions are sufficient to avoid or mitigate adverse off-site air quality effects associated with the SW Pit. No other substantive air quality matters are identified for WRC to raise in its section 53 response.

6 Closure

If you have any questions regarding the above assessment, please do not hesitate to contact the undersigned.

Yours sincerely,

Peter Stacey
BSc, GradDip(Bus), CASANZ CAQP
Managing Director
Phone: 021 614 842
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7 Limitations

Air Quality Consulting NZ Limited has prepared this memorandum in accordance with the usual care and thoroughness of the consulting profession for the use of Waikato Regional Council, and only those third parties who have been authorised in writing by Air Quality Consulting NZ Limited to rely on this memorandum.

Air Quality Consulting NZ Limited is not liable for any errors or omissions contained within the Assessment of Environmental Effects report and Dust Management Plan updated for the proposed South-western Pit expansion which would otherwise impact our assessment.

It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this memorandum.

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This memorandum was prepared in October 2026 and is based on the conditions encountered and information reviewed at the time of preparation. Air Quality Consulting NZ Limited disclaims responsibility for any changes that may have occurred after this time.

This memorandum should be read in full. No responsibility is accepted for use of any part of this memorandum in any other context or for any other purpose or by third parties. This memorandum does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Appendix 3

Paul Williams
Cave and Karst System
Technical review

REVIEW OF QUARRY APPLICATION

Date: 23 October 2026

To: Chris Dawson

From: Paul Williams ONZM, University of Auckland

Subject:

Oparure Quarry South-Western Pit:
substantive application under the Fast Track Approval Act 2024
FTAA 2606-1251
and associated Appendices

I refer here to the application made by Graymont (NZ) Limited prepared on 17 July 2026 and to Appendices associated with the application.

1 I have followed quarrying operations at this site since I did the first water tracing for the proposed quarry in 1979. I recognise the continued provision of limestone products to be of national significance, so I support the continued use of the Oparure locality for quarrying limestone, provided operations are conducted with an effectively administered minimum impact policy and that effective land rehabilitation follows pit closure. I am particularly concerned that the impact of quarrying does not spread to adjacent catchments thereby widening its deleterious effects.

2 This application by Graymont (NZ) Limited, submitted under the Fast-track legislation, is essentially the same as presented previously to Waikato Regional Council and Waitomo District Council for consent under the Resource Management Act (1991). In essence, the application seeks approval to open a new limestone quarry adjacent to its existing Oparure operation, because the present opencast pit is nearing the end of its working life. The application states that the proposed new quarry will maintain, rather than increase, the current production rates of quarried limestone.

3 Over its lifetime of about 50 years, the area covered by the new quarry will reach 59.6 ha. If it proceeds, it will excavate limestone from a karst landscape located in an area that the Geoscience Society of New Zealand recognises (in its *New Zealand Geopreservation Inventory*) to be of national scientific importance. This partly because of the well displayed unusual landforms (polygonal karst), but also because karst is relative rare in New Zealand, covering only about 3% of the country. Although destroyed landforms cannot be replaced, Graymont will endeavour to make compensation for environmental damage during quarrying by instituting a series of 'betterment' actions, mainly involving planting and sediment control.

4 In the application, the company claims (p. iii) that "The **betterment approach** will lead to an overall positive outcome for the Mangawhitikau Stream catchment due to improvements to water quality and increased habitat through planting of streams, hillsides and tomos." But it is evident that although progressive planting may occur any significant improvement in water quality through 'betterment' will be achieve only after active quarrying has ceased, some 50 years hence.

5 Speleological exploration in the 1980s discovered a cave named Camelot that is located beneath the existing Oparure quarry and also extends under the proposed new quarry site (South-Western Pit). A stream runs through this cave and dye tracing (Figure 1 p. 25) from its headwaters has shown its main resurgence to be at Potea Spring beside the Mangawhitikau Stream to which it is a tributary. This is significant because drainage that infiltrates through the quarry floor (existing and proposed) finds its way into this stream, as would any accompanying waterborne pollutants including excess sediment. Thus subterranean aquatic ecology is potentially impacted by quarrying operations, as is the quality of cave water downstream to its resurgence at Potea Spring (Fig. 1). Any water quality impact would in turn be transmitted to receiving waters (in this case from lower Mangawhitikau Stream via the Mangapu to the Waipa River).

6 The existing active Oparure quarry impacts the water quality and ecology of only one groundwater basin, that of Camelot Cave stream. The proposed new South-Western Pit is situated over an upstream section of the same groundwater basin, so potential impacts of the new pit would be confined to the Camelot catchment. But this would remain the case only if the boundaries of the new South-Western Pit are confined within the watershed of the Camelot groundwater basin. Water quality and discharge patterns at Potea Spring would be affected if quarrying caused collapse of part of Camelot Cave roof. This has been avoided in Oparure pit, so continued good management should prevent it in the new pit, although we have to accept that the water quality in the downstream section of the subterranean Camelot Stream has been impacted by existing quarrying operations.

7 Management must vigorously guard against the unnecessary spread of ecological and water quality impacts into adjacent groundwater basins. Potential operations on the northern boundary of the proposed South-Western Pit are especially important in this respect. Figure 2 (p. 26) indicates that the northern boundary of the proposed new Pit (shown as a light blue line) coincides with the karst catchment boundary (shown as a dark blue line). However, the karst catchment boundary in the landscape follows a *surface* topographical feature (hill crests) and so cannot accurately depict the plan position of the boundary of the *subterranean* karst groundwater basin (that may also fluctuate naturally in position according to groundwater recharge

conditions). Only dye tracing the water draining into each doline will determine the route of groundwater flow and hence enable definition of the position of the groundwater divide. This is recognised in Appendix-I-Water section 2.3 (p.7): 'surface topography is an unreliable indicator of subsurface water movement in the karst environment'. Thus, the depicted northern boundary of the South-Western Pit should be taken as an approximate limit to quarrying and **be subject to confirmation** following better definition of the groundwater divide. Drainage from two dolines (D29 and C4) north of the divide was shown by dye tracing to flow to upper Mangawhitikau spring (Appendix-I-Water, Figure 3), but only one other doline (C13) near the divide has been dye traced. What is at risk here is possible damage to the water quality of upper Mangawhitikau Stream where it flows into Spellbound (tourist) Cave, the location of an international quality glow worm display filmed by Sir David Attenborough's team. This issue is not recognised in the application but must be addressed. [My memorandum of 14 Jan 2025 to Chris Dawson concerned this point].

8 The Conditions of Consent should recognise that impacts of quarrying might inadvertently spread into neighbouring groundwater basins. Consequently, a new set of formal conditions 'Protection of Adjacent Catchments' should be drafted that allow for this possibility and guide remediation. For example: quarrying activities should stop in that part of the pit that was the source of the problem; redefinition of the authorised spatial limits of the quarry might be necessary; and a wider buffer zone around quarry limits might be required. The quarry operator should be required to prepare a draft management plan (for WRC certification) for dealing with this kind of contingency that could be activated without delay to ensure effective remediation. This would be in addition to and distinct from the Spill Response Plan. A new section is required, therefore, in the 'Draft Conditions of Consent for the South-Western Pit and Haul Road Project' to deal with protection and possible remediation of adjacent groundwater basins.

9 The conceptual model of subsurface flow paths in the karst system depicted in Appendix-I-Water, Section 2.4 and Figure 4, is perfectly reasonable for the vadose (aerated) part of the groundwater system, but once drainage reaches the saturated (or phreatic) zone then dispersion will occur and water (plus dye) can appear at more than one spring (hence dye injections into Camelot emerge at both Potea (Gate) and Farm springs). A fuller conceptual explanation of the hydrogeology of karst in the region is available in appended report PDP11 Nov 2019.

10 To enable early warning of any possible water quality deterioration in the upper Mangawhitikau Stream, a permanent water quality/aquatic ecology monitoring site should be established near the upstream entrance to Spellbound Cave. Should water quality deterioration be detected, a previously established action plan should be

activated to identify the source of the problem (which could have nothing to do with quarry operations) and prevent or reduce further water quality impacts.

11 Section 6.4 of the application concerns 'Climate Change'.
This section is just six lines long, so the applicant clearly sees no significant air quality issues other than dust. But in some respects, I consider an application such as this to open a new limestone quarry to be similar to an application to open a new coal mine. We are aware that the purpose of a coal mine is to produce coal for consumption, mainly as a source of energy. The burning of coal produces carbon dioxide, a well-known atmospheric pollutant that we are strenuously trying to reduce because of the Greenhouse Effect. So society objects to the opening of new coal mines.

12 Similarly, the purpose of a limestone quarry is to produce limestone for industrial consumption. The materials produced include rock aggregate, lime and cement. In section 11.1 'Extent of Benefits', the application notes that Graymont's lime and limestone products are essential inputs across the New Zealand economy and that Oparure is the biggest limestone quarry in New Zealand by output. In fact, it supplies about 750,000 tonnes of limestone annually. In section 4.1 of the application, it is stated that about 40% of the extracted tonnage is sent to lime kilns in Otorohanga and Te Kuiti for further processing into quicklime products. Calcination of limestone in kilns to make such products consumes energy and in the process releases carbon dioxide into the atmosphere. 1 tonne of limestone yields about 440 kg of carbon dioxide (varies with its purity). So if about 300,000 tonnes of limestone are processed annually through Graymont's kilns, then the associated discharge of CO_2 into the atmosphere is about 132,000 tonnes. This constitutes about 30% of New Zealand's annual CO_2 emissions from cement production. The proposed new South-Western Pit would likely extend these nationally significant atmospheric emissions for up to 50 years. This is therefore an adverse effect of national importance.

13 Section 7.6 discusses 'Aquatic Ecology'.
Aquatic ecology monitoring is proposed only in the resurgence zone of Camelot Cave. This is possibly because the assumption is made that no ecological impacts are likely to occur in the Mangawhitakau Stream upstream of the confluence of waters from Potea Spring. However, as explained in paragraph 7 above, the northern watershed boundary of the proposed South-Western Pit is not well constrained by scientific evidence, so a possibility remains that accidental impacts may spill northeast into the upper Mangawhitikau Stream or directly into Mangawhitakau Cave. To monitor and guard against the former, a permanent water quality/ aquatic ecology sampling station should be established just upstream of the entrance to Spellbound Cave. This site should be identified in clause 60 of the 'Draft Conditions of Consent for the South-Western Pit and Haulage Road Project'. Any waterborne impacts into Mangawhitikau Cave should be

detectable at the sampling site located upstream of Potea Spring confluence. The potential for unanticipated adverse effects of this kind might also be noted in Table 16 (p. 87) 'Proposed mitigation and management measures' under 'Actual and Potential Effects'.

14 Table 17 (p. 91) 'Conditions recommended in CIA' mentions in item 6-9 a Karst Enhancement Plan that, amongst other things, includes offsetting the loss of 10 tomo. However, the meaning of the word 'tomo' in a geological context has through popular useage become somewhat ambiguous. The term is usually used in reference to an entrance, shaft or pit, and in karst landscapes such features are often found near the bottom of topographically enclosed depressions. Such depressions in karst scientific literature are known as dolines, but in America are popularly called sinkholes. Polygonal karst as found at the proposed quarry site refers to clusters of immediately adjacent dolines, producing a honeycomb pattern in plan view. It is an area of polygonal karst that the new pit workings would quarry away. So what does the statement in Table 17 referring to 'off setting of the loss of 10 tomo with up to 30 over the life of the Quarry' actually mean? My interpretation is that it refers to offsetting the loss of up to 30 enclosed depressions (dolines) rather than just shafts or pits. If that is the intention, then the word tomo should be replaced. I also note that Figure 1 (p.3) in Appendix-I-Water is titled 'Catchments and Potential Tomos'. This figure shows the area of polygonal karst that would be quarried by the South-Western Pit. Doline boundaries are delineated to define the catchment area for each doline, the assemblage illustrating the polygonal pattern of adjacent karst depressions. The lowest point of each doline is identified by a red dot and in the key these sites are described as a 'potential tomos', i.e. sites where runoff might escape by draining underground via joints or shafts. This is correct, but I note that there is no international term for the lowest point on a doline floor. It is just the bottom of the depression unless a hole is open, in which case it might be a shaft or in New Zealand parlance a 'tomo'.

15 Section 9.3.1 Part 2 of the RMA: Purpose and Principles
On p. 99 lines 6 to 7 Dr Keesing remarks that most of the karst features present do not represent those prior to human settlement. If he is just referring to the biological features of karst, then he is probably correct, but the physical karst landscape features at the quarry site were undoubtedly present prior to human settlement.

16 According to Section 7 of the RMA, particular regard should be paid to a number of matters including (i) the effects of climate change. This issue is addressed in the application on p. 102, where five bullet point headings are used to identify the main likely climate-related risks for limestone quarries. As explained in 12 above, the main purpose of a limestone quarry is to produce raw material for economic activities, one of which is the production of cement. The present Oparure quarry sends about 40% of the

extracted tonnage to nearby Otorohanga and Te Kuiti for further processing into quicklime products in kilns owned by Graymont (NZ) Ltd, and the intention is to maintain the output of quicklime products at the same rate should this application for the new South-Western Pit be successful. Therefore, this intimately linked downstream process producing quicklime could continue to emit nationally significant quantities of carbon dioxide, a major greenhouse gas, for up to 50 years.

17 National Policy Statements

The application considers the NPS for Greenhouse Gas Emissions from Industrial Heat 2023 to be not relevant to this application, because it concerns the development of a new pit and the quarrying of limestone, where the only process included is a mobile crushing plant which is not an industrial heat device. This is like saying that a coal mine is not responsible for greenhouse gas emissions because it doesn't burn the coal, it just provides the raw materials. The purpose of the coal mine is to provide a source of energy, a by-product being CO_2 and, likewise, a major purpose of this limestone quarry (40% of its tonnage) is to enable manufacture of quicklime and cement through its nearby Graymont-owned kilns, a significant by-product being CO_2.

18 The transport of limestone from the quarry to its kilns in nearby Otorohanga and Te Kuiti results in the emission of CO_2 not just from truck emissions but especially from kiln processes. This is relevant to air policies detailed on p 108 of the application because, as noted in 12 above, this at present constitutes about 30% of New Zealand's annual CO_2 emissions from cement production and because a major purpose of the new pit is to maintain production for the life of the pit (until about 2080 (p.43)).

19 Conclusions

I agree with the statement in 11.1 (p.128) that Graymont's products are essential inputs across the New Zealand economy. I also agree that Oparure quarry operates to high environmental standards. But even more care will be required if the quarry expands upstream in the Camelot groundwater basin. In my opinion, the environmental costs (including destruction of nationally important karst landforms, aquatic ecology damage, greenhouse gas emission) are worth the benefits accrued to employment and the economy over the next 50 years or so, but only provided environmental impacts do not spill over into neighbouring groundwater basins and provided Mangawhitikau Cave (including its Spellbound section) remains unaffected. In effect, Camelot becomes the sacrificial basin for the economy.

I also believe that it is important for Graymont to 'own' the effects of CO_2 emissions associated with limestone quarrying, because if their products were not destined for and used in their kilns there would be no significant emissions from this part of their industry. The Graymont quarry and kiln operations are indelibly linked.

Appendix 4

Kerry Pearce
Erosion and Sediment Control
Technical review

Internal Memo

Bryant Environmental Solutions Ltd
LAND MANAGEMENT, EROSION & SEDIMENT CONTROL CONSULTANTS

To: Sheryl Roa, Principal Consents Advisor, Waikato Regional Council

From: Kerry Pearce

Date: October 29 2026

Re: Graymont Oparure Quarry South-Western Pit Substantive Resource Consent Application

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Note:

This memo draws on and includes discussion from my original memo "Comments on Draft Erosion and Sediment Control Assessment for Graymont Quarry Pakeho Pit including Revised Southern Catchment Pit."

I have considered the current approach to ESC management and have not considered the 'betterment' options as part of this assessment. As ESC expert, my focus is on minimising the potential discharge from the proposed operation and ensuring the ESC approach is based on current Guidelines and Best Practice.

As part of my assessment I have reviewed the following documents:

- "Oparure Quarry South-Western Pit Substantive application under the Fast-track Approvals Act 2024 – FTA 2606-1251." **(Application).** Prepared by Enspire Consulting Limited and dated July 2026.
- "Oparure Quarry South-Western Pit: Erosion and Sediment Control Plan." **(ESCP).** Prepared by Pattle Delamore Partners Ltd and dated 13 July 2026.
- "Oparure Quarry South-Western Pit: Erosion and Sediment Control Toolkit." **(ESC Toolkit).** Prepared by Pattle Delamore Partners Ltd and dated 13 July 2026.
- "Oparure Quarry South-Western Pit: Topsoil Management Plan." **(TMP).** Prepared by Pattle Delamore Partners Ltd and dated July 2026.
- "South-Western Pit and Haul Road Site Management Plan." **(SMP).** Prepared by Pattle Delamore Partners Ltd and dated June 2026DRAFT.
- "Draft Conditions of Consent for the South-Western Pit and Haul Road Project". **(Draft Conditions).**

<u>Guideline Standard/Best Practice</u>

Section 2.0 of the ESCP states: *"The ESCP follows the principals in Auckland Council (AC 2016) Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, Guideline Document (GD 2016/005)",* herein after referred to as GD05. GD05 is well recognised throughout New Zealand, and has a proven track record in ensuring successful erosion and

sediment control management for a range of projects. GD05 is highly regarded and well understood by industry, and contains a 'toolbox' of measures that can be employed to minimise erosion and control sediment within the earthworks site.

However, Appendix B of the ESCP refers in Section 4.4 to "WRC (2014)" which is in reference to Waikato Regional Council's "*Sediment Retention Pond (SRP), Earthworks series – erosion and sediment control factsheet. Series No.2. Waikato Regional Council".* Section 2.4 of the SMP also refers to WRC Guidelines. For consistency the application and conditions should use the single Guideline, with GD05 employing most recent best practice.

There are many instances where GD05 promotes a higher standard that WRC Earthworks Guidelines including:

- GD05 promotes flocculation of Sediment Retention Ponds and Decanting Earth Bunds as best practice for earthworks operations;
- GD05 promotes a Decanting Earth Bund length to width ratio equivalent to that of sediment retention ponds, both of which greatly increase the efficiency of these devices;
- GD05 contains a significantly higher level of detail on construction and maintenance of ESC devices, including a whole section on flocculation;
- GD05 requires clean and dirty water diversions to be constructed with sufficient capacity to safely carry the flow from a 5% AEP storm event, plus a freeboard of 300mm. WRC Guidelines require clean and dirty water diversions to carry the flow from a 20% AEP rain event, plus 300mm freeboard;
- GD05 promotes the use of 'drop-out pits' within dirty water diversions on steeper sites to promote the dropping out of heavier sediment particles before flows reach a sediment control device.

It is therefore recommended that GD05 be the point of reference as a minimum standard in the design and implementation of ESC measures on site to ensure the earthworks can be appropriately managed using current best practice erosion and sediment control techniques. However, this does not preclude the applicant proposing a higher standard of ESC in the ESCP, ESC Toolkit, and SMP.

Section 2.1 of the ESCP details that a final ESCP will be finalized following granting of consents and will incorporate any changes to the quarry and construction planning. Section 2.1 of the ESCP also states that yearly ESC Stage plans will be prepared for the upcoming year, and will detail specific measures for those years works. Early ESC Stage Plans were provided with the application. This approach should be supported through consent conditions.

<u>ESC Approach</u>

The general approach for Graymont Oparure Quarry, and applied to quarries in general, has been to maintain all quarry runoff within the quarry pit and encourage use of this water on site and infiltration of this runoff to ground thereby minimising any point source discharge. It is recognized that the unique karst system on which the Oparure Quarry and the proposed South-Western Pit are located can lend itself to greater infiltration than a standard quarry pit, and can pose a risk to sediment discharge though the karst system and into downstream receiving environments due to the increased infiltration rates. Section 3.8 of the Application specifically states *"…cave development in and around the Site is likely to occur through chemical dissolution*

of limestone by slightly acidic surface water." Furthermore, Section 5.4 of Appendix B of the ESCP refers to infiltration rates of 12m/day via gross fractures in the limestone.

This was identified in my previous memo "*Comments on Draft Erosion and Sediment Control Assessment for Graymont Quarry Pakeho Pit including Revised Southern Catchment Pit*" dated January 28 2025. In this memo the preferential flowpaths within the karst cave system were raised as a potential issue, with the option for the collection, treatment, and discharge of treated water off site (i.e. out of the quarry system) rather than directing runoff into the quarry pit for infiltration being a preferred option. It was appreciated that collection of all treated runoff to discharge off site is impractical and likely unfeasible in some cases, however if the site is proposing ESC measures in accordance with current best practice, then runoff from these treatment devices should be discharged off site where practicable without redirecting this runoff into the quarry pit for potential recontamination with sediment and gross infiltration into the subterranean water system.

The basis for this assessment is that the treatment efficiency of a well-maintained sediment retention pond constructed in accordance with best practice, for example, has been proven to range between 75% and 95%, thereby removing the majority of sediment from incoming flows. This treatment efficiency can be at the higher end of this range when flocculation is incorporated, which should be considered the current standard for earthworks operations. Section F1.1 of GD05 specifically states *"The majority of SRPs will require flocculant treatment."* Current best practice is to require flocculation of SRPs where bench testing shows a benefit, and this should be applied here.

Contrary to this, the treatment efficiency of directing runoff into the quarry pit and infiltration into the karst system is unknown and this could be a contributor to sediment loading in downstream systems, both within the karst systems and in surface downstream receiving environments. It is inefficient to treat sediment laden runoff and remove sediment with Best Practice ESC measures, only to discharge this runoff back into a 'dirty' environment where the treated water will pass over exposed areas and potentially become re-contaminated with sediment prior to potentially discharging into the karst cave systems.

Any runoff that cannot be directed out of the quarry pit will obviously be subject to infiltration to ground and potentially into the karst system. The treatment efficiency and resultant sediment discharge during this process cannot be easily measured or quantified given the underground discharge.

The Application does include an ESC Toolkit intended to provide *"a suite of methods, assumptions, and details of how the erosion control devices are designed, typical layout and construction details."* This ESC Toolkit contains ESC measures that might be considered outside of standard GD05 design, and very site specific to the unique conditions at Graymont Quarry. The ESCP and ESC Toolkit refers to the construction of Infiltration Sediment Retention Ponds within the SW Pit, which will have a filter medium installed to increase the sediment retention efficiency of the infiltration ponds within the quarry pit. While these will likely provide an improvement over an uncontrolled discharge, it is unknown how efficient these would be and how any discharge would be monitored. There is also the risk of these being overwhelmed as a filter medium, with the resultant overflow back into the quarry and karst system. It is also not clear how long this filter medium would last, the impacts of flooding the quarry by reducing infiltration, and what the maintenance requirements on these ponds would be.

Monitoring

Section 3.8.3 of the SMP proposes monitoring of discharges from all *'lined erosion and sediment control devices'* for Total Suspended Solids (TSS) to observe whether discharges from these devices exceed TSS of 100mg/litre. Should this limit be exceeded, further ESC measures including flocculation are proposed. It is noted that GD05 promotes the use of a 100mm clarity trigger for pumped discharges to provide an instant measure of how an ESC device is performing and this has potential to be monitored here to provide an instant assessment on how an ESC device is performing. Section 3.8.4 of the SMP provides for the implementation of flocculation should trigger levels be exceeded, however there are no other continency measures proposed.

Continuous turbidity monitoring is proposed in the unnamed tributary that flows to the Camelot Stream and downstream of Gate Spring, within an initial trigger of 2,000 NTU. While this is not directly related to direct discharges from ESC measures noted above, 2,000 NTU seems to be an extremely high trigger for surface water quality. It is also unclear how this 2000 NTU trigger relates to 100mg/litre proposed for ESC measures, or 100mm clarity provided in GD05.

Further comments on monitoring is included in the Comments on ESC Consent Conditions below.

Comments on ESC Consent Conditions

Condition 22e) – Deemed certification. Condition 22e proposes that should there be no response from WRC to the submission of a Management Plan, then that Management Plan is deemed certified. This is a problematic consent condition and is not supported by case law (refer to Meridian Energy Ltd v Wellington City Council [2011], and New Zealand Transport Agency – Waka Kotahi (ENV-2023-WLG-000005) for Otaki to North of Levin Project). Works should not commence until the respective Management Plan is certified and this should be supported by consent conditions.

Proffered consent conditions also propose upstream and downstream water quality monitoring to monitor the turbidity of upstream and downstream environments to assess the impacts of the proposed works on the receiving environments. The monitoring and standards should be assessed by a water quality specialist to determine whether these are effective measures of the impact of the quarry on the downstream receiving environments and are not considered further as part of this ESC assessment. However, the 2,000 NTU turbidity trigger in condition 19 does seem excessively high as a trigger point.

Proffered condition 66 refers to discharges from all lined erosion and sediment control measures, however it is not clear on what these devices are, be it sediment pits, sediment retention ponds, or diversion drains. A limit of 100mg/litre is proposed as a discharge limit, with flocculation proposed should that limit be exceeded. There is no discussion on what happens should that limit be exceeded with flocculation already implemented. Flocculation is now considered industry best practice and should be applied to all sediment retention measures if bench testing shows a benefit. This should be supported through consent conditions.

Proffered conditions 73 and 74 refer to dust management, however are generally not standard WRC consent conditions in relation to dust. The proposed activity has a significant risk of dust generation, and more robust conditions should be implemented on the management and mitigation of dust on site. Of particular note is the maximum exposed area of 59.5ha proposed, which would be a significant dust generating area to control with standard measures.

Discussion

The Application and associated documents have proposed an ESC approach in general accordance with GD05 (noting exceptions raised earlier in this memo and with flocculation only being required in response to exceeding discharge limits) and GD05 should be supported as the standard for all earthworks runoff that can be directed away from the quarry pit and into GD05 compliant ESC measures.

However, the general approach for the quarry pit still includes the discharge of all runoff into the quarry pit and there are instances where the discharge from GD05 compliant devices is proposed to discharge back into the quarry pit. This raises an area of concern in regard to the unknown treatment efficiency and resultant potential sediment discharges from the collection and infiltration of runoff in the quarry pit, even with the inclusion of Infiltration Sediment Retention Ponds proposed.

Any earthworks runoff that can be directed away from the quarry pit and into GD05 compliant ESC measures and off site should be encouraged to do so. This could include the haul roads, overburden and topsoil stockpiles, and any other areas that can discharge via gravity to an ESC measure outside the quarry pit. The discharges from these ESC measures should be monitored as proposed, and allowed to discharge away from the quarry pit. It may be necessary to line these measures should they intersect with any fractures in the karst system to avoid potential preferential flows, however given these are likely to be in the upper layers of overburden this may not be an issue.

While the applicant has proposed Infiltration Sediment Retention Ponds within the quarry pit and these may assist with treatment of runoff within the quarry pit, the treatment efficiency of these devices is largely unknown and would be extremely difficult to monitor. It is also noted that these devices are proposed for catchments up to 5ha in area, when the quarry pit will quickly exceed that catchment area by some margin. This may require a large number of these Infiltration Sediment Retention Ponds and careful management of runoff within the quarry pit. This may also result in inundation of the quarry pit in large rainfall events or should the filter systems become blocked.

There is also the manner of diversion of runoff to these Infiltration Sediment Retention Ponds, and how infiltration of runoff in any diversion drains will be managed. There is currently no proposal to line these drains to prevent any incursion of runoff into the karst system. This should be provided for in consent conditions.

The risk of discharge of sediment laden runoff increases in correlation to the increase in disturbed area due to the increased area being exposed to any rainfall and subsequent runoff. A tool that could be used to manage this increased risk could be staging exposed areas to minimise the risk of sediment laden runoff. This could be supported through consent conditions.

As outlined earlier, sediment discharges from standard GD05 compliant ESC measures can be monitored at point of discharge. Any exceedances from pre-determined trigger levels can be picked up through this monitoring and contingency measures applied. This is supported through proposed conditions 66-69, however there is a lack of contingency options other than flocculation. Flocculation should be imposed as a standard given it is now current best practice, and other contingency measures should be provided for. This could include minimizing exposed areas where there are repeated exceedances.

Appendix 5

Andrew Rumsby
Water Quality
Technical review

Review of Oparue Quarry Fast Track Application WB 1008189

To: Sheryl Roa – West Coast Regional Council

From: Andrew Rumsby, EHS Support New Zealand Ltd

Date: 13 October 2026

Job No.: NZL.0331.0000

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1 Introduction

Waikato Regional Council (WRC) engaged EHS Support New Zealand Limited (EHS Support) to undertake an independent technical peer review of the Graymont (NZ) Limited (Graymont) Fast Track Application and supporting technical documentation. EHS Support's role is to provide an impartial and scientifically robust assessment of the information presented by the applicant, with particular focus on matters relating to water quality, and to assist WRC in evaluating the adequacy, completeness, and technical defensibility of the application.

Graymont has applied for approvals to develop the Oparure Quarry South-Western Pit Project at 806 Oparure Road, north of Te Kūiti. The proposal includes developing a new limestone extraction area adjacent to Graymont's existing quarry operations, along with associated quarrying activities, overburden removal, stormwater management infrastructure, and ancillary works to support expanded operations.

Based on information presented in the application and the findings of the Joint Statement of Experts (2024), potential environmental effects associated with the proposed development include changes to surface water runoff, erosion and sediment generation, groundwater and surface water quality, hydrological processes, and the management of quarry-derived discharges during both the construction and operational phases.

This peer review focuses on actual and potential effects on surface water and groundwater quality. The review considers the adequacy of baseline environmental information, impact assessment methodologies, proposed mitigation measures, stormwater and sediment control strategies, monitoring programmes, adaptive management provisions, and relevant consent conditions. The review does not reassess all environmental aspects of the proposal. Instead, it evaluates whether the water quality effects information is scientifically robust, internally consistent, supported by appropriate evidence, and sufficient to inform regulatory decision-making.

The purpose of this memorandum is to document EHS Support's findings, conclusions, and recommendations regarding the potential water quality effects of the proposed development and to assist WRC in determining whether those effects have been appropriately identified, assessed, and managed. The review considers whether the investigations, assessments, management measures, monitoring programmes, and proposed consent conditions are scientifically sound, internally

consistent, practical to implement, and capable of effectively managing potential adverse effects on water quality. The review is limited to the documents requested by WRC and identified below.

This review is subject to the limitations outlined at the end of this memorandum.

1.1 Scope of Review

The scope of EHS Support's peer review includes:

- Review of the following documents:
  - Enspire Consulting Limited (2026), Oparure Quarry South-Western Pit. Substantive Application under the Fast Track Approvals Act 2024. FTAA 2606-1251. Dated July 2026.
  - PDP (2026), Appendix I: Oparure Quarry South-Western Pit - Water Assessment. Dated July 2026.
  - Appendix T1: Draft Conditions of Consent for the South-Western Pit and Haul Road Project.
- Assessment of the adequacy and completeness of the technical information supporting the application.
- Evaluation of the appropriateness of the proposed management, mitigation, and monitoring measures.
- Review of proposed consent conditions and environmental management commitments relevant to the matters considered.
- Identification of technical uncertainties, information gaps, and matters requiring clarification.
- Provision of independent technical advice to WRC to support its assessment of the application and associated decision-making process.

This memorandum presents EHS Support's findings, conclusions, and recommendations arising from that review.

2 Changes in the Water Quality Assessment from Original Resource Consent Application

2.1 2022 Application

In October 2022, Graymont applied for resource consents from WRC to develop, operate and progressively rehabilitate the Pakeho Limestone Quarry at Oparue. After the section 92 process and expert witness workshop on 15 October 2024 (Joint Statement of Experts, 2024), several key areas required further assessment, primarily related to interpreting the karst groundwater system, the potential for sediment transport and accumulation within caves, and the adequacy of the information available to assess effects on cave and aquatic ecosystems. More specifically, Council Reviewers felt that:

- Groundwater catchment boundaries remain uncertain. Council reviewers considered the extent of the Guildford Cave and Upper Mangawhitikau groundwater catchments was not sufficiently defined, and that additional investigation may be required, whereas the applicant's experts considered further dye tracing was unnecessary.
- Insufficient information was available to demonstrate that sediment would not accumulate within the Mangawhitikau Cave system. Council reviewers noted significant information gaps regarding cave sedimentation and potential effects on cave ecology, while the

applicant's experts considered effects would be low but provided no further evidence to support this view.

- The significance of ecological effects within the cave system remained disputed. Council experts considered the magnitude of effects could not be reliably assessed because increased sedimentation could potentially affect aquatic habitats and food resources supporting the internationally significant glowworm populations within the Mangawhitikau and Guildford cave systems. Concerns were also raised that sediment accumulation within cave passages and flood caverns could alter flooding characteristics and affect cave-dependent ecological communities. Professor Paul Williams noted that the Flood Caverns in the lower part of the Mangawhitikau Caves have already been affected by a significant build-up of creamy white sediment, which has raised the cave flood level.

Subsequent to the expert witness conferencing, Graymont amended the proposal by reducing the northern extent of the Southern Pit to increase the buffer between quarry activities and the inferred groundwater divide and fault zone. In EHS Support's opinion, these changes largely addressed concerns regarding potential effects on the Upper Mangawhitikau Stream catchment, Mangawhitikau Cave system, and associated groundwater flow pathways.

2.2 Changes in the Fast Track Application

The Fast Track Application incorporates several substantive changes to both the proposed quarry development and the supporting technical assessment information compared with the earlier consent application. Most notably, the proposed South-Western Pit has been significantly reduced in size, decreasing from approximately 88.3 ha to 59.6 ha, representing a reduction of approximately 28.7 ha (33%). The revised pit design shortens the extraction area by approximately 120 m and confines quarrying activity to the southern portion of the previously proposed Western/Pakeho resource area. This redesign avoids the northern catchment, which was identified as a key concern during the earlier consent process (and Expert Witness Workshop) due to potential hydrological and water quality effects.

The Fast Track Application also incorporates a range of updated environmental monitoring and assessment information, including:

- Additional Camelot Stream and Pōtea Spring monitoring data collected during 2025 and 2026.
- Updated continuous sonde monitoring data covering the period from 15 December 2025 to 26 February 2026, together with further data and analysis of relationships between dissolved oxygen, pH, turbidity, and rainfall for both monitoring periods.
- Consent compliance monitoring data through to December 2025.
- Expanded discussion of attenuation processes relevant to water quality effects.

These updates provide additional information to support the assessment of the proposed development's potential water quality effects and form a key component of this review.

Table 1 summarises the significant changes in the FTA application.

TABLE 1 COMPARISON 2024 WESTERN PIT WATER ASSESSMENT VERSUS 2026 SW PIT WATER ASSESSMENT

Section (in 2026 WQ Assessment)	2024 Report (Western Pit)	2026 Report (SW PIT)	Significance of Change
Executive Summary	Focus on Western Pit consent application and WRC processes.	Rewritten for Fast-track application. Expanded baseline, monitoring, attenuation and mitigation discussion.	Major Change
Section 2.1 Water Classification	Defines karst environment as surface water as per Waikato Regional Plan (WRP).	Additional text added.	No Significant Change
Section 2.2 – 2.3 Catchment Delimitation	Mangapu, Mangawhitikau and Camelot caves catchment described	Similar framework, revised figures and updated terminology	Moderate update with more information on the catchment divided
Dye Tracing	Detailed 2020 and 2023 tracer work with Upper Mangawhitikau and Pōtea Spring connections.	No new dye tracing data, but has revised the information on the groundwater catchment divide (Similar to the interpretation provided by Professor Paul Williams during the Expert Witness Workshop -see memo dated 18 August 2024 (Williams, 2024; Richardson J., 2001)).	Refinement of CSM in Section 2.4
Sections 2.5 Baseline Monitoring	Summarises water quality data from Camelot Stream and Potea Springs (25/6/21 to 10/9/21) plus compliance monitoring until July 2020	Additional water quality data 15/12/25-26/02/26. Additional compliance monitoring data has been added	Additional data
Section 2.6 Water Quality guidelines and 2.7 Discussion	Brief Discussion only in the 2024 report. Says water quality is impacted by agricultural impacts. Statement has not been supported by evidence within the document.	Also compares data with WRC water classification and more detailed discussion. Concludes that agricultural impacts and erosion of the limestone catchment combined to drive the results.	Additional discussion notes that erosional processes also impacted
Section 4.0 Potential Effects on Environment	Summarised in Section 3.0	Reorganise discussion, with greater emphasis on the Camelot Cave	More assessment has been undertaken, and the risk assessment

Section (in 2026 WQ Assessment)	2024 Report (Western Pit)	2026 Report (SW PIT)	Significance of Change
		buffer Zone. Restriction on excavation and overburden placement. Progressive investigation of cave geometry	approach has been modified from managed risk to avoid cave impacts until proven safe
Sediment loads calculation	Estimate peak loads of 432,000 kg per year	Estimate peak load of 185,022 kg per year.	Updated sediment load modelling. Concludes that quantified sediment offsets exceed predicted load increases.
Section 5.0 Alternative Water Management Options	Consider effects to be less than minor.	More focused on sediment effects	No significant change
Section 6.0 Proposed Mitigation	Focuses on offset only	Improved sediment control measures to reduce sediment load, but the 2024 report's cropping management proposal has now been removed. Adds operational rainfall-response	Significant improvement
Section 7 Reasonable Mixing	Not Discussed	Briefly mentions location of monitoring points	

Overall, the 2026 Water Quality Report provides significantly improved water quality assessments and better mitigation options compared to the 2024 water quality assessment.

2.3 Gaps in 2026 Water Quality Assessment

The Water Quality Assessment Report contains significant gaps and mistakes, outlined below.

2.3.1 Incorrect characterisation of ANZG (2018) and WRC water quality criteria

The assessment repeatedly treats the ANZG default guideline values and Waikato Regional Council water quality categories as chronic aquatic toxicity thresholds. This is not technically correct.

The ANZG (2018) default trigger values for physicochemical stressors such as turbidity and suspended solids are derived using a reference-site percentile approach. Exceedance of the default guideline value does not indicate toxicity or ecological effects. Instead, it indicates that water quality differs from typical reference or pseudo-reference conditions and that a potential stressor may be present and requires further investigation. Similarly, the WRC Excellent / Satisfactory / Unsatisfactory classification framework is a state-of-environment classification tool and not a chronic ecological effects threshold.

Consequently, the assessment's repeated references to "chronic effects thresholds" and conclusions regarding the absence of chronic impacts are not supported by the guideline methodology itself.

2.3.2 No ecological effects analysis of turbidity toxicity thresholds

The assessment focuses almost entirely on comparing measured turbidity and suspended solids concentrations (SSC) values against ANZG and WRC guidelines but does not assess actual ecological effects.

In particular:

- no acute or chronic turbidity effects assessment has been undertaken;
- no comparison has been made against experimentally derived thresholds for New Zealand freshwater species;
- no consideration has been given to magnitude, duration, frequency and timing of turbidity events from an ecological perspective.

This is a significant omission because the project seeks long-term approval (35 years), and the report identifies turbidity as the principal contaminant of concern; within the proposed consent conditions, several turbidity limits have been proposed, but no justification has been provided. Under condition 20, a trigger of 2,000 NTU has been proposed, which is significantly higher than the acceptable action threshold or the toxicity thresholds identified in Table 2. This value is derived from an unreferenced statement in Stantec (2026) (the aquatic ecology report) that was adopted in the principal Environmental Assessment. This is discussed further in **Section 2.3.4** below.

2.3.3 Censoring of turbidity data in Table 3

In Table 3 of the PDP (2026) Oparure Quarry South-Western Pit: Water Assessment, maximum turbidity values are reported as ">200 NTU" (or FNU), despite the monitoring sondes having a stated measurement range of up to approximately 4,000 FNU. Figure 6 indicates that at least seven turbidity events exceeding 200 FNU occurred during the two sonde monitoring periods. Consequently, the reported summary statistics do not allow an assessment of the true magnitude of these events or the upper range of natural variability.

Because the underlying raw monitoring data are not provided, it is unclear what maximum turbidity values were recorded at each monitoring location, whether the dataset used to calculate summary statistics retained values exceeding 200 FNU, or whether any censoring, truncation, filtering, or data transformation was applied. This lack of transparency limits independent review of the dataset and the robustness of the conclusions drawn from it.

These data are particularly relevant because the application proposes a turbidity trigger level of 2,000 NTU under proposed Conditions 19 and 20. Based on the information presented, it is not possible to determine whether this trigger appropriately reflects baseline conditions, represents a meaningful departure from natural variability, or would provide adequate protection against potential quarry-related effects.

Turbidity data are typically highly skewed and strongly event-driven, with a small number of high-flow or storm-related events often accounting for a substantial proportion of the overall turbidity load and variability observed within a catchment. Consequently, mean values alone can be misleading and may not adequately characterise the frequency, duration, or magnitude of elevated

turbidity events. Percentile-based statistics and event-duration metrics are generally more informative when assessing ecological exposure and establishing scientifically defensible trigger values. The additional statistical information requested below is therefore important for evaluating baseline conditions, understanding the receiving environment's natural variability, and determining whether the proposed consent trigger values are appropriate and supported by the available monitoring data.

Additional information is therefore required to robustly assess baseline turbidity conditions. At a minimum, the report should present the complete uncensored dataset together with a comprehensive statistical summary for each monitoring location, including:

- Number of observations (n) and data capture rate (%);
- Minimum, maximum, mean, geometric mean, median, and standard deviation;
- 10th, 25th, 50th, 75th, 90th, 95th and 99th percentile values;
- Frequency and duration of turbidity events exceeding 200 FNU;
- Maximum rolling 24-, 48- and 72-hour turbidity values;
- Number of storm events represented within each monitoring period;
- Relationships between rainfall and turbidity responses;
- Percentage of time dissolved oxygen concentrations are below the applicable minimum dissolved oxygen criterion; and
- Percentage of time pH falls outside the range of 7.0-8.5 pH units.

Given that continuous monitoring has been undertaken for only about six months, and that the monitoring record may not capture the full range of seasonal and interannual climatic variability, consider collecting at least one additional year of continuous monitoring data. This would provide a more robust basis for characterising baseline conditions, evaluating the frequency and magnitude of naturally occurring high-turbidity events, and establishing consent trigger values that are both environmentally protective and representative of the natural operating range of the receiving environment.

2.3.4 Failure to assess impacts on sensitive ecological receptors

While the PDP assessment focuses primarily on compliance with guideline values (ANZECC physical stressor values and WRC stream classification criteria), it does not provide a detailed assessment of the potential ecological effects of elevated turbidity on aquatic organisms, nor does it evaluate whether the proposed turbidity trigger values are supported by ecological response data. In particular, the assessment does not consider the magnitude, duration, frequency, timing, or ecological relevance of turbidity events, despite identifying turbidity as the primary contaminant of concern and proposing a 35-year operational period.

In particular:

- no acute or chronic turbidity toxicity review or assessment has been undertaken within the PDP report (although there is a brief assessment within the Stantec report (2026), it does not transparently outline the data and misses several key studies);
- no site-specific ecological response assessment has been presented;
- no comparison has been made against experimentally derived thresholds for New Zealand freshwater species;
- no consideration has been given to magnitude, duration, frequency and timing of turbidity events from an ecological perspective.

There has been substantial research undertaken within New Zealand in relation to the effects of suspended particulates (measured as either turbidity or TSS) on freshwater fauna. In addition to the specific effects studies summarised in **Tables 2** and **3**, several reviews have been published on guidance. Since the early review by Ryan (1991), these include:

- Reed & Quinn 2011 who undertook work to develop sediment guidelines for streams on the west coast of the South Island.
- Cavanagh et al. (2014) noted that in New Zealand, studies on the effects of suspended sediments on fish have focused on feeding, avoidance behaviour, migration and survival. The review tabulated results from international studies and summarised regulatory approaches (Table 3 of that review) for managing suspended sediment, typically provided as not-to-exceed values or as a not-to-exceed value above a background value. The review discusses the approaches used by Regional Councils within New Zealand. Many used the 5.6 NTU value for lowland rivers in New Zealand provided by ANZECC (ANZECC/ARMCANZ, 2000).
- Glenjarmin (2017) reviewed the impact of suspended sediment on New Zealand freshwater fish and examined effects on feeding rates.
- Depree et al. (2018) identified an indicative TSS threshold for the NOF TSS attribute for macroinvertebrates of 80% protection of 4.3 NTU and a corresponding 80% value for fish of 3.2 NTU but noted considerable variation across REC classes. The authors proposed an overall warm-climate national bottom line of 6 NTU as an annual median, which would reduce biodiversity impacts by 30%.

In contrast, the authors have not clearly explained the basis for the proposed 2,000 NTU trigger value. Given that the available monitoring data indicate multiple naturally occurring turbidity events exceeding 200 NTU, and that the application has not presented a sufficiently detailed analysis of baseline event magnitude, duration, frequency, percentile distributions, or ecological response thresholds, it is not possible to determine whether a 2,000 NTU trigger represents an ecologically meaningful threshold or an appropriate management trigger for adaptive management.

Tables 2 and **3** present examples of New Zealand studies that have identified acute and chronic effect thresholds for different invertebrate and fish species.

The fish species known to be present in the wider catchment include red-finned bully and banded kokopu. Rowe et al. (2000) found that the mean occurrence of banded kōkopu was reduced by 89.5% in turbid rivers (defined as those where suspended sediment concentrations exceeded 120 mg/L for over 20% of the time). Across lab and stream studies, banded kōkopu have shown avoidance responses, reduced feeding rates, reduced in-stream occurrence, and limited upstream migration when turbidity exceeded 25 NTU (e.g., Richardson et al. 2001). Glenjarman (2017) found that redfin bully showed a reduction in mean feeding rate (mayfly consumption) at 200 NTU compared with 0–40 NTU.

TABLE 2 ACUTE THRESHOLDS FOR NZ FISH AND INVERTEBRATES TO TURBIDITY

Species	Endpoint	Duration	Turbidity (NTU)	Reference
Fish (Banded kokopu – Adult)	Survival	24-hours	>40,0000	(Rowe D. S., 2002)
Fish (Banded kokopu – Juvenile)	Avoidance	1-hr	17 NTU 50% avoidance (9.8 to 87 NTU	(Boubee, 1997)

Species	Endpoint	Duration	Turbidity (NTU)	Reference
Fish (banded kakopu)	Reduced Feeding Rates	Not specified	20 NTU	(Rowe D. a., 1998)
Fish (Rainbow Trout)	Reduced Feeding Rates	Not specified	15 NTU	(Barrett, 1992)
Fish (Koaro)	Avoidance	1-hr	69.2 NTU 50% avoidance (26.6 to >110 NTU	(Boubee, 1997)
Fish (Redfin Bully)	Survival	24-hours	>40,0000	(Rowe D. S., 2002)
Invertebrate (Mayfly)	Survival	24-hours	>18,300	(Rowe D. S., 2002)
Invertebrate (Damselfly)	Survival	24-hours	>18,300	(Rowe D. S., 2002)
Fish (smelt) [4]	Survival $LC_{50\%}$	24-hours	3,050 mg/L (95% CL 2,760-3,370 mg/L)	(Rowe D. D., 2009)

Table Notes:

1. Value in brackets is the 5 to 95% Confidence Interval
2. NTU = Nephelometric Turbidity Unit
3. NOEC = No Observable Effect Concentration
4. Note: Dr C. Hickey (pers comms) derived a $LC_{10\%}$ for smelt of 550 mg/L from this dataset (unpublished data)

As shown in **Table 2**, in-stream fauna in New Zealand have shown ecological responses to turbidity at concentrations below 2,000 NTU.

TABLE 3 CHRONIC THRESHOLDS FOR NZ FISH AND INVERTEBRATES TO TURBIDITY

Species	Endpoint	Duration	Turbidity	Reference
Macroinvertebrates	Abundance	Not specified	< 20 NTU increase to protect species richness	(Quinn, 1992)
Macroinvertebrates	Abundance	Not specified	7-day rolling average 200 NTU	(Davis-Colley, 1992)
Fish	Feeding rate	21- day	15-640 NTU	(Cavanagh, 2014)
Fish (banded Kokopu)	Reduced abundance	Not specified	120 mg/kg Suspended Solids	(Rowe D. H., 2000)
Phytoplankton	Reduction in algae biomass	1344 hours	10 mg (40% reduction)	(Quinn, 1992; Ryan, 1991)
Periphyton	Abrasive damage and reduced biomass	Not specified	6,500 mg/kg	Francoeur and Biggs (2003)

As shown in **Tables 2** and **3**, acute mortality thresholds for most New Zealand freshwater fish are generally very high, occurring at turbidity levels in the order of thousands of NTU. In contrast, long-term ecological effects, including avoidance behaviour, disrupted migration, and reduced feeding efficiency, have been observed at much lower turbidity levels. These lower-level ecological responses are typically more relevant to protecting aquatic ecosystems and should therefore be carefully considered when assessing the appropriateness of proposed turbidity consent limits.

In addition to the above New Zealand studies, the Ministry of Environment and Climate Change Strategy also published a very good and comprehensive study of the effects of turbidity and suspended sediment on freshwater aquatic ecosystems (BC MECCS, 2021). This guideline recommends different turbidity criteria for low-flow and high-flow or naturally turbid conditions, and it recognises that both concentration and duration of exposure are important ecological stressors related to exposure to turbid waters, and that both short-term and long-term criteria are required. The PDP water quality assessment does not address this, yet it is important for setting appropriate consent limits and determining when to undertake adaptive management, especially given the PDP assessment that the proposed activity will have a less than minor impact on aquatic receptors.

Based on the available baseline monitoring data, published ecological response information, and commonly adopted approaches for managing turbidity effects, EHS Support considers that a more appropriate high-flow trigger would be based on changes relative to upstream reference conditions rather than a fixed absolute threshold. Specifically, when background turbidity exceeds 200 NTU, turbidity at downstream compliance monitoring locations should not exceed the corresponding upstream reference value by more than 10%. A 10-20% change from an upstream control site is a commonly adopted approach for managing turbidity effects in naturally variable systems and better reflects ecological risk than a fixed 2,000 NTU criterion. The currently proposed 2,000 NTU trigger is not adequately supported by either the baseline monitoring record or the ecological effects information presented in the application.

2.3.5 No assessment of indirect effects on glowworms

The water quality report assesses suspended sediment primarily from a water quality perspective and does not appear to consider how elevated suspended or deposited sediment could indirectly affect important elements of the local invertebrate fauna such as glowworm populations.

Potential mechanisms include:

Reduced aquatic prey production

Glowworm populations rely on flying aquatic insects emerging from cave and associated stream ecosystems.

Increased turbidity and fine sediment deposition within the cave system can:

- reduce benthic habitat quality;
- alter macroinvertebrate communities;
- reduce aquatic insect productivity;
- reduce prey availability for glowworms.

No assessment of these pathways is provided.

Changes in cave hydraulics

The report acknowledges that sediment is deposited and remobilised in cave systems. However, no assessment is provided regarding:

- long-term sediment accumulation within conduits;
- reduction in hydraulic capacity;
- increased flood levels;
- altered flood frequencies.

Over a 35-year consent duration, relatively small annual increases in fine sediment deposition could potentially alter cave hydraulics, yet this has not been adequately assessed.

Flood-related glowworm impacts

Increased sediment deposition may raise cave bed elevations and reduce hydraulic conveyance. Potential consequences include:

- increased flood levels;
- increased duration of inundation;
- more frequent washing out of glowworm larvae;
- reduced habitat persistence.

These potential long-term effects have not been evaluated.

2.3.6 Reliance on turbidity concentration rather than ecological effect

Turbidity concentration is not the only parameter to consider when assessing potential ecological effects on aquatic ecosystems. The ecological response to elevated turbidity and suspended solids is influenced by several factors, including:

- Magnitude (concentration);
- Duration of exposure;
- Frequency of occurrence;
- Particle size and particle characteristics.

While the report primarily focuses on turbidity concentration, it does not adequately evaluate these additional factors or their influence on ecological effects. As discussed above, New Zealand studies have identified both acute and chronic responses to turbidity, with effect thresholds varying depending on the exposure duration and biological endpoint considered.

The substantive assessment notes milky sediment discharged from the cave system. The dye studies show that flow rates within key cave systems under the work areas are very slow under normal flow conditions. This may imply potential sedimentation of fine material within the cave system, if the cave's physical characteristics allow. In the documentation reviewed, we found no indication of particle-size analysis of sediment likely to enter the cave system (based on the particle size of stormwater draining within the work areas).

This omission is particularly relevant to proposed Conditions 20(b) and 20(c), which appear to recognise the importance of exposure duration by allowing turbidity levels exceeding 2,000 NTU for

periods of up to 48 hours and 72 hours, respectively. However, the document provides insufficient scientific justification for why turbidity above 2,000 NTU would be acceptable for these durations, nor does it assess the potential ecological consequences. It is therefore unclear how the 2,000 NTU threshold and associated duration limits were derived, whether they are based on ecological effects data, or whether they provide an appropriate level of protection for sensitive aquatic receptors. Without such justification, it is difficult to assess whether the proposed trigger levels and allowable durations are scientifically robust and ecologically protective.

2.3.7 Nitrogen and Blasting

The Applicant's water quality monitoring shows that, at all monitored sites, dissolved nitrate-nitrogen dominates total nitrogen. Organic nitrogen likely makes up most of the remainder. The reported median values are relatively consistent across the monitored sites.

The assessment discusses nitrogen sources and states that the source is likely agricultural (animal and fertiliser use) and blasting in the existing pit. Section 2.7.1 of the water quality report notes elevated concentrations in upstream locations. EHS Support concurs that much of the nitrogen is likely land-use related, but we also expect some episodic contribution from blasting activity.

As noted earlier, the wording used at times regarding default guidance values is unclear. In section 2.7.1, it references the ANZG (2018) toxicity DGV for ammonia. This is followed by a reference to the average nitrate-nitrogen values being well above the ANZG DGV of 0.065 mg/L. This reference is not to a toxicity-based guidance value. The reference is to the 80th percentile reference value for the local REC category. This comparative value indicates that 80% of waters in that class have low nitrate concentrations. ANZG (2018) provides a specific nitrate-toxicity value, and Table 4 of the water report correctly references it (Reid, 2011).

In the overall assessment of effects, reference is made to mitigation of nitrogen (presumably derived from blasting) being mitigated through stormwater sediment and erosion control methods within the works areas. Page 33 of the water report states that most nitrogen is volatilised during the use of nitrogen-based explosives. This is a very generic statement and does not always apply (i.e. misfiring/incomplete detonation or abandonment of charges, spills (or other handling losses) or loading explosives into wet or partially wet blast holes). Regarding mitigation, the application notes at various points that the sediment and erosion control plan will manage nutrients in stormwater. EHS Support agrees this will be the case for particulate-associated nitrogen and phosphorus, but because nitrogen remaining after blasting will be dissolved inorganic nitrogen, standard control methods will not remove it. We suggest monitoring nitrogen concentrations to confirm that nitrogen additions do not have any unwanted/additional effects on downstream water quality.

3 Recommended Changes in Conditions

Based on my review of the documents, I would recommend the following insertions or changes in the proposed consent conditions.

1. A limit, in terms of northward expansion of the pit, to prevent the pit footprint from entering the groundwater watershed of the Upper Mangawhitikau catchment.

To ensure that future quarry development does not encroach on the inferred groundwater divide separating the Upper Mangawhitikau catchment from adjacent catchments, the following consent conditions are recommended:

a) Prior to commencement, the consent holder shall survey and permanently mark the approved pit footprint.

This provides certainty for both Graymont and WRC on the maximum pit size.

b) No quarry excavation, overburden placement or blasting shall occur north of the groundwater divide shown on Figure 5; Dye Injection and Doline Locations within the PDP (2023) Graymont New Zealand Limited -Additional Dye Tracer Groundwater Monitoring Report within Appendix C of Appendix I; Oparure Quarry South-Western Pit Water Quality Assessment report by PDP (2026).

Ideally, Graymont should commission a registered surveyor to produce a plan that defines the pit's geographic boundary in relation to the southernmost inferred location of the groundwater divide. This geographic boundary of the pit will need to be certified by WRC.

2. Temporary sediment management condition.

EHS Support recommends that a consent condition is added to existing conditions requiring that an Initial Development Sediment Management Plan covering

- Years 1 to 5
- Specifying maximum exposed areas
- Stabilisation timeframes
- Contingency control for major rainfall events

3. Active disturbance area limit

As part of the proposal, Graymont (NZ) Limited effectively claims that operational and environmental impacts will remain consistent with or not exceed the level of the existing quarry operations. To ensure this, the consent should include a condition that the total active disturbed area, including the quarry floor, stripped ground, active overburden placement areas, active stockpiles, and haul road construction areas, shall not exceed the current active area of the existing Oparure Quarry.

This would require Graymont to provide the current surveyed active disturbed area of the existing Oparure Quarry.

4. Water Quality Compliance Conditions

The receiving environment has a few water performance conditions, and the earlier pH limit condition has now been deleted. Currently, there is no explicit requirement that impacts remain no worse than existing operations.

The operation of the SW Pit shall not cause water quality effects at Pōtea Spring, Pumphouse Spring or the Mangawhitikau Stream, and the daily mean turbidity at the compliance site shall not exceed baseline conditions by more than 20%.

This would better align with the applicant's assessment that effects will be no greater than existing conditions. Additionally, a 7-day rolling average of less than 200 NTU (excluding 1 in 5-year flood events or when the upstream reference site is above 200 NTU) and an annual average turbidity of 20 NTU at the Pōtea Spring, Pumphouse Spring, or the Mangawhitikau Stream.

I would also add a pH condition to ensure it remains circumneutral (pH 7 to 8) within the Pōtea Spring, Pumphouse Spring, or the Mangawhitikau Stream.

5. Lower Turbidity Trigger limits

Condition 19 requires continuous monitoring to occur only after an initial trigger of 2,000 NTU. In my opinion, this is too high; either continuous monitoring should occur at all times, or the limit should be set much lower (i.e., 200 NTU).

4 Closure

EHS Support thanks you for the opportunity to prepare this review of Graymont (NZ) Oparure Quarry – Fast Track Application. If you have any questions or need additional information, please contact me at 021 295 2284.

Sincerely,

Andrew Rumsby
Principal Environmental Chemistry

EHS Support New Zealand Ltd

5 References

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Limitations Statement [Calibri Body 16]

The Limitations Statement must meet the project needs. For 90% of deliverables, the following statement will be sufficient. The main body of the report should highlight any project-specific issues/ limitations.

Standard Limitations Statement

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Where conditions encountered at the subject site are subsequently found to differ significantly from those anticipated in this document, EHS Support must be notified of any such findings and be provided with an opportunity to review the recommendations of this document.

Whilst to the best of our knowledge information contained in this document is accurate at the date of issue, subsurface conditions, including groundwater levels and flow direction can change in a limited time, as well as natural processes or works of man at the subject site or on adjacent properties. Changes in applicable standards may also occur as a result of legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond our control. Therefore, this document and the information contained herein should only be regarded as valid at the time of writing, unless otherwise explicitly stated in this document.

Appendix 6

Mark Hamer
Aquatic Ecology
Technical review

Technical Review

To:	Sheryl Roa	**Date:**	23/10/2026
Authority:	Waikato Regional Council	**Ref:**	23063_4
Consent:	FTAA2606-1251_Graymont-Oparure Quarry South-Western Pit project		

From	**Role in Audit**	**Internal Reviewer**
Mark Hamer	Aquatic Ecology Review	Bryony Miller

1 Project Summary

The Project entails the development and operation of a new South-Western (SW) Pit adjacent to Graymont's existing Oparure Quarry. The Site is located in an undulating karst landform with the subterranean Camelot Stream flowing approximately 80 metres beneath the proposed site. Its primary source is 1.6 km south-west of the proposed site and stormwater infiltrating into the ground moves through the karst system and emerges into the lower Mangawhitikau Stream at Pōtea Spring and Pumphouse Spring around 3 km to the north-east of the site. The South-Western Pit location has been chosen to avoid the northern catchment that feeds to the Upper Mangawhitikau catchment and the tourist caves there. There is a stated risk that the mining method may cause damage to the Camelot Cave system. The applicant (Graymont) has proposed a 200 m wide buffer zone to allow for early-stage mining to be undertaken away from the cave system and to enable more information to be gathered about the exact extent and position of the cave. Sediment reduction measures, ecological betterment plan, and monitoring conditions are proposed to offset the loss of karst features. The application considers no net loss in aquatic ecology values will occur.

1.1 Scope of Works

To review of the application documents, being:

- The SW Substantive application
- Appendix J – Aquatic Ecology (and I – Water, if applicable to the review)
- Appendix T1 – Draft Waikato Regional Council Conditions
- Appendix U1 – Ecological Betterment Plan

With the specific questions;

1. Are the measures proposed in the application sufficient to avoid any potential adverse effects from the quarry operations over the lifetime of the consents?
2. Do the consent conditions provide sufficient measures to ensure risk to the aquatic ecology is minimised?
3. Are there any matters that require raising in the WRC s53 response?

2 Review

The approach taken for the Aquatic Ecology assessment is generally sound and largely follows established sampling and assessment protocols for New Zealand freshwater ecological assessments. The use of the EIANZ Guidelines (Roper-Lindsay, *et al*., 2018) to assess ecological values and impact is appropriate, although I disagree with some of the ecological value and impact assessment findings. This is largely due to the methods used (life stage sampled and level of identification) not being effective at identifying At Risk or Threatened macroinvertebrates.

2.1 Ecological Value Issues

The ecological values associated with Camelot Stream have been assessed as high, while Pōtea Spring and Pumphouse Spring are assessed as moderate and low ecological value. The ecological values of the downgradient surface watercourses (Mangawhitikau Stream and Mangapu River) are assessed as high and moderate, respectively, due to the presence of Threatened and At-Risk fish species (Stantec, 2026). Based on the information available (i.e. no threatened karst, spring or subterranean system fauna found) the ecological values assigned to the waterways are largely agreed with. However, due to methodology used for the ecological values assessment, At Risk or Threatened macroinvertebrates

are likely to not be represented within the findings, whether they are present or not. This undermines confidence in the ecological values assigned to the streams, which then further influences the overall ecological impact assessment findings and management actions.

The application states that the (Threatened – Nationally critical) macroinvertebrate *Potamopyrgus doci* is considered unlikely to be present at Pōtea Spring, the main Camelot Cave stream water emergence site (Stantec 2026). I agree it is unlikely that *Potamopyrgus doci* will be present at the site; however, springs are known to be diversity hotspots, with karsts, springs and subterranean hydrological systems standing out as having the highest proportion of freshwater species that are known to be threatened (Collier *et al.*, 2016). Further to this a large number of invertebrates within these ecosystems are still undescribed (Fenwick & Scarsbrook, 2004) such as Paraleptomorphus amphipods which although the genus is relatively common still have a number of undescribed species (Chapman, et al., 2011). Stygofauna, (taxa that live in groundwater aquifers and caves) are important as they have high endemism and some species are specific to a single cave system e.g. *P. doci* and cave specific snails were historically present within Camelot Cave (Stantec, 2026)). Based on the habitat type, location and previously documented invertebrate species present, with no evidence provided to demonstrate rare stygofauna and cave snails aren't now present. I consider it reasonable that rare macroinvertebrate taxa could be present and will not have been identified within the assessment given the identification methodology carried out by the applicant. Therefore an assessment specifically targetting rare invertebrtae taxa utilising light/sticky trapping to enable identification of adult insects to species level (Pohe, *et al*., 2020)) or greater spring macroinvertebrate taxonomic rigour and expertise (e.g. crustacea experts) is warranted. I note Section 4.2.2 discusses the use of an experienced macroinvertebrate sample processor, however, identification of macroinvertebrates to genus level for MCI calculation is much simpler than identifying aquatic macroinvertebrates (especially rare ones) to species level. eDNA methods for fish and mammals are appropriate but are unlikely to detect rare taxa that have not yet had their DNA sequenced and is therefore is only useful for more common macroinvertebrates. If Threatened or At Risk (or Data Deficient) macroinvertebrates were identified at Pōtea Spring this would increase the rarity matter to High, and shift the overall ecological value assigned to High also. Therefore, an assessment specifically targeting the occurrence of Threatened or At Risk (or Data Deficient) spring or cave fauna should be undertaken to clarify the value assigned to the rarity matter and overall ecological value.

The diversity and pattern matter is assessed as Low for the Mangapu River with 7 fish species present, while the Mangawhitikau Stream is classed as High with 9 fish species present. Based on the provided rationale it appears more appropriate to assign "Moderate" value to diversity and pattern for the Mangapu River, which would then elevate the overall ecological value for the Mangapu River to High. This matter should be reviewed and justified or amended for the Mangapu River.

2.2 Ecological Effect Issues

Sediment input loads due to the activity are modelled to range from 66,172 kg/yr within the first year to a peak sediment input in year 13 of the project of 180,837 kg/year contributed to the aquatic karst system (Water Assessment- PDP, 2026; Substantive Application -Enspire, 2026). Elevated suspended and deposited fine sediment ranging from 66,172 to 180,837 kg/year appear to be the key ecological impacts from the proposed activity on the Camelot Cave Stream, Pōtea Spring and the downstream receiving environment.

The application states that the predicted ecological impacts are;

1. Elevated suspended sediment within the water column downgradient which may lead to increased invertebrate drift, fish avoidance, reductions in fish feeding and growth, and mortality of fish (at high turbidity levels (>2000 NTU)) (Stantec, 2026).
2. Elevated deposited fine sediment and streambed smothering leading to reduction in available habitat for benthic species and reduction in available food sources for fish (Stantec, 2026).

In addition to the above, increase deposited fine sediment cover has also been demonstrated to reduce macroinvertebrate densities, abundance, biomass, taxa richness, community shift to more diptera and worms (Clapcott, *et al*., 2011 and references therein). These reductions in relation to increased deposited fine sediment levels could well lead to the loss of Threatened or At Risk macroinvertebrates if present.

The magnitude effect is described as Low for Camelot Stream and Pōtea Spring, the reasoning includes that Camelot Stream is 80 m below the activity and that sediment pulses will be of short duration in relation to rainfall events. However, the project description suggests quarrying activity will eventually be within 8 m

vertically and 25 m laterally of the subterranean stream and the water assessment (PDP, 2026) reports that below the existing Oparure Quarry the "High significance" Digme Cave has had sections intersected and quarried. Modelling has demonstrated explosive use within 25 m may cause localised dropouts. Based on the above, the findings of the applications' assessment that an 8 m buffer with a nearby example of quarry/cave interactions and a modelled contribution of up to 180 tonnes of sediment per year is sufficient mitigation to be considered a Low Level of effect, appears to be largely unjustified and contrary to the existing Oparure Quarry example. Further justification for the applicants assessment of 'low' magnitude and low overall level of ecological effect assigned to Camelot Stream and Pōtea Spring.

Elevated deposited fine sediment levels are known to have adverse ecological effects (as listed above). Deposited fine sediment levels should be maintained at <20% bed cover to minimise the risk of ecological impacts (Clapcott, *et al*., 2011). Glowworms themselves may not have an aquatic life stage but much of their food source does (adult flying insects, with aquatic larval stages) as such instream sedimentation may alter the food resource available to glowworms, if present, within Camelot Cave. Irrespective of the turbidity readings recorded, mean deposited fine sediment levels downstream of the Pōtea Spring emergence should be managed to minimise ecological impacts. National guidance on sediment cover in streams states that fine sediment cover should be maintained below 20% cover to minimise ecological impacts (Clapcott, *et al*., 2011). The applicant has completed sediment cover assessments which show that these streams are already dealing with high percentage cover of sediment, with the exception of DS Mangawhitikau Stream where the streambed average remains below 20%. The proposed sediment inputs will further modify these streams and create cumulative effects on these ecosystems. Further information is required to understand how the applicant proposes to manage these cumulative effects and maintain the current ecosystem function of the streams within the receiving environment. This should also include appropriate monitoring, triggers and management actions to protect these environments.

The impact assessment for Mangawhitikau Stream (Table 5-2; Stantec (2026)) states "the very fine sediment associated with the quarry is not expected to become deposited on the stream bed and therefore have adverse effects to instream ecology". No hydrological assessment nor further evidence to support this statement is provided. Please provide evidence or justification for this

statement. Sediment will drop out of the water column in relation to lower velocity and settled solids are known to be correlated with suspended sediment (Rowe *et al.,* 2000). Where pools and slow flowing areas are present in a stream, fine sediment will be deposited on the streambed. Turbidity criteria may not safeguard macroinvertebrate communities or be sufficient to prevent habitat modification due to deposited sediment siltation (Boubee, *et al.*, 1997). Given this, and the nearby high ecological habitats, an assessment of the potential ecological effects within the receiving environment identified, is also required. Deposited fine sediment cover should be assessed as its own standalone consent condition with a bed cover limit for sites set to maintain or reduce sediment cover for the Pōtea Spring Emergence.

The Aquatic Ecology Impact Assessment also suggests that following rainfall events, small, patchy pockets of sediment settling out within the mixing zone may be observed. This is considered to only occur in limited, localised spots and only at a scale similar to what already happens naturally upstream in the Mangawhitikau Stream and in nearby catchments. Given the estimated volumes of additional sediment proposed to be contributed annually by this activity (66-180 tonnes of sediment; Section 5.3 of Stantec 2026) this statement appears largely unsubstantiated. Increased deposited sediment will result in streambed habitat modification, along with finer materials transported downstream during higher flow events to the Mangapu River and beyond. Deposited fine sediment is known to adversely affect aquatic macroinvertebrates present, which is likely to result in a shift in macroinvertebrate community composition (Clapcott, *et al*., 2011). Utilising the EIANZ guidelines this would constitute a "Moderate" magnitude of effect in the vicinity of Pōtea Spring and the nearby sections of Mangawhitikau Stream, rather than the low magnitude of effect assigned by Stantec (2026). A moderate magnitude of effect combined with high ecological value of Mangawhitikau Stream equates to a High level of effect and would require further management actions to reduce this level of effect or offsetting to redress the adverse aquatic ecological effects. Please review the magnitude of effect assigned to the Mangawhitikau Stream and any further management actions that may be required to manage these effects.

A turbidity level of 2000 NTU is mentioned in the Aquatic Ecology Impact Assessment (Stantec, 2026) as a level at which fish mortality may occur. This level (2000 NTU) then appears to be used as a trigger level within the consent condition suite. Ecological impacts from elevated turbidity will occur well before fish deaths occur. Known fish behavioural and physical changes that occur are reduced

feeding rates (Rowe & Dean, 1998; Greer, *et al*., 2015)), altered prey size selection (Rowe, *et al*, 2003) avoidance (Boubee, *et al*, 1997), limit upstream migration (Boubee, *et al*, 1997); Richardson, *et al*, 2001), reduced recruitment (Rowe, *et al*, 2000), reduced abundance (Rowe, *et al*, 2000), reduced growth rates and gill damage (Cavanagh, *et al*., 2014). Known effects of elevated turbidity and suspended sediment on macroinvertebrates are a reduction in primary production, clogging of gills, impeded filter feeding, and extra energy spent cleaning these apparatus (Ryan, 1991; Glanjarman, 2017), increased drift, and physical abrasion during floods (Clapcott, *et al*., 2011 and references therein). Historic compliance monitoring average turbidity reported in the Water Assessment ranged from 14.7 to 96 NTU (Table 3; PDP 2026). Within the Mangawhitikau and Mangapu catchment sites, average turbidity ranged from 13.1 – 14 NTU (Table 6 PDP 2026). Greater than 5 NTU is considered unsatisfactory in the Waikato and 5.2 is the ANZG 2018 WWL guideline level.

As such, I do not consider 2000 NTU a suitable trigger level to minimise ecological effects and support the life supporting capacity of the waterway. A percent difference between upstream and downstream monitoring sites (i.e. 10% difference) may be more appropriate. Please review this trigger level and propose a more appropriate trigger level to avoid adverse ecological effects.

Proposed Management Actions (Section 6)(Stantec, 2026) include;

1. Avoidance of presumed Camelot Stream location by a 200 m wide buffer zone for the initial 10 years or until further investigation confirms the Camelot subterranean watercourse location. To then be followed by a blast restriction zone and no blast zone.
2. No remediation is recommended within the aquatic ecology assessment but the project should be required to include a site rehabilitation plan.
3. There will be sediment laden stormwater runoff to the receiving environment (Camelot Stream, Pōtea Spring and lower Mangawhitikau Stream). To minimise the amount of sediment lost an Erosion and Sediment Control Plan is proposed to mitigate the effects.
4. Offsetting is proposed to achieve neutral sediment load from the project site within the Water Assessment.

The project is proposed to achieve a near neutral sediment input, represented by a 2% reduction in overall catchment sediment (Section 6, Water Assessment, PDP

2026). However, despite the sediment reductions proposed in the Betterment Plan to offset increased sediment inputs from the quarry, the resulting sediment balance is not fully consistent with the intent of *Te Ture Whaimana o te Awa o Waikato* and *Nga Wai o Maniapoto*. These frameworks propose to "To achieve the restoration and protection of the health and wellbeing of the awa for current and future generations". A greater sediment reduction would be more likely to meet the restoration aspect of the vision and strategy of *Te Ture Whaimana o te Awa o Waikato* and *Nga Wai o Maniapoto*.

The proposed 200 m buffer around the Camelot Stream appears to be an appropriate approach until the applicant can better assess the depth down to the cave and alignment. Provided the sensitivity of the receiving environment is robustly understood.

Section 5.3 of the Aquatic Ecology Impact Assessment (Stantec 2026) states that it is not possible to avoid the infiltration of rainwater with suspended sediment from the pit site. However, to minimise the potential input of sediment to the Camelot Cave system and downstream emergent springs, there would be of benefit if the seismic survey could be utilised to design the site staging plans.

The location of the sediment retention ponds (ESCP) should also be designed/reviewed after the seismic survey has been undertaken, to avoid any cracks and subsurface voids identified by the survey and minimise infiltration pathways. The ESCP should be designed to direct water from within the quarry and associated roading away from dolines and the subterranean Camelot Stream.

The current ESCP designs appear to direct stormwater to tomo/dolines (ESCP Appendix B - PDP, 2026c). Please provide clarification and justification as to why this is considered an appropriate design to minimise sediment contributions to the Camelot Cave Stream and downstream watercourses.

A mitigation action that does not appear to have been considered is bank regrading. Bank regrading could further minimise erosion and sediment contributions to the waterways, for example where Appendix A Photo 19 (Stantec, 2026) demonstrates bank erosion. The Mangawhitikau Stream 20 m upstream of Pōtea Spring could have the bank slope angle reduced prior to

restoration plantings to help ensure the bank stability is improved and streambank sediment contributions are reduced (Drewry, *et al.*, 2024).

The proposed Pōtea Spring riparian restoration and Camelot Stream Headwaters fencing, planting and pest control are appropriate management measures for this activity.

The Stage plans do not appear to show avoidance of the Camelot Cave system for the initial 10 years as proposed. Please review this and ensure the 200 m Camelot Cave Buffer is clearly demarcated and adhered to via consent conditions.

2.3 Betterment Plan Comments

The Betterment Plan introduction states that the first two objectives of the plan are to;

a) Compensate for the loss of indigenous terrestrial, karst and any **impacts on aquatic (freshwater) habitat** as a consequence of the SW Pit's development and provide betterment in accordance with the Vision and Strategy for the Waikato River;

b) Reduce the net contribution that the SW Pit makes to the contaminant (sediment and nutrient) load that is discharged to the downstream surface and groundwater resources (PDP, 2026b).

Stantec's (2026) findings are that there were to be no aquatic ecological effects from the proposed activity, therefore it is unclear how this betterment plan aligns with 'compensation' for freshwater ecological impacts. It is agreed that improvements to the aquatic ecosystems should be undertaken as part of this activity; however, the statements and findings from the Stantec (2026) report do not align with this generalised betterment plan.

It is intended that improvements to better land practices as outlined in the "Betterment Plan" on land nearby will mitigate the sediment losses to the waterway receptors. This includes riparian planting and stock exclusion in the upper Camelot catchment source streams, riparian planting and stock exclusion of the area between the two proposed SNAs west of the pit and around Pōtea Spring.

Based on the uncertainties, ecological values, documented ecological impacts and projected sediment loads outlined in the sections above, Stantec's conclusion of no ecological effects remains unjustified (i.e. alteration of the existing baseline conditions so that attributes will be partially changed). Therefore, without further mitigation and avoidance measures, offsetting is required and the Betterment Plan needs to ensure adequate and clearly aligned offsetting for the Moderate/High level of aquatic effect is implemented.

The sediment reductions from planting and restoring areas are outlined in the water assessment and are based on change from pasture to bush (ARC, 2010; PDP, 2026). ARC (2010) outlines that the model may not be applicable to small catchments (less than 20 ha). It also states the modelled TSS yields have been of limited success when used outside of the Auckland region (ARC, 2010). The model was not calibrated for rural land and therefore results will be more uncertain when used in that setting (ARC, 2010). The report suggest that the model accuracy (for suitable catchments) is +/- 20%. This suggests the sediment load reduction may be as high as 222,026 or as low as 148,017 kg/year, even without the other model issues outlined above.

The whole basis of the betterment plan relies on these TSS values, which appear to have a range of limitations and uncertainties. The review of this is not within my expertise; however, more confidence is required in this approach to enable it to be utilised as the applicant is proposing and for the ecological outcomes to be achievable.

The consent conditions require the Betterment Plan to be supplied and certified by WRC. It is appropriate that this should be reviewed and certified by council.

Consideration of the use of bank regrading where appropriate could further minimise erosion and sediment contributions to the waterways e.g. Mangawhitikau Stream 20 m upstream of Pōtea Spring. Locations and methodology of this option should be included in the Betterment Plan.

2.4 Outstanding Questions

Further clarification on the following points would assist in understanding and justifying the effects assessment:

1. What is the proposed explosives weight for blasting within the 8 – 25 m proximity (e.g. elevation directly above) of the cave?

2. Can sediment retention ponds be lined to reduce the amount of sediment lost to the subterranean Camelot Stream? Would this result in a reduction of sediment contribution?

3. Section 2.2 of the Water Assessment report state that quarrying is to be carried out to within 8 m of Camelot Cave (PDP, 2026). The charge weight restriction appears to cease at 25 m rather than 8 m. What is the charge weight restriction when between 8 – 25 m of the cave?

2.5 Recommended Consent Condition Edits

1G. The wording of condition 1G should be improved to be clearer. Should this say "all quarrying" or "all quarrying but excluding 10m of existing features".

14. It is good that this condition requires WRC certification.

19. The initial trigger of 2000 NTU is not appropriate for this environment and has no clear rationalisation for protecting the aquatic values of the stream. This value is used once in the Aquatic Ecology Impact Assessment but not referenced or justified.

20. A defined percentage higher than the upstream monitoring site would be a more suitable trigger rather than also requiring >2000 NTU for 48hrs to trigger actions. No justification has been provided for the use of 2000 NTU as a trigger, this does not appear to be an ecologically protective value. The use of an immediate alert to the applicant and site manager is appropriate. Further clarification as to what protection level the proposed 50 NTU value is based on is required.

Also, for deposited sediment it may be more appropriate to compare sites to annual summer sampling results for that site rather than upstream sites given the existing differences in bed sediment demonstrated in Tables 3-6 and 3-7. The Condition 20 suite needs to be reviewed and reconsidered to be more effective at minimising ecological effects.

37d. Condition 37d is missing.

47. I recommend revising the ESCP once the location of Camelot Cave beneath the site has been mapped to ensure no stormwater ponds are situated above the cave.

60d. 2026 data could be used as baseline data to compare to (as it is prior to the activity commencing).

61c. I recommend excluding thin films from the periphyton percent cover assessment but use matts and filamentous algae only. Based on the variances described in the Appendix B of Stantec (2026).

2.6 Conclusions

There is currently disagreement with some of the ecological values assigned, in particular the Mangapu River and Pōtea Spring. I recommend further assessments be undertaken to ensure the ecological value of Potea Spring is correctly characterised.

The application considers no net loss in aquatic ecology values will occur. However, due to uncertainty as to whether threatened or at risk taxa are present in the spring emergence I consider this finding currently unsupported. This brings into question the ecological value assigned to the Pōtea Spring, and therefore the level of effect assigned. I consider a robust assessment of Pōtea Spring specifically designed to target rare or threatened macroinvertebrates is required to resolve this matter. Based on the information supplied, a robust assessment of the invertebrates within Pōtea Spring needs to be provided to determine whether any threatened or at risk species are present. Karst, spring, and subterranean habitats are recognised to contain higher proportions of Threatened or At risk species than any other freshwater ecosystem (Collier, *et al*., 2016) and therefore the presence/absence of threated macroinvertebrates should be clearly understood. Without this information the EIANZ guidelines cannot be applied correctly and therefore the ecological value assigned to Pōtea Spring in particular should be treated with caution.

The applicant should review the value assigned to the diversity and pattern matter for the Mangapu River and revise the ecological value assigned if required. Please provide a justification for the level assigned after this revision.

There is currently disagreement with the level of effect assigned, I consider the level of effect "moderate" in the vicinity of Pōtea Spring. Once the ecological values has been reviewed, please provide further justification for the low magnitude of ecological effect assigned to Camelot Stream and Pōtea Spring.

There is currently disagreement with the level of effect assigned to the Mangiwhitikau Stream. Please review the magnitude of effect assigned to the Mangawhitikau Stream and any further management actions that may be required to manage these effects.

Deposited fine sediment can cause adverse ecological impacts and should be managed independently of turbidity. Mean deposited fine sediment downstream of the Pōtea Spring emergence, measured using the SAM-2 method, should be a standalone consent condition and maintained below an ecologically relevant level.

Suspended sediment has the potential to cause adverse ecological effects. Based on the information provided, I do not consider turbidity of 2000 NTU a suitable trigger level to minimise ecological effects. Please review this trigger level and propose a more appropriate trigger level to avoid adverse ecological effects.

The sediment reductions proposed within the betterment plan use a model with known limitations. These limitations do not appear to have been considered adequately. I therefore do not have confidence in the proposed sediment reduction value of 180,022 kg/yr being accurate. Therefore, the effectiveness of the Betterment Plan is questionable in relation to freshwater ecology impact reduction.

The findings of this review in relation to the WRC review questions are;

1. Are the measures proposed in the application sufficient to avoid any potential adverse effects from the quarry operations over the lifetime of the consents?

No. I do not currently have sufficient confidence in the modelled sediment load reductions that these would have an ecologically meaningful reduction and lower the level of effect.

2. Do the consent conditions provide sufficient measures to ensure risk to the aquatic ecology is minimised?

Partially, yes. The majority of the consent conditions are sufficient. However, the use of 2000 NTU as a trigger for response is too high and not justified by a clear rationale within the documents I reviewed. The conditions are reviewed in the section above; however, Condition 20 in particular needs to be reviewed and revised.

3. Are there any matters that require raising in the WRC s53 response?

Yes, as outlined above. In summary, but not-withstanding further points raised within the body of this review, the ecological value and level of effect should be reviewed for Pōtea Spring, Mangawhitikau Stream and Mangapu River. An assessment specifically assessing the presence of threatened or at risk karst, subterranean and spring fauna should be undertaken. The sediment reduction model output should be reviewed and its use justified. After this has occurred, the requirements of the betterment plan would also require review. A 2% reduction in overall catchment sediment load (which is well within the margin of error of the model) does not appear to meet the intent of betterment, nor meet the principles of *Te Ture Whaimana o te Awa o Waikato* and *Nga Wai o Maniapoto*. The use of the 2000 NTU turbidity trigger within condition 20 should be revised and justified. Deposited fine sediment and suspended sediment should be treated as separate effects and separate consent conditions applied to these.

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Appendix 7

Gerry Kessels
Terrestrial Ecology
Technical review

29 October 2026

Waikato Regional Council & Waitomo District Council c/-
Chris Dawson
Principal Planner
PO Box 9041
Hamilton 3240

Our Ref: WRC.00694

Dear Chris

Terrestrial Ecology Cross-check and Review of the Fast-track Substantive Application for the Oparure Quarry South-Western Pit (FTAA 2606-1251) – input to the Waitomo District Council section 53 response

1. SCOPE

1.1 You have asked me (email from your office dated 12 October 2026) to review, from a terrestrial ecology perspective, the substantive application documents lodged with the Environmental Protection Authority under the Fast-track Approvals Act 2024 (FTAA) for Graymont (NZ) Limited's (Graymont) proposed South-Western Pit (SW Pit) at Oparure Quarry, Te Kuiti, and to cross-check those documents against the matters I raised in my earlier reviews, most recently my letter dated 18 February 2025 (the February 2025 Review).

1.2 Specifically, you have asked me to address four questions: (1) whether my view on the validity of the conclusions reached by the applicant's ecologists concerning the possible ecological impacts of the quarry expansion remains appropriate; (2) whether the measures proposed are sufficient to avoid potential adverse effects over the lifetime of the consents; (3) whether the draft consent conditions provide sufficient measures to ensure risk to terrestrial ecology is minimised; and (4) whether there are matters that should be raised in the Waitomo District Council (WDC) section 53 response.

1.3 My scope is confined to terrestrial and cave (subsurface) ecology, including indigenous vegetation, karst ecosystems, long-tailed bats, indigenous birds and lizards. I do not address freshwater ecology, hydrogeology, sediment transport or cave geomorphology

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except where these matters bear directly on terrestrial and cave fauna habitat. I rely on the evidence of other experts (in particular Professor Williams and Dr Rumsby on karst hydrology) where I say so.

1.4 Although this is not a hearing, I have prepared this review in accordance with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023. The opinions expressed are within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from them.

2. DOCUMENTS REVIEWED

2.1 I have reviewed the following documents.

- SW Pit Substantive Application Report, Enspire Consulting Limited, 17 July 2026 (the Application Report), in particular Sections 2, 7 and 9;
- **Appendix K** – Terrestrial and Subsurface Ecology Assessment, BlueGreen Ecology Limited (Dr V. Keesing), Final v4, 9 July 2026 (Appendix K);
- Appendix T1 – WRC Draft Conditions and Appendix T2 – WDC Draft Conditions (V36, 14 July 2026);
- Appendix U1 – Ecological Betterment Plan, PDP, July 2026 (**EcoBP**);
- Appendix U5 – Draft Bat Management Plan, Phoenix Ecology, Version 3, September 2025 (**BaMP**);
- Appendix U6 – Pit and Haul Road Site Management Plan V2 (updated 27 October 2026) (**P&HMP**);
- Appendix U7 – Karst and Riparian Management Plan, PDP, July 2026 (**KRMP**);
- Appendix U8 – SW Pit Bird Management Plan, PDP, Final 8 July 2026 (**BiMP**);
- Appendix U9 – SW Pit Plant and Animal Pest Management Plan, PDP, July 2026 (**PMP**); and
- Appendix U12 – Wildlife Act Authority 118705-FAU and Lizard Management Plan, Dr M. Tocher (**LMP**).

2.2 I have also had regard to the project history on file, including:

- Ecology New Zealand, Terrestrial Ecological Impact Assessment: Pakeho Pit (22 September 2022) and the 2022 management plan suite;
- Boffa Miskell (Dr V. Keesing), Subterranean Habitat: Troglobite Fauna Impact Assessment, Pakeho Pit (2022) (the Boffa Miskell report);
- My review of the application and further information requests dated 14 November 2022, and the WRC subsequent further information request on cave and karst matters dated 14 February 2023;
- Professor Paul Williams, Pakeho Quarry Site Report: Review of Application Documents (November 2022);
- Dr Keesing's memorandum responding to section 92 questions 4(b)–(g) (24 February 2024);
- Joint Statement of Experts in the Fields of Ecology, Water Quality and Hydrology (15 October 2024) (JWS);
- Hayward, B.W. (2019) TR22-03 Mapping Significant Natural Areas of the Waikato Region: the Physical Basis for the Identification of Karst Ecosystems; and
- My review letter of 18 February 2025.

3. THE PROPOSAL AND WHAT HAS CHANGED

3.1 The SW Pit is an opencast limestone pit immediately west of the existing Oparure pit, with a 1.3 km haul road. The Application Report states that the total area disturbed over the life of the pit will be 59.6 ha by approximately 2080 (Note Appendix K refers to 57.4 ha over 53 years. Quarrying is staged, with progressive rehabilitation using overburden. The P&HMP anticipates a consent duration of 35 years, which is shorter than the 53-year development horizon described in the BaMP and Appendix K.

3.2 Relative to the proposal notified in April 2022, the pit footprint has been reduced (the northern portion removed), a 100 m Camelot Cave Buffer Zone either side of the cave centreline is now proposed in conditions, and the BaMP records that the footprint has

been adjusted to avoid Sites 5 and 6, which contained the better potential bat roost habitat. These are the changes I assessed in my February 2025 Review and I remain of the view that the reduced footprint materially lessens the risk to the Camelot system and the SNA to the west of the pit.

3.3 Appendix K characterises the site as grazed pasture with scattered limestone outcrops, small native bush fragments on karst, scattered native and exotic trees, dolines, and seven short, shallow cave entrances. It identifies the actual effects as: permanent loss of approximately 1.0 ha of high-value, significant karst ecosystem features; permanent loss of approximately 1.4 ha of native vegetation/habitat; removal of seven small caves (111 m² of cave floor); and loss of moderate-value habitat and food resources for native fauna. No troglobitic fauna were recorded. Long-tailed bats (Threatened – Nationally Critical) were confirmed at low activity levels, copper skink (At Risk) and ornate skink (At Risk – Declining) were found, and bush falcon (Threatened – Nationally Increasing) uses the locality.

3.4 Note that Appendix K incorrectly classified copper skink (*Oligosoma aeneum*) as Not Threatened. This is incorrect. It is currently classified as At Risk – Declining under the New Zealand Threat Classification System[1].

3.5 Appendix K concludes that the level of effect of karst and bush remnant loss at the Ecological District scale is less than minor and 'does not technically require any remedial or offset action', but that the betterment package offered by Graymont means those effects are 'more than offset'. The Application Report (Section 9) adopts this conclusion. The betterment package, as summarised in EcoBP Table 1, comprises: 21 cave entrances (224 m² floor area) protected and enhanced; 6.7 ha of planting between and around the two existing SNAs (including a 2.5 ha linking corridor and a 0.5 ha lizard release area); 14.4 ha of fencing and pest control of significant forest in and around the SNAs; 11.8 ha of riparian planting and fencing in the upper Camelot Stream catchment; 9.4 ha of planting/sediment control on steep land in the Mangawhitikau catchment; 314 m² of Pōtea Spring restoration; existing QEII covenants; and a bat reserve with 25–50 roost boxes and 10–20 chainsaw hollows.

[1] Hitchmough, R., Barr, B., Knox, C., Lettink, M., Monks, J. M., Patterson, G. B., Reardon, J. T., van Winkel, D., Makan, T., & Michel, P. (2026). *Conservation status of reptiles in Aotearoa New Zealand, 2025*. New Zealand Threat Classification Series 50. Department of Conservation.

4. QUESTION 1: IS MY VIEW ON THE VALIDITY OF THE APPLICANT'S ECOLOGICAL CONCLUSIONS STILL APPROPRIATE

4.1 My November 2022 review of the Boffa Miskell report raised six principal concerns:

(a) the report underplayed the rarity and threat status of caves, cave entrances and cracks in karst, which Williams et al. (2007) classify as historically rare ecosystems and Holdaway et al. (2012) rank cave entrances as Critically Endangered;

(b) it undertook no assessment of the subterranean values against the WRPS significance criteria, which in my view the cave systems were likely to trigger;

(c) it provided no analysis of the intrinsic values and life-supporting capacity of the karst system at a catchment scale (section 6(d) RMA);

(d) its 3:1 'offset' ratio had no scientific basis and was in substance compensation, not offsetting;

(e) it did not distinguish additional compensation from non-additional 'betterment' (measures required for other purposes, such as landscape or freshwater effects or Overseas Investment Office conditions); and

(f) the mechanics of the compensation package were too light to give surety of success. Professor Williams' November 2022 review reinforced these points, in particular that the epikarst – the principal habitat of subterranean fauna – was neither mentioned nor sampled, that offset ratio models developed for fluvial landscapes are inappropriate for karst, and that the assessment was 'inappropriately conceived for karst terrain'. I also noted that WRC's draft karst SNA layer (SNA326, Pakeho polygonal karst; Hayward 2019) overlapped part of the originally proposed pit. I will not address this matter further, but will leave it to Professor Williams to address.

4.2 A good deal of that ground has since been addressed. Dr Keesing's February 2024 section 92 response assessed the on-site cave features against the RPS criteria and concluded that, singly or collectively, they do not meet the significance criteria, with the exception of the Camelot Cave system which *'may be ecologically significant'* and is to be avoided. The eDNA work and literature review for Camelot Cave indicated low invertebrate diversity. At expert conferencing on 15 October 2024, Dr Keesing and I recorded agreement *'in terms of cave entrance and karst features troglobite fauna values*

and the management of those effects' (JWS, Topic 6, para 31). The subsequent removal of the northern portion of the pit, the 200 m Camelot Stream buffer and the 100 m Camelot Cave Buffer Zone addressed the reservation I shared with Mr Hamer at conferencing (JWS para 16) that the magnitude of underground effects had not been adequately demonstrated, as I recorded in my February 2025 Review..

4.3 Accordingly, my view on the validity of the subterranean conclusions, as now expressed in Appendix K, is that they are appropriate for the caves within the reduced footprint: the seven caves to be lost are short, shallow, in early formation, support trogloxene rather than troglobitic fauna, and are not individually significant.

4.4 Where I continue to differ is in the framing. First, the cave entrances and small vegetated karst fragments remain historically rare ecosystems and approximately 1 ha is acknowledged by Appendix K itself to be SNA-quality karst; their loss is a residual adverse effect that is being compensated, not a less-than-minor effect that is being 'bettered'. Second, the additionality question I raised in 2022 remains relevant: the EcoBP presents riparian and sediment-control planting (11.8 ha and 9.4 ha), which primarily addresses freshwater and sediment effects, alongside the karst and cave entrance measures, and the Application Report should be clear about which measures are compensation for terrestrial and subterranean losses and which are for other purposes. On my reading the genuinely additional terrestrial/karst measures are the 21 cave entrances, the 6.7 ha of SNA planting and linkage (including the lizard release area), the 14.4 ha of SNA fencing and pest control, and the ‘Bat Reserve’ (see s7.5 BaMP).

Terrestrial ecology

4.5 In short, yes, subject to the qualifications below. My February 2025 Review agreed that the surface ecological attributes of the pit area are comparatively low in value, that there are no mapped SNAs within the footprint, but that the known and likely presence of Threatened and At Risk fauna and the karst cave entrances mean that section 6(c) RMA, section 7(d) RMA, the Waikato Regional Policy Statement (Section 11) and the NPS-IB are engaged. Appendix K is, in my view, a more candid and better structured assessment than the 2022 reporting and I agree with its description of the site and the species present.

4.6 I agree with Appendix K that approximately 1 ha of the better-vegetated limestone outcrops meet the criteria for significant karst ecosystems and should be treated as SNA for the purposes of assessment, notwithstanding that they are not mapped. This is

consistent with the approach to karst SNA identification in TR23-29 and with WRC's karst SNA ranking work. It is also consistent with my long-held view that karst significance does not depend on the size of the vegetated fragment but on the integrity of the surface–subsurface system.

4.7 Where I depart from Appendix K is in its characterisation of the level of effect as 'less than minor' and therefore not technically requiring remedy or offset. The permanent loss of 1 ha of significant karst ecosystem, seven cave entrances and 1.4 ha of indigenous vegetation that provides habitat for an At Risk lizard and foraging/commuting habitat for a Nationally Critically Endangered bat is, in my opinion, correctly assessed as a Low to Moderate level of effect under the EIANZ (2018) framework when the Ecological District context (a heavily cleared, under-protected karst landscape) is weighted appropriately. In practical terms the distinction is academic because Graymont has offered, and the conditions will require, a substantial betterment package. However, it is still relevant for two reasons: (a) if the betterment is characterised as voluntary 'betterment' rather than as offset/compensation required to address residual effects, the conditions must still secure it as firmly as if it were required; and (b) under the NPS-IB and the RPS, loss of significant karst is to be avoided in the first instance, and I would prefer the Application Report to acknowledge that the effects management hierarchy has been applied and that residual effects are being compensated, rather than that no residual effect exists.

4.8 I note that the Application Report characterises habitat-related effects as 'less than minor' in Section 9. For the reasons above I consider the correct characterisation, before betterment, is minor to more than minor at the local scale and less than minor at the regional scale, and that the proposal achieves a net gain only if the betterment package is fully implemented and maintained for the life of the quarry and beyond. That is the basis on which I assessed the proposal in February 2025, and I remain of that view.

4.9 Appendix K's conclusion regarding long-tailed bats – that the site is used for commuting and foraging and is less likely to be used for roosting – is reasonable on the data, but I note that the ABM survey effort underpinning it dates from 2021 (29 valid nights across the original footprint and a further seven ABMs deployed by WSP in November 2021), and that 11 of the 121 trees/tree groups assessed were rated as high roost potential. Given the 53-year staged clearance programme, I consider the survey data adequate to characterise the risk now but not adequate to be relied upon at the time of each future stage of clearance (see Section 5).

4.10 I also draw attention to Table 1 of the BiMP, which lists short-tailed bat (At Risk – Declining) as 'On site (addressed in Bat Management Plan)'. The BaMP addresses long-tailed bats only and Appendix K does not report short-tailed bat detections. I assume this is a transcription error in the BiMP or a material omission from the BaMP and Appendix K. The applicant should be asked to clarify. If short-tailed bats have been detected, the roost assessment, felling protocols and Wildlife Act implications require revisiting, since short-tailed bats roost in cavities in large trees and also use caves.

5. QUESTION 2 – ARE THE PROPOSED MEASURES SUFFICIENT TO AVOID ADVERSE EFFECTS OVER THE LIFETIME OF THE CONSENTS?

5.1 The management plan suite has improved considerably since 2022 and most of the recommendations in my February 2025 Review have been picked up in one or more of the plans. The cross-check in Section 7 of this review sets this out item by item. The following matters remain, in my opinion, insufficient to ensure that adverse effects are avoided, remedied, mitigated or compensated over the lifetime of the consents.

Duration of pest animal control and maintenance

5.2 My February 2025 Review stated that I did not agree with a five-year duration for animal pest control, and that control should be conducted for the life of the operational quarry. The PMP (Section 1.1 and Section 4.0) still provides for five years of pest animal control and five years of weed monitoring, after which actions *'will be reviewed*'. The KRMP (Section 8.4) and the BaMP (Section 7.5) adopt the same five-year horizon. This remains the single most significant shortfall in the package. The ecological benefit claimed for the 14.4 ha of SNA fencing and pest control, the lizard release area, the cave entrance plantings and the bat reserve depends on sustained predator suppression; five years of control followed by an open-ended review is, in my experience, of negligible long-term value for lizards and bats and risks creating a predator sink in the very habitat into which salvaged ornate skinks are released. Pest animal control and plant pest control over all betterment areas should be required for the full term of the consents, with the regime (not its existence) reviewable at five-yearly intervals.

Legal protection of betterment areas

5.3 My February 2025 Review recommended that some form of legal protection over the betterment areas is required to ensure they are protected in perpetuity. The EcoBP (Table 1) now lists *'Create QEII covenants*' as a commitment and Figure 1 shows a QEII covenant

area; the LMP proposes that the lizard release site be given SNA status under the District Plan. Neither mechanism appears in the draft conditions (see Section 6). Without a condition, the covenant commitment is unenforceable.

Currency of survey data for staged clearance

5.4 The BaMP relies on roost assessments and ABM surveys undertaken in 2021 and notes that many of the high-rated trees are decaying and 'will likely fall over within the next year or so'. It sates that clearance will occur in stages over approximately 53 years. The BaMP's pre-felling protocol (PRF assessment, two valid ABM nights, roost watches/arborist inspection) is consistent with the current DOC Protocols for Minimising the Risk of Felling Occupied Bat Roosts and I support it. However, the plan should expressly require a fresh tree roost assessment of each stage by the Project Bat Ecologist within 12 months prior to clearance of that stage, and a repeat ABM baseline (minimum 12 valid nights in the October– April period) at the commencement of each new stage, so that the risk characterisation keeps pace with vegetation senescence and any change in bat use of the site. The same applies to lizard and falcon surveys.

Status of the Bat Management Plan

5.5 Section 6.9 of the BaMP states that reporting to WDC and WRC is not required because the BaMP *'is a voluntary plan rather than a consent condition*', and that review is *'on a voluntary basis*'. That is not acceptable for a Nationally Critically Endangered species where the entire footprint will be cleared. The BaMP (and the BiMP and LMP) must be sub-plans of the P&HMP/EcoBP, certified by the councils, with post-clearance reports supplied to WDC, WRC and DOC. I note that the proffered condition in LMP Appendix 1a lists the BaMP, BiMP and LMP as components of the EcoBP, but that list has not carried through to T1 or T2 (see Section 6).

Cave entrance enhancement

5.6 In February 2025 I queried the basis for the 3:1 cave entrance ratio and considered a 10 m planting radius too thin. The package now offers 21 entrances (224 m²) for seven lost (111 m²), i.e. a 3:1 count ratio and 2:1 floor-area ratio, and the KRMP (Section 5) requires a 10 m planted radius extended to 25 m where there is no surrounding native vegetation. This is a reasonable response and I support it, subject to: (a) a requirement that the 21 entrances be selected on ecological criteria (associated native vegetation, cave length,

evidence of cave fauna or bat use, hydrological connection) by an independent expert and reported to the councils; (b) priority being given to the seven neighbouring entrances identified by Appendix K; and (c) fencing and planting being maintained for the term of the consents, not five years.

Lizards

5.7 The LMP is robust and the Wildlife Act Authority (118705-FAU) is in place. I note two matters. First, the LMP describes the 'Phase 1 Western Pit and Haul Road' footprint as 26 ha (24 ha virgin ground), whereas the consented footprint is 59.6 ha; the LMP and the Authority need to be confirmed as covering the full SW Pit footprint and all stages, or updated before clearance beyond Phase 1. Secondly, the LMP's conclusion that no compensation is required rests on the release site being rehabilitated with rodent control and permanently protected; both depend on the matters in paragraphs 5.2 and 5.3 being secured by condition. The LMP's own assessment is that habitat loss is high for ornate skink at the local scale, which supports my view.

Birds

5.8 The BiMP remains robust and in line with best practice, as I found in February 2025. The falcon protocols (acoustic recorders for eight weeks in January/February before clearance, clearance only outside the breeding season or after confirmation of no breeding) are appropriate. The protocols should apply to each stage of clearance and karst feature removal, not only to the initial works, and this should be made explicit in the plan and condition.

Rehabilitation and the 35-year consent term

5.9 Progressive rehabilitation using overburden will, over time, create engineered landforms. Nothing in the documents I have reviewed sets any ecological performance standard for rehabilitated land (e.g. a proportion of indigenous revegetation, re-creation of rock piles for lizards, or planting of cavity-forming tree species for bats). Given that the consents will expire before the pit is complete, the Pit Rehabilitation Plan and the EcoBP should include ecological end-state objectives and the betterment obligations should be structured to survive consent expiry (via covenant and bond).

6. QUESTION 3 – DO THE DRAFT CONSENT CONDITIONS PROVIDE SUFFICIENT MEASURES TO MINIMISE RISK TO TERRESTRIAL ECOLOGY?

6.1 Not yet. The conditions (T1 for WRC and T2 for WDC) secure the betterment quanta in part, and adopt a certification process, five-yearly review of the P&HMP and its sub-plans, and a machinery hygiene requirement (WDC condition 25, which addresses my February 2025 query about plant pest and seed introduction). However, I have identified the following gaps and drafting matters in the table below (Table 1).

Matter	Draft condition position	Recommendation
Management plans for bats, birds and lizards	WRC 27–30 require the P&HMP to include an EcoBP 'including but not limited to' a KRMP. The BaMP, BiMP, LMP and PMP are not named in T1 or T2, although the proffered condition in LMP Appendix 1a listed them. The BaMP itself describes itself as voluntary.	Amend WRC condition 29(b) and WDC condition 19 to expressly require the EcoBP to include the BaMP, BiMP, LMP, PMP and KRMP as certified sub-plans; require the plans to be implemented as certified; require pre-clearance survey and post-clearance reporting to both councils and DOC for every stage of clearance.
Betterment initiatives (WDC 24)	24(a) 21 cave entrances/224 m^2 within 10 km; 24(b) 6.7 ha planting between and around SNAs; 24(c) 9.4 ha sediment control, Mangawhitikau; 24(d) is blank; 24(e) 11.8 ha Camelot catchment. No reference to 14.4 ha SNA fencing and pest control, the 0.5 ha lizard release area, the bat reserve (roost boxes/chainsaw hollows), Pōtea Spring (314 m^2) or QEII covenants, all of which are EcoBP Table 1 commitments.	Complete 24(d) and add sub-clauses securing each of the omitted EcoBP Table 1 commitments with the same specificity (area, number, location, timeframe). Include 'and maintained for the term of this consent' in the chapeau of condition 24.
Duration of pest control and maintenance	No condition specifies duration; plans default to five years.	New condition: plant and animal pest control, fence maintenance and planting maintenance across all betterment areas for the full term of the consents, with monitoring against performance targets (e.g. rat tracking ≤5%, possum RTC/wax-tag ≤5%, mustelid tracking ≤5% in each November and February survey) and a contingency trigger if targets are not met in any two consecutive surveys.
Performance standards for plantings	None in T1/T2 (my February 2025 paragraph 3.12).	New condition: minimum 80% survival at year 2 with infill, ≥80% indigenous canopy closure by year 10 (riparian and SNA link) and ≥70% indigenous ground/shrub cover within 10 m of each enhanced cave entrance by year 5; annual reporting until targets met, then three-yearly.
Legal protection	None.	New condition: register QEII (or equivalent) covenants over the SNA link, lizard release area, cave entrance enhancement areas and Camelot catchment riparian areas within five years of consent commencement (or demonstrate landowner refusal and provide an alternative mechanism to the satisfaction of the councils). Alternatively require an application to WDC for SNA scheduling as proposed in the LMP.

Matter	Draft condition position	Recommendation
Timeframe	WDC 24 requires betterment to be 'identified and implemented' within three years.	Retain, but clarify that planting is to be completed (not merely commenced) within three years, and that the cave entrance enhancement and lizard release habitat must be established and pest control operating before the first clearance of karst features or lizard habitat.
Survey currency for staged clearance	Not addressed.	New condition: before each clearance stage, updated tree roost assessment, ABM baseline, lizard salvage planning and falcon survey, with a stage clearance report certified by the councils.
Short-tailed bat	Not addressed.	Require clarification from the applicant with regard to the BiMP; if confirmed, extend the BaMP to short-tailed bats and confirm Wildlife Act position.
Consent term vs. quarry life	P&HMP refers to a 35-year term; disturbance programme is to ~2080.	Ensure the bond (WRC bond condition) explicitly covers completion and maintenance of betterment and ecological rehabilitation, and that the EcoBP review required on cessation of quarrying includes a legacy management plan.
Disturbance area	Application Report/T2: 59.6 ha; Appendix K: 57.4 ha.	Reconcile; ensure retained karst features at pit margins are shown on a plan and excluded from the disturbance area.
Independent review	Plans are prepared by the consent holder's experts.	Require the councils' certification to be informed by an independent ecologist's review of the EcoBP and sub-plans, at the consent holder's cost, as was envisaged in my February 2025 Review (paragraph 3.6).

7. CROSS-CHECK OF PREVIOUS RECOMMENDATIONS AGAINST THE CURRENT DOCUMENTS

7.1 Table 2 below records the matters raised in my November 2022 review and at the October 2024 conferencing; Table 3 records the recommendations in my February 2025 Review. Each is marked as to whether it has been addressed in the fast-track documents.

Nov 2022 / JWS 2024 matter	Current document response	Status
Rarity/threat status of caves and cave entrances underplayed	Appendix K treats ~1 ha of vegetated karst as SNA; cave entrances still assessed as low value.	Partly addressed
No RPS significance assessment of subterranean values	Provided in Feb 2024 s92 response; carried into Appendix K.	Addressed
No intrinsic values / life-supporting capacity analysis (s6(d))	Addressed at a general level in s92 response; Camelot avoided by buffer.	Addressed
Epikarst habitat not sampled or assessed (Williams)	Not addressed in Appendix K.	Not addressed – to be address by Prof. Willams
3:1 ratio arbitrary; package is compensation not offset	Ratio retained (21:7 entrances; 224 m^2:111 m^2); still described as betterment.	Partly addressed – framing
Distinguish additional compensation from non-additional betterment	EcoBP Table 1 lists all measures together by source report.	Not addressed
Mechanics of compensation too light	EcoBP, KRMP, PMP now provide detailed methods and schedules.	Addressed (subject to duration)
SNA326 Pakeho polygonal karst overlap	Northern portion of pit removed.	Addressed
JWS para 16 – magnitude of underground effects not demonstrated	Reduced footprint, Camelot buffers; accepted in my Feb 2025 Review.	Addressed
JWS para 31 – agreement on cave entrance/troglobite values and management	Reflected in Appendix K and KRMP Section 5.	Addressed
Rehabilitation to restore ecosystem services (Williams)	No ecological end-state objectives for engineered landforms.	Not addressed

7.2 February 2025 recommendations (Table 3):

Feb 2025 recommendation	Current document response	Status
3.9 Acknowledge and provide contingency for new plant pests	PMP includes weed monitoring to twice yearly and qualified contractors; no explicit incursion contingency beyond five years.	Partly addressed
3.10 Monitor and control seed/plant material/disease introduced by vehicles	WDC condition 25 requires machinery cleaning to NPCA A16; not in PMP.	Addressed (condition)
3.11 Pest animal control for life of quarry, not five years	PMP, KRMP and BaMP retain five years then review.	Not addressed
3.12 Performance standards for riparian planting, weed control and fences in conditions	KRMP has maintenance schedules; no measurable standards in T1/T2.	Not addressed
3.13 Karst planting plan supported; confirm fence inspections for life of quarry	KRMP Section 8 fencing inspections; duration tied to five-year programme.	Partly addressed
3.14 Basis for 3:1 ratio; 25 m rather than 10 m planting radius at cave entrances	21 entrances for 7 lost (224 m^2 for 111 m^2); 10 m radius extended to 25 m where no native cover.	Largely addressed
3.15 Bird Management Plan supported	BiMP updated July 2026; protocols retained.	Addressed
3.16 Update bat felling protocols to current DOC protocols and append them	BaMP v3 (Sept 2025) reflects current DOC protocols, DOC competencies appended; status 'voluntary'.	Addressed in content; not secured
3.17 Artificial roosts and cavity-forming species in planting plans	BaMP 7.5: bat reserve, 25–50 roost boxes, 10–20 chainsaw hollows, hollow-forming species; not in conditions.	Addressed in plan; not secured
3.18 Lizard search and pre-works methods supported	LMP certified by DOC; Authority 118705-FAU held.	Addressed
3.19 Accidental find protocols for lizards	LMP contingency retained; confirm accidental discovery section covers all stages.	Largely addressed
3.20 Ongoing pest control at lizard release site	Rodent control proposed; five-year horizon.	Partly addressed
3.6 / 4.1 Expert agreement on EcoBP before certification	EcoBP finalised July 2026 without council ecologist input.	Not addressed
4.2 Conditions with key performance standards for life of quarry	T1/T2 contain quanta but no standards or durations.	Not addressed
4.3 Legal protection of betterment areas in perpetuity	QEII covenant shown in EcoBP Figure 1/Table 1; no condition.	Not secured

8. QUESTION 4 – MATTERS FOR THE WDC SECTION 53 RESPONSE

8.1 I recommend that the section 53 response raise the following terrestrial ecology matters with the Expert Panel:

- That Council's ecological advice is that the pre-betterment level of effect on significant karst ecosystems, indigenous vegetation and Threatened/At Risk fauna habitat is at least minor at the local scale, that the proposal is acceptable only on the basis of the full betterment package being secured by condition, and that the package should be characterised as compensation under the effects management hierarchy rather than voluntary betterment.
- That the Application Report and EcoBP distinguish the measures that compensate for terrestrial and subterranean losses (cave entrances, SNA planting and linkage, SNA fencing and pest control, bat reserve) from the riparian and sediment-control measures that primarily address freshwater effects, so that the Panel can assess additionality.
- That the draft conditions do not currently secure all of the EcoBP Table 1 commitments (14.4 ha SNA fencing and pest control, lizard release area, bat reserve, Pōtea Spring, QEII covenants), that WDC condition 24(d) is blank, and that the amended wording in Section 6 above be adopted.
- That the Bat, Bird, Lizard and Pest Management Plans be expressly required as certified sub-plans, that the 'voluntary' status of the BaMP be removed, and that reporting be to WDC, WRC and DOC.
- That pest animal and plant control, fencing and planting maintenance across all betterment areas be required for the full term of the consents, with measurable performance targets and contingency triggers.
- That legal protection (QEII covenant or SNA scheduling) of the betterment areas be required by condition within five years.
- That the staged nature of clearance over approximately 35 years (or is it 53 years as stated in Appendix K and the BaMP) be recognised through stage-by-stage pre-clearance survey, certification and reporting requirements for bats, lizards and bush falcon.

- That the applicant clarify the BiMP reference to central lesser short-tailed bat being present on site and, if confirmed, amend the BaMP and Appendix K accordingly.
- That the applicant confirm that the Lizard Management Plan and Wildlife Act Authority 118705-FAU cover the full 59.6 ha SW Pit footprint and all stages, not only the 26 ha 'Phase 1' area.
- That the Pit Rehabilitation Plan include ecological end-state objectives for the engineered landforms, and that the bond expressly cover completion and maintenance of ecological betterment and rehabilitation beyond the consent term.
- That an independent ecological peer review (at the consent holder's cost) inform council certification of the EcoBP and sub-plans and each five-yearly review.

9. QUESTION 4 – MATTERS FOR THE WDC SECTION 53 RESPONSE

9.1 My overall view of the proposal has not changed since February 2025, and the concerns I raised about the Boffa Miskell subterranean assessment in November 2022 have largely been resolved through the section 92 process, expert conferencing and the reduced footprint, with the exceptions of the additionality of the package and its framing as betterment rather than compensation. The surface ecological values of the pit footprint are comparatively low, the reduced footprint and Camelot Cave buffer address my earlier concerns about the wider karst system, and the betterment package – if fully implemented and maintained – is capable of delivering a net gain for karst ecosystems, lizards, bats and birds in this locality.

9.2 The management plan suite now addresses most of the technical matters I raised previously, with the important exceptions of the duration of pest control and maintenance, measurable performance standards, and legal protection of the betterment areas. The principal deficiency in the application as lodged is that the draft conditions do not secure the package: several EcoBP commitments are omitted, the species management plans are not named, or are described as voluntary, no durations or performance standards are specified, and the staged, multi-decade nature of the clearance is not reflected in survey and reporting requirements.

9.3 If the condition amendments recommended in this review are adopted, I consider that the risk to terrestrial and cave ecology over the lifetime of the consents would be appropriately minimised and the residual effects adequately compensated.

9.4 I am happy to discuss any of these matters, to assist with drafting of the revised conditions, or to participate in expert conferencing should the Panel direct it.

Yours faithfully



Gerry Kessels
Managing Director & Principal Ecologist
Bluewattle Ecology

Appendix 8

Waikato Regional Council
draft conditions V5
(10 November 2026)

RESOURCE CONSENT

CERTIFICATE

Resource Consent: AUTH148506.01.01

File Number: 60 28 22A

Pursuant to the Resource Management Act 1991, the Regional Council hereby grants consent to:

Graymont (NZ) Limited
Level 4
214 Collingwood Street
Hamilton 3204

(hereinafter referred to as the Consent Holder)

Consent Type: Water permit

Consent Subtype: Use

Activity authorised: The use of water for dust suppression in association with the establishment and operation of the SW Pit

Location: 806 Oparure Road, Te Kuiti

Map reference: NZTM 1780187 E 5754082 N

Consent duration: This consent will commence in accordance with section 116 of the Resource Management Act 1991 and will expire on 31 October 2039

Subject to the conditions overleaf:

1. The use of water must comply with the conditions in Schedule One.

Advice Notes – General

a) *In accordance with Section 125 of the RMA, this consent shall lapse five (5) years after the date on which it was granted unless it has been given effect to before the end of that period.*
b) *This resource consent does not give any right of access over private or public property. Arrangements for access must be made between the Consent Holder and the property owner.*
c) *This resource consent is transferrable to another owner or occupier of the land concerned, upon written notice to WRC, on the same conditions and for the same use as originally granted (sections 134-137 of the RMA). The transfer of water, including changes of location, may occur as provided for in Chapter 3.4 of the Waikato Regional Plan, subject to the requirements of those rules.*

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d) *The reasonable costs incurred by WRC arising from supervision and monitoring of these consents will be charged to the Consent Holder. This may include but not be limited to routine inspection of the site by WRC officers or agents, liaison with the Consent Holder, responding to complaints or enquiries relating to the site, and review and assessment of compliance with the conditions of consents.*
e) *Note that pursuant to section 332 of the RMA, enforcement officers may at all reasonable times go onto the property that is the subject of this consent, for the purpose of carrying out inspections, surveys, investigations, tests, measurements or taking samples.*

If the Consent Holder intends to replace this consent upon its expiry, please note that an application for a new consent made at least six (6) months prior to this consent's expiry gives the Consent Holder the right to continue exercising this consent

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RESOURCE CONSENT
CERTIFICATE

Resource Consent: AUTH148506.02.01

File Number: 60 28 22A

Pursuant to the Resource Management Act 1991, the Regional Council hereby grants consent to:

Graymont (NZ) Limited
Level 4
214 Collingwood Street
Hamilton 3204

(hereinafter referred to as the Consent Holder)

Consent Type: Discharge Permit

Consent Subtype: Land and water - stormwater

Activity authorised: To discharge stormwater to land, and surface and groundwater, in association with the establishment and operation of the SW Pit

Location: 806 Oparure Road, Te Kuiti

Map reference: NZTM 1780187 E 5754082 N

Consent duration: This consent will commence in accordance with section 116 of the Resource Management Act 1991 and will expire on 10 November 2061

Subject to the conditions overleaf:

Conditions:

1. The stormwater discharges to land and water shall comply with the conditions in Schedule One.

Advice Notes – General

a) In accordance with Section 125 of the RMA, this consent shall lapse five (5) years after the date on which it was granted unless it has been given effect to before the end of that period.
b) This resource consent does not give any right of access over private or public property. Arrangements for access must be made between the Consent Holder and the property owner.
c) This resource consent is transferrable to another owner or occupier of the land concerned, upon written notice to WRC, on the same conditions and for the same use as originally granted

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(sections 134-137 of the RMA). The transfer of water, including changes of location, may occur as provided for in Chapter 3.4 of the Waikato Regional Plan, subject to the requirements of those rules.

d) *The reasonable costs incurred by WRC arising from supervision and monitoring of these consents will be charged to the Consent Holder. This may include but not be limited to routine inspection of the site by WRC officers or agents, liaison with the Consent Holder, responding to complaints or enquiries relating to the site, and review and assessment of compliance with the conditions of consents.*

e) *Note that pursuant to section 332 of the RMA, enforcement officers may at all reasonable times go onto the property that is the subject of this consent, for the purpose of carrying out inspections, surveys, investigations, tests, measurements or taking samples.*

If the Consent Holder intends to replace this consent upon its expiry, please note that an application for a new consent made at least six (6) months prior to this consent's expiry gives the Consent Holder the right to continue exercising this consent

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RESOURCE CONSENT
CERTIFICATE

Resource Consent: AUTH148506.03.01

File Number: 60 28 22A

Pursuant to the Resource Management Act 1991, the Regional Council hereby grants consent to:

Graymont (NZ) Limited
Level 4
214 Collingwood Street
Hamilton 3204

(hereinafter referred to as the Consent Holder)

Consent Type: Discharge Permit

Consent Subtype: Discharge and Divert

Activity authorised: To divert and discharge water from erosion and sediment controls in association with the establishment and operation of the SW

Location: 806 Oparure Road, Te Kuiti

Map reference: NZTM 1780187 E 5754082 N

Consent duration: This consent will commence in accordance with section 116 of the Resource Management Act 1991 and will expire on 10 November 2061

Subject to the conditions overleaf:

1 The diversion and discharges from erosion and sediment controls shall comply with the conditions in Schedule One.

Advice Notes – General

a) *In accordance with Section 125 of the RMA, this consent shall lapse five (5) years after the date on which it was granted unless it has been given effect to before the end of that period.*
b) *This resource consent does not give any right of access over private or public property. Arrangements for access must be made between the Consent Holder and the property owner.*
c) *This resource consent is transferrable to another owner or occupier of the land concerned, upon written notice to WRC, on the same conditions and for the same use as originally granted (sections 134-137 of the RMA). The transfer of water, including changes of location, may occur*

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as provided for in Chapter 3.4 of the Waikato Regional Plan, subject to the requirements of those rules.

d) *The reasonable costs incurred by WRC arising from supervision and monitoring of these consents will be charged to the Consent Holder. This may include but not be limited to routine inspection of the site by WRC officers or agents, liaison with the Consent Holder, responding to complaints or enquiries relating to the site, and review and assessment of compliance with the conditions of consents.*

e) *Note that pursuant to section 332 of the RMA, enforcement officers may at all reasonable times go onto the property that is the subject of this consent, for the purpose of carrying out inspections, surveys, investigations, tests, measurements or taking samples.*

If the Consent Holder intends to replace this consent upon its expiry, please note that an application for a new consent made at least six (6) months prior to this consent's expiry gives the Consent Holder the right to continue exercising this consent

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RESOURCE CONSENT
CERTIFICATE

Resource Consent: AUTH148506.04.01

File Number: 60 28 22A

Pursuant to the Resource Management Act 1991, the Regional Council hereby grants consent to:

Graymont (NZ) Limited
Level 4
214 Collingwood Street
Hamilton 3204

(hereinafter referred to as the Consent Holder)

Consent Type: Water Permit

Consent Subtype: Diversion

Activity authorised: To divert surface/groundwater not associated with erosion and sediment controls in association with the establishment and operation of the SW Pit

Location: 806 Oparure Road, Te Kuiti

Map reference: NZTM 1780187 E 5754082 N

Consent duration: This consent will commence in accordance with section 116 of the Resource Management Act 1991 and will expire on 10 November 2061

Subject to the conditions overleaf:

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Conditions:

1. The diversion of surface/groundwater not associated with erosion and sediment controls shall comply with the conditions in Schedule One.

Advice Notes – General

a) *In accordance with Section 125 of the RMA, this consent shall lapse five (5) years after the date on which it was granted unless it has been given effect to before the end of that period.*
b) *This resource consent does not give any right of access over private or public property. Arrangements for access must be made between the Consent Holder and the property owner.*
c) *This resource consent is transferrable to another owner or occupier of the land concerned, upon written notice to WRC, on the same conditions and for the same use as originally granted (sections 134-137 of the RMA). The transfer of water, including changes of location, may occur as provided for in Chapter 3.4 of the Waikato Regional Plan, subject to the requirements of those rules.*
d) *The reasonable costs incurred by WRC arising from supervision and monitoring of these consents will be charged to the Consent Holder. This may include but not be limited to routine inspection of the site by WRC officers or agents, liaison with the Consent Holder, responding to complaints or enquiries relating to the site, and review and assessment of compliance with the conditions of consents.*
e) *Note that pursuant to section 332 of the RMA, enforcement officers may at all reasonable times go onto the property that is the subject of this consent, for the purpose of carrying out inspections, surveys, investigations, tests, measurements or taking samples.*

If the Consent Holder intends to replace this consent upon its expiry, please note that an application for a new consent made at least six (6) months prior to this consent's expiry gives the Consent Holder the right to continue exercising this consent

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RESOURCE CONSENT
CERTIFICATE

Resource Consent: AUTH148506.05.01

File Number: 60 28 22A

Pursuant to the Resource Management Act 1991, the Regional Council hereby grants consent to:

Graymont (NZ) Limited
Level 4
214 Collingwood Street
Hamilton 3204

(hereinafter referred to as the Consent Holder)

Consent Type: Land Use Consent

Consent Subtype: Land disturbance

Activity authorised: To remove overburden and the quarrying of limestone and subsequent discharge to water and air in association with the establishment and operation of the SW Pit

Location: 806 Oparure Road, Te Kuiti

Map reference: NZTM 1780187 E 5754082 N

Consent duration: This consent will commence in accordance with section 116 of the Resource Management Act 1991 and will expire on 10 November 2061

Subject to the conditions overleaf:

1. The removal of overburden to land and the quarrying of limestone and subsequent discharge to water and air shall comply with the conditions in Schedule One.

Physical Protection of the Camelot Cave System

2. Prior to the commencement of quarrying activities authorised by this resource consent, the consent holder shall confirm the coordinates of the 'Camelot Cave Buffer Zone' ('**CCBZ**'), which shall extend 100 metres either side of the estimated centre line of Camelot Cave defined on the plan entitled 'Figure 2', dated 16 June 2026 and attached as **Appendix A** to this resource consent. The CCBZ shall be surveyed and marked on the site. No quarry excavation or overburden placement shall be undertaken in the CCBZ until:

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a) The extents and geometry of the cave system have been confirmed by an independent suitably qualified and/or experienced expert and provided to the Chief Executive Officer of the WRC (or delegate) for certification in accordance with condition 2(a); and
b) The WRC has certified the extents and geometry as sufficiently accurate to position the Camelot Cave with respect to the proposed quarry.

Spill Response Plan

3. The consent holder shall engage an independent suitably qualified and/or experienced person(s) to prepare a Spill Response Plan (or '**SRP**') which is to form part of the P&HMP. The objective of the SRP is to (i) impose measures that will reduce, to a practicable minimum, the prospect of an accidental discharge of hazardous substances to land or water, and (ii) put procedures and responses in place to reduce, again to a practicable minimum, the adverse effects of any accidental discharge that occurs.

4. The SRP shall, as a minimum, include the following:
   a) The methods (including but not limited to the minimum controls set out in conditions 5 to 8 that the consent holder is to employ to minimise the potential for hazardous substances to be accidentally discharged or spilled to air, water and/or land;
   ~~b) The methods (including but not limited to the minimum controls set out in conditions 37 to 39) that the consent holder is to employ to minimise any adverse environmental effects caused by any accidental discharge of hazardous substances;~~
   c) The measures / procedures that are to be established and followed by the consent holder to:
      i. Store and transport hazardous substances (other than flocculation substances which are to be set out within the Flocculation Management Plan ('**FMP**') within the Site;
      ii. Report any accidental spill of hazardous substances that occurs to the WRC and other stakeholders; and
   d) The spill response procedures that the consent holder shall employ to capture any accidental discharge of hazardous substances to land and/or water.

Minimum Requirements for the Storage & Use of Hazardous Substances

5. Any hazardous substances stored within the Site shall be contained within a bunded area, where the ground is covered with an impermeable surface (such as concrete).

6. All machinery shall be operated in a manner that ensures that spillages of fuel, oil and similar contaminants to soils, the karst system and water (both surface water and groundwater) are prevented during refuelling and machinery servicing and maintenance. Refuelling and lubrication activities shall be carried out away from any water body such that any spillage can be contained so it does not enter any natural waterway systems. Refuelling shall also not be undertaken within the CCBZ as defined by condition 2.

7. Any mobile crushing plant used within the Site shall have a spill response kit located at the plant and shall not be located within 200 metres of one of the boundaries to the CCBZ established by condition 2 of this resource consent or within 100 metres of any stormwater management control device.

8. Any tanker supplying diesel, hydraulic fluids, oils and greases to a mobile crushing plant located within the Site shall have appropriate spill control measures, including a diesel transfer nozzle that limits the potential for spills to occur, an emergency shutoff system to deactivate diesel dispensing and a spill response kit located with the tanker.

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Erosion & Sediment Control Plan

9. The consent holder shall engage an independent suitably qualified and/or experienced expert to prepare an Erosion and Sediment Control Plan (or 'ESCP') which is to form part of the P&HMP.

10. The erosion and sediment control devices to be included in the ESCP shall be based upon and incorporate all the relevant principles and practices for the activity authorised by this resource consent and contained within the document prepared by PDP Limited, entitled "Ōparure Quarry ESCP Version x" and dated x.

11. The objective of the ESCP shall be to outline the methods and techniques that are to be used by the consent holder to manage sediment loss as a result of the development of the haul road and SW pit, and the on-going operation of both facilities so that they do not exceed the water quality limits set out in this resource consent.

12. The ESCP shall as a minimum include the following:
    a) A description of (and a map of) the SW pit's and proposed haul road's staging and disposal areas;
    b) Maps showing each area that an ESC Stage Plan shall be prepared for;
    c) The approximate timing, schedule, commencement date and expected duration of proposed earthworks activities that are proposed in at least the coming 24 months;
    d) Details of all erosion and sediment control principles, procedures and practices that will be implemented by the consent holder to minimise the potential for untreated sediment discharge from the SW pit and proposed haul road to natural water;
    e) Consideration of the physical extent of the Camelot Cave Buffer Zone (CCBZ) as certified under condition 2 to confirm appropriate locations for directing treated stormwater to limit its ingress into the Camelot Cave Stream.
    f) The design criteria of all proposed erosion and sediment control devices[1] that may be employed by the consent holder,;
    g) The monitoring, maintenance programme and approach that will be taken by the consent holder when establishing, operating and decommissioning of the erosion and sediment control devices;
    h) An auxiliary toolbox ('the **ESC Toolkit**') that provides methods, assumptions, and details of how the erosion control devices are designed and typical layout and construction details. Where the erosion and sediment control devices, shall:
        i. Apply the principals of the Auckland Council Erosion and Sediment Control Guide of Land Disturbing Activities in the Auckland Region, and be
        ii. Correct for site specific rainfall intensity.
    i) The measures that will be adopted to ensure that the consent holder complies with the requirements of conditions 47 to 51 of this resource consent; and
    j) An escalating response mechanism[2] that the consent holder shall follow in the event that the monitoring undertaken in accordance with conditions 58 to 60 shows that:
        * There are three or more exceedances of the turbidity (~~61(d))~~ minimum compliance standard set out in condition 23 within an 18 month period of monitoring; or
        ** Following the exceedance of the minimum compliance standards set out in conditions 24 (a), 24(b) or 24(c).

[1] **Advice Note 9:** For the purposes of conditions 41 to 54, the term erosion and sediment control device shall include all devices constructed, operated and maintained by the consent holder to minimise the discharge of sediment for natural freshwater, and to limit the potential for erosion to occur on the site and on adjacent properties. It shall include sediment retention ponds, decanting earth bunds and diversion channels and/or bunds

[2] **Advice Note 10:** For the avoidance of doubt, an escalating response mechanism is one which requires the consent holder to adopt increasingly stringent responses to ensure that the performance standards in condition 55 are met.

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13. To respond to changes in the development of the SW pit which will result in material changes to flows and sediment loads in the stormwater runoff, Erosion and Sediment Control Stage Plans ('**ESC Stage Plans**') shall be prepared by the consent holder for each of the areas identified by the maps produced in accordance with condition 47(b). The consent holder shall submit each ESC Stage Plan to the Waikato Regional Council (WRC) for certification in accordance with conditions 22 and 23. The ESC Stage Plan can not be implemented until it is certified. No earthworks, quarrying or and other earth moving activity may be undertaken by the consent holder within an area defined in accordance with condition 47(b) until an ESC Stage Plan for that area is certified.

14. Each ESC Stage Plan shall consist of drawings illustrating the location of the erosion and sediment control devices that are to be employed on site and a technical memorandum that describes the erosion and sediment control devices proposed and the design methods / guidelines that have been followed to develop the proposed devices. The Technical memorandum shall include:
    a) The purpose of the ESC Stage Plan;
    b) The scope of the earthworks covered by the ESC Stage Plan;
    c) The erosion and sediment control devices that are proposed to be used in the ESC Stage Plan, with reference to the Toolkit. This shall include the location and design of each erosion and sediment control device that is to be used and where that device will discharge to;
    d) The basis of design of erosion and sediment control devices with reference to the Toolkit;
    e) Any special maintenance, monitoring and inspection over and above those in the ESCP;
    f) Any special requirements associated with the ESC Stage Plan; and
    g) Any deviations from the certified ESC Toolkit (including details of why the deviations are needed).[3]

Site Stabilisation & Removal of Controls

15. The consent holder shall, within a period not exceeding 14 calendar days after completion of any earthworks authorised by this resource consent, implement measures on those areas of the Site where the earthworks occurred that are designed to stabilise the disturbed areas against erosion.

16. The consent holder shall adopt the measures to reduce the geotechnical hazards associated with the establishment and on-going development of the SW pit. This shall include ensuring that the slopes of the SW pit are designed by senior geotechnical professional with at least 10 years' experience in mining or quarrying.

Management of Erosion & Sediment Control

17. The works and activities undertaken in accordance with this resource consent shall be undertaken so as to avoid causing any new, or exacerbating any existing flooding effects on land that is adjacent to or downstream of the site.

18. In addition to the requirements of the ESCP and ESC Stage Plans, the consent holder shall ensure that all clean water run-off from stabilised surfaces is diverted away from the exposed areas via a stabilised stormwater system. The diversions are to be designed so as to minimise erosion resulting from the stormwater flows. The consent holder shall also ensure any the outfall(s)

[3] **Advice Note 11:** A draft ESC Stage Plan for the first year of the net pits development and operation is included as Appendix A to the ESCP cited in condition 42.

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associated with the stabilised stormwater system are protected so as to minimise any potential for erosion.

19. The consent holder shall ensure that all erosion and sediment control devices are inspected in accordance with the frequency specified in the ESCP and ESC Stage Plans. The inspection shall consider if the function or performance of the erosion and sediment control devices have been impaired. A record shall be maintained of the date and time of inspections undertaken, any maintenance actions that were identified, and of maintenance undertaken to all erosion and sediment control devices. Records associated with the maintenance of all erosion and sediment control devices shall be made available to the WRC within five working days of them being requested by the WRC.

20. The consent holder shall submit 'As Built Certification Statements'[4] for all erosion and sediment control devices that are signed by an independent suitably qualified and/or experienced expert to the WRC. The As Built Certification Statements shall confirm that the erosion and sediment control devices existing at the time of certification have been constructed in accordance with the certified and current version of the ESCP and the applicable ESC Stage Plan. The 'As Built Certification Statements' signed by an independent suitably qualified and/or experienced expert shall also be submitted for all erosion and sediment control devices within 10 working days of the structures being constructed, and at least one (1) working day prior to bulk earthworks (not including any land disturbance necessary to install the erosion and sediment control devices).

21. The 'As Built Certification Statements' shall include, but shall not be limited to the following information:
    a) Confirmation of contributing catchment area(s) for each erosion and sediment control device;
    b) The location, capacity and design of each erosion and sediment control device;
    c) Position of all inlets and outlets to each erosion and sediment control device;
    d) Stability of all of the erosion and sediment control devices; and
    e) The measures (if any are needed) that have been installed to control erosion that each erosion and sediment control device could cause.

22. The Consent Holder shall keep a register of all of the erosion and sediment control devices implemented on the site with a reference to the relevant item in the ESC Toolkit that applies.

Water Quality & Aquatic Ecology Monitoring

23. The consent holder shall engage a suitability qualified and/or experienced person to undertake and report on the following monitoring:
    a) Continuous monitoring (at a 15 minute sample frequency) of the turbidity following NEMS Turbidity (2017) guidelines in the unnamed tributary that flows to the Camelot Stream and that is upgradient of both the SW Pit and Gate Spring (at or about NZTM 1778110E: 5753300N), and downstream of the Gate Spring / Mangawhitikau Stream confluence (at or about NZTM 1783190E; 5755350N). For the avoidance of doubt, the consent holder shall be deemed to have complied with this condition even if an event(s) beyond its control prevents data being captured every 15 minutes where:
        i) The consent holder notifies (in writing) the WRC within 24 hours of becoming aware that data is not being captured. The notification shall set out the reason for

[4] **Advice Note 12:** An example template and the information required for the As Built Certification Statement can be found on the Waikato Regional Council's website www.waikatoregion.govt.nz/earthworks.

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/ cause of data not being captured and the actions that are being undertaken to restore the data capture; and

ii) The consent holder works to restore the data capture as soon as it is possible to do so and shall undertake all practicable actions to ensure that data capture restarts within two (2) weeks of the issue being identified. If this is not practicable, the consent holder shall write to the WRC explaining the reasons for the delay, and to set out a date by when data gathering is expected to recommence.

24. The consent holder shall engage a suitability qualified and/or experienced person to undertake and report on the following ecological monitoring in the Mangawhitikau Stream:
    a) Deposited fine sediment surveys (percent cover and depth) using the SAM2 method (Clapcott et al., 2011);
    b) Benthic macroinvertebrate sampling following the NEMS (2022) '200+ Fixed Count with Scan for Missed Taxa' method.;
    c) Invertebrate drift sampling at Gate (Potea) Spring and Pumphouse Spring using 250 µm and 500 µm mesh nets; and
    d) Periphyton surveys (percent cover and type) (for matts and filamentous algae only) following NEMS 2020 methods.

25. The monitoring required by condition 23 shall be:
    a) Undertaken annually the 1st of December and the 30th of April of each year for five years after the commencement of the earthworks authorised by this resource consent, and every three years thereafter; and
    b) Conducted in comparable habitat;
    c) In the Mangawhitikau Stream, 20 metres upstream (at or about NZTM 1783138E, 5755338N) and 100 metres downstream (at or about NZTM 1783235E, 5755336N) of the Gate (Potea) Spring confluence with the Mangawhitikau Stream.
    d) Analysis such that the results for deposited sediment, benthic macroinvertebrates and periphyton are compared against the relevant regional and national standards and guidelines and the compliance standards provided in condition 26. Following the first monitoring exercise undertaken in accordance with conditions 23 and 24, the first round of data shall form the baseline for all future monitoring exercises.

26. When reporting on the monitoring required by conditions 23, 24 and 25, the independent and/or suitability experienced expert retained by the consent holder shall compare its results with the following minimum compliance standards. The comparison shall be made against both upstream conditions and the baseline conditions that have been reported in previous monitoring exercises undertaken by or for the consent holder. The independent and/or suitability experienced expert shall recommend mitigation options in accordance with condition 44(i) if the minimum compliance standards are not achieved and the cause of the exceedances is, in the opinion of the independent and/or suitability experienced expert, caused by the establishment and/or operation of the SW pit. When recommending the mitigation options the independent and/or suitability experienced expert shall set out when they must be installed by, what operation, maintenance and specific monitoring is required, and what quarrying, earthworks and other land disturbance activities can occur on the site while the mitigation options are being installed.
    a) ≤20% increase in deposited sediment percent cover;
    b) MCI and QMCI scores remain in the same NPSFM attribute band;
    c) ≤20% increase in periphyton percent cover; and
    d) ≤20% increase in daily mean turbidity.

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27. The results of monitoring undertaken and a description of what mitigation measures have been installed (and their effectiveness in addressing any exceedances of the minimum compliance standards) in accordance with conditions 23, 24 and 25 shall be summarised in a single report that is attached to and forms part of the Annual Report that is prepared and supplied to the WRC in accordance with condition 84 of this resource consent.

28. The mixing zone for all water quality monitoring is considered the reach of the Mangawhitikau Stream 20 metres downstream of where the Gate (Potea) Springs which receive discharge meet the mainstem, these being in the Mangawhitikau Stream, 20 metres downstream of the confluence with the recorded point of the Gate (Potea) Spring discharge (NZTM 1783190E; 5755350N).

Stormwater Management

29. There shall be no direct discharge of contaminated stormwater into surface waterways.

30. The consent holder shall be responsible for the structural integrity and maintenance of all settlement ponds, spillways and gravel beds utilised for the control of stormwater within the Site, and for the provision and maintenance of any erosion control works that become necessary to control erosion as a result of the exercise of this consent. Any such works shall be installed / constructed and maintained to the satisfaction of the Chief Executive Officer of the WRC (or delegate).

Water Quality Limits, Monitoring & Flocculation Management

31. The consent holder shall take samples of the discharge from all lined erosion and sediment control devices on the Site at least once per month and after all rainfall events where greater than or equal to 50mm of rainfall has occurred in the preceding 24 hours. The consent holder shall take the samples within 24 hours of becoming aware that a rainfall event greater than 50mm has occurred in the preceding 24 hours. The purpose of the samples is to determine if the discharges from the lined erosion and sediment control devices achieve the following limit:
    a) The suspended solids ('**TSS**') level of the stormwater from the lined erosion and sediment control devices (as measured when the device is discharging to a naturally occurring surface waterbody at the time of sampling) shall not exceed 100 milligrams per litre.

    If there has been no discharges from a lined erosion and sediment control device since the preceding sample being taken, the consent holder need not take a sample from that lined erosion and sediment control device. Further, no sample needs to be taken if there have been no discharges from the lined erosion and sediment control device after a rainfall event of the size (or larger) set out in Condition 63 of this resource consent.

32. The consent holder shall, within five working days of taking any samples required in accordance with condition 31, forward those samples to a laboratory where they are to be analysed for TSS. The results of the analysis shall be forwarded to the Chief Executive Officer of the WRC (or delegate) within seven days of the consent holder receiving results of the analysis.

33. Should the monitoring undertaken in condition 31 of this resource consent show that the limit set in bullet point a) of that condition has been exceeded, the consent holder shall implement a flocculation treatment system in the applicable sediment retention pond(s) for the purpose of reducing sediment discharges from the Site. The flocculation treatment system shall be installed and implemented in accordance with a certified Flocculation Management Plan ('**FMP**') prepared in accordance with condition 66 of this resource consent. The FMP shall be prepared so as to ensure that the following standards are achieved and that sufficient monitoring is undertaken to ensure that compliance is being achieved:

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a) The soluble aluminium concentration of any sediment retention pond discharge shall not exceed 0.2 g/m^3; and
b) The pH of any sediment retention pond discharge shall not be less than 7.5 pH units.

34. If required by condition 33 of this resource consent or any other water quality reason, the consent holder shall engage an independent suitably qualified and/or experienced expert to prepare a Flocculation Management Plan ('**the FMP**'). The FMP shall be submitted to the Chief Executive of the WRC (or delegate) for certification prior to any flocculation treatment commencing. The FMP shall have the purpose of ensuring that any discharges from the sediment retention pond meet the water quality standards set out in condition 33 and shall include as a minimum:
    a) An analysis identifying which sediment pond(s) requires flocculation. This analysis shall, as a minimum, take the following matters into account;
        i. The soil's reactivity to flocculants based on soil tests;
        ii. The size of the contributing catchment that the pond(s) is treating; and
        iii. The likely duration of the ponds use;
    b) Specific design details of the flocculation system that is to be installed and operated;
    c) Monitoring (including pH and any other testing procedures), maintenance (including post- storm) and including a record system;
    d) Details of the optimum dosage (including assumptions) of the flocculant that is to be used;
    e) The results of any initial flocculation trial; and
    f) The contact details of the person responsible for the operation and maintenance of the flocculation treatment system and the organisational structure to which this person shall report.

Air Quality Management Plan

35. The consent holder shall ensure that the implementation of this resource consent does not result in noxious, dangerous, objectionable, or offensive dust to the extent that is causes an adverse effect at or beyond the boundary of the Site.

36. The consent holder shall engage an independent suitably qualified and/or experienced person(s) to prepare an Air Quality Management Plan (or '**AQMP**') which shall form part of the P&HMP. The objective of the AQMP is to ensure compliance with condition 35. More particularly, it is to:
    a) Set out the measures and methods that are to be implemented to avoid, remedy or mitigate any adverse effects of discharges of dust generated from the extraction of material and associated crushing activities undertaken at the Site;
    b) Promote proactive solutions to control of dust discharges from the Site; and
    c) Ensure the effective and targeted use of available dust suppression water so that adverse effects of dust discharges are mitigated.

37. The AQMP shall include, but shall not be limited to the following:
    a) The measures that the Applicant shall use to:
        i. Manage, mitigate and/or suppress dust emissions within the boundary of the site that have the potential to create dust impacts beyond the Site's boundary;
        ii. Control discharges of dust to air from stockpiles;
        iii. Limit exposed unconsolidated surfaces as much as practicable;
        iv. Limit discharges of dust caused by vehicle movements;
        v. Manage discharges associated with earthmoving and quarrying;
        vi. Manage discharges of dust resulting from trucks being loaded / unloaded;

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vii. Comply with the requirements of conditions 36, 37, 38 & 39 of this resource consent;

b) The visual and meteorological monitoring that the consent holder shall undertake to monitor the effectiveness of its air quality controls;

c) The procedures to be adopted to calibrate and verify the on site meteorological monitoring instruments prior to implementing the operation of the SW pit, and

d) The reporting that will be provided to the Chief Executive Officer of the WRC (or delegate) including the frequency of such reporting.

Dust Management

38. The maximum area of unconsolidated land comprising the excavation areas, backfilling areas and unvegetated rehabilitation areas shall not exceed 59.6 hectares.

39. If at any time, including outside normal operating hours, visible dust is blowing beyond the boundary of the Site the Consent Holder shall:
    a) Cease any activity that is generating the visible dust;
    b) Continue or start dust suppression activities including but not limited to the immediate watering of both active and inactive exposed surfaces;
    c) Investigate possible sources of the dust; and
    d) Only recommence the dust generating activity once measures are in place and operating to ensure that condition 35 is achieved.

Advice Notes – General

f) In accordance with Section 125 of the RMA, this consent shall lapse five (5) years after the date on which it was granted unless it has been given effect to before the end of that period.

g) This resource consent does not give any right of access over private or public property. Arrangements for access must be made between the Consent Holder and the property owner.

h) This resource consent is transferrable to another owner or occupier of the land concerned, upon written notice to WRC, on the same conditions and for the same use as originally granted (sections 134-137 of the RMA). The transfer of water, including changes of location, may occur as provided for in Chapter 3.4 of the Waikato Regional Plan, subject to the requirements of those rules.

i) The reasonable costs incurred by WRC arising from supervision and monitoring of these consents will be charged to the Consent Holder. This may include but not be limited to routine inspection of the site by WRC officers or agents, liaison with the Consent Holder, responding to complaints or enquiries relating to the site, and review and assessment of compliance with the conditions of consents.

j) Note that pursuant to section 332 of the RMA, enforcement officers may at all reasonable times go onto the property that is the subject of this consent, for the purpose of carrying out inspections, surveys, investigations, tests, measurements or taking samples.

If the Consent Holder intends to replace this consent upon its expiry, please note that an application for a new consent made at least six (6) months prior to this consent's expiry gives the Consent Holder the right to continue exercising this consent

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RESOURCE CONSENT
CERTIFICATE

Resource Consent: AUTH148506.06.01

File Number: 60 28 22A

Pursuant to the Resource Management Act 1991, the Regional Council hereby grants consent to:

Graymont (NZ) Limited
Level 4
214 Collingwood Street
Hamilton 3204

(hereinafter referred to as the Consent Holder)

Consent Type: Discharge Permit

Consent Subtype: Land - Overburden

Activity authorised: To discharge overburden into the quarry pit associated with the establishment and operation of the SW Pit (including the construction and maintenance of the haul road)

Location: 806 Oparure Road, Te Kuiti

Map reference: NZTM 1780187 E 5754082 N

Consent duration: This consent will commence in accordance with section 116 of the Resource Management Act 1991 and will expire on 10 November 2061.

Subject to the conditions overleaf:

Conditions:

1. The discharges to land shall comply with the conditions in Schedule One.

Advice Notes – General

a) *In accordance with Section 125 of the RMA, this consent shall lapse five (5) years after the date on which it was granted unless it has been given effect to before the end of that period.*
b) *This resource consent does not give any right of access over private or public property. Arrangements for access must be made between the Consent Holder and the property owner.*
c) *This resource consent is transferrable to another owner or occupier of the land concerned, upon written notice to WRC, on the same conditions and for the same use as originally granted*

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(sections 134-137 of the RMA). The transfer of water, including changes of location, may occur as provided for in Chapter 3.4 of the Waikato Regional Plan, subject to the requirements of those rules.

d) *The reasonable costs incurred by WRC arising from supervision and monitoring of these consents will be charged to the Consent Holder. This may include but not be limited to routine inspection of the site by WRC officers or agents, liaison with the Consent Holder, responding to complaints or enquiries relating to the site, and review and assessment of compliance with the conditions of consents.*

e) *Note that pursuant to section 332 of the RMA, enforcement officers may at all reasonable times go onto the property that is the subject of this consent, for the purpose of carrying out inspections, surveys, investigations, tests, measurements or taking samples.*

If the Consent Holder intends to replace this consent upon its expiry, please note that an application for a new consent made at least six (6) months prior to this consent's expiry gives the Consent Holder the right to continue exercising this consent

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SCHEDULE 1 – GENERAL CONDITIONS

TO BE ATTACHED TO CONSENTS AUTH148506.01.01, AUTH148506.02.01, AUTH148506.03.01, AUTH148506.04.01, AUTH148506.05.01 and AUTH148506.06.01.

1 Except as modified by the conditions below, the activities authorised by this consent shall be undertaken in general accordance with but not limited to the Substantive Application Report prepared for Graymont (NZ) Limited by Enspire Consulting, entitled *'Oparure Quarry South-Western Pit – Substantive application under the Fast-track Approvals Act 2024''* and dated July 2026) and any subsequent amendments and further information. Where a conflict exists between the application documentation and these conditions of these resource consents, these conditions shall prevail.

2) Where there may be differences or apparent conflict between the general conditions and conditions contained in either the individual consents contained within this suite, or any other consent referred to below, the conditions contained in the respective individual consents shall prevail.

3) The Consent Holder shall be responsible for all contracted operations relating to the exercise of this resource consent and shall ensure contractors are made aware of these conditions and ensure compliance with them.

Authorised Activities

4) The activities authorised by this resource consent (hereafter referred to as '**the Project**') include but are not limited to the:
   a) Use of lawfully abstracted surface water and groundwater (under other resource consents) for dust suppression within the site of the proposed South-Western Pit ('**the SW Pit**') and/or along the proposed haul road ('**the Haul Road**');
   b) Discharge of overland flow / stormwater to ground and to surface water;
   c) Discharge of overland flow / stormwater to land / ground;
   d) Diversion (along with any associated takes and discharges) of overland flow / stormwater into and / or around bunds, silt fences, sediment pits, check dams and diversion channels (and any similar stormwater detention and diversion structures) as part of the haul road and the SW pit;
   e) Impoundment of water at several different locations for a number of different durations, as part of the stormwater management system for the proposed haul road and SW pit;
   f) Diversion of water and groundwater at several different locations for the proposed haul road and SW pit;
   g) Quarrying of limestone and earthworks associated with the establishment of the SW pit and haul road, including that all quarrying / earthworks conducted within 10 metres ('**m**') of an existing and unknown/known sinkhole and/or cave entrance (including all associated discharges to air and water); and
   h) Discharge, via placement and deposition, of overburden and interburden from the proposed haul road and SW pit into the SW pit and/or onto an area that is located between the SW pit and the existing Oparure pit.

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Location and Maximum Extent

5) The activities authorised in condition 4 shall be undertaken at 806 Oparure Road, Te Kuiti on the land with the following legal descriptions Lot 1 - DPS 77130, Lot 2 – DPS 33442, Lot 1 – DPS 74022, Lot 1 – DPS 7402 and Lot 2 – DPS 77130 (hereafter referred to as '**the Site**').

6) Prior to commencing any earthworks associated with this consent, the Consent Holder shall engage a registered surveyor (or similarly qualified person) to survey the position of the southernmost inferred location of the groundwater divide for the Upper Mangawhitikau catchment as shown on Figure 5; Dye Injection and Doline Locations within the PDP 2023 Graymont New Zealand Limited – Additional Dye Tracer Groundwater Monitoring Report within Appendix C of Appendix I; Oparure Quarry South Western Pit Water Quality Assessment report by PDP 2026. The Consent Holder shall provide a plan of the groundwater divide to the Waikato Regional Council (WRC) for certification at least 10 working days prior commencing any earthworks. The certified groundwater divide shall be physically marked on the ground using survey pegs or similar markings to ensure the position of the divide is clearly visible.

7) No quarry excavation, overburden placement or blasting shall occur north of the groundwater divide defined, surveyed and marked in accordance with condition 6 above.

8) The SW Pit shall have a maximum north-south dimension (length) of 1,080.00 metres and a maximum west-east dimension (width) of 800 metres. The SW Pit shall not exceed 59.6 hectares in area at any point in time. Any part of the Site that has been rehabilitated in accordance with the conditions of this resource consent or which forms part of the betterment proposals shall not be calculated as part of the 59.6 hectare area set by this condition.[5]

9) The total active disturbed area of the SW Pit shall not exceed 59.6 hectares including the quarry floor, stripped ground, active overburden placement areas, active stockpiles and haul road construction area.

Consent Duration

10) This resource consent shall commence in accordance with section 116 of the Resource Management Act 1991 (hereafter referred to as '**the RMA**') and shall expire 35 years later.

Lapse Date

11) This resource consent shall lapse ten (10) years after this resource consent has commenced in accordance with condition 10.

General Conditions

12) The consent holder shall ensure that a representative of all contractors engaged to undertake activities authorised by this resource consent are made aware of the conditions of this resource consent and all management plans relevant to their work area and the measures required for compliance with the conditions.

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[5] **Advice Note 1:** The term 'external cadastral boundary' means any boundary that separates the Site from adjoining / abutting land that is not owned by the consent holder and/or is not lawfully used by the consent holder for quarrying and/or to haul equipment, materials (including limestone and overburden) and personnel to and from the SW Pit . .

Cultural Monitoring Plan

13) The consent holder shall, not later than three months prior to the quarrying of limestone from the SW Pit, invite Oparure Marae[6] to collaborate with the consent holder in the preparation of a Cultural Monitoring Plan (or '**CMP**') for the Site and quarrying activities authorised by this resource consent which are undertaken on land owned by the consent holder. In the event that Oparure Marae do not accept the invitation to prepare the CMP with the consent holder, then conditions 14 to 18 do not apply.

14) Should the Oparure Marae accept the invitation extended by the consent holder in accordance with condition 13, the consent holder shall fund the preparation of the CMP. Once the CMP has been prepared (and agreed to by the consent holder), the consent holder shall submit the CMP to the WRC.

15) The objective of the CMP shall be to both acknowledge mana whenua as kaitiaki, and to provide the opportunity for cultural monitors to participate in the monitoring (including the application of appropriate tikanga) undertaken by the consent holder of the quarrying activities conducted on land it (the consent holder) owns in accordance with the conditions of this resource consent to avoid, remedy, manage or offset actual and potential adverse effects from the activities authorised by this resource consent.

16) The CMP shall include, but is not limited to:
    a) Identification of culturally appropriate monitoring indicators and methods relating to:
        i. the actual or potential effects of the SW Pit on the Camelot Karst (cave) System;
        ii. the Ecological Betterment Plan required under condition XX;
        iii. culturally important plant and aquatic species (if identified);
    b) Protocols for the presence of cultural monitors on site on land that is owned by the consent holder; and
    c) Procedures for reporting and responding to cultural issues or concerns.

17) The CMP may be amended by the consent holder to respond to new information or changing circumstances. The consent holder shall engage with Oparure Marae prior to submitting the amended CMP to the Chief Executive Officer of the WRC (or delegate).

18) The consent holder shall implement the certified version of the CMP.

19) Upon certification of the extents and geometry of Camelot Cave under condition 2 of AUTH148506.05.01, the following restrictions shall apply:
    a) No blasting activities shall be undertaken within 25 metres of Camelot Cave ('**No Blast Zone**');
    b) Within 25 – 100 metres of Camelot Cave, a 'Blast Vibration Restriction Zone' ('**BVRZ**') shall apply, where blast design shall limit Peak Particle Acceleration ('**PPA**') to less than 2.4g at the nearest part of the cave system;
    c) Prior to any blasting occurring within the BVRZ, the consent holder shall install permanent vibration monitors. The monitors shall be positioned to monitor blast vibration at the ground surface above Camelot Cave; and
    d) At distances greater than 100 metres from Camelot Cave, no restrictions on blasting or excavation activities shall apply (with respect to protection of the cave system).

[6] **Advice Note 2:** The reference to the 'Oparure Marae' within these resource consent conditions shall include any group or committee that may be established to represent the Oparure Marae.

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20) A Blast and Vibration Management Plan shall be developed and submitted to the WRC for certification in accordance with condition 23(a) that it complies with Conditions 21 and 22.

21) The objective of the Blast and Vibration Management Plan is to ensure that all blasting activities are planned, undertaken, and monitored in a manner that protects people, property, infrastructure, and the environment, while achieving operational requirements and complying with all relevant legal and consent obligations.

22) The Blast and Vibration Management Plan shall include the following:
   a) Plans illustrating the Camelot Cave Buffer Zone, the Blast Vibration Restriction Zone and the No Blast Zone.
   b) The limitations on PPA (2.4 g) to be applied in the Blast Vibration Restriction Zone.
   c) Proposed controls on the Maximum Instantaneous Charge ('**MIC**') and delays to limit PPA to below the threshold for protection of the cave system.
   d) The proposed positions of permanent blast monitoring devices.
   e) Procedures for reporting on each blast.
   f) Procedures for notifying WRC of vibration exceedance events.

23) The Consent Holder shall monitor turbidity continuously at the unnamed tributary that flows to the Camelot Stream and that is upgradient of the SW Pit at or about NZTM 1778110E: 5753300N ('**the Upstream Turbidity Monitoring Site**') and the Camelot Stream resurgence being Gate (Potea) Spring at or about 1783186E: 5755306N ('**the Downstream Turbidity Monitoring Site**') once the physical works (excavations, quarrying or disturbance activities) associated with the SW Pit commence within the CCBZ or the BVRZ. The purpose of the continuous turbidity monitoring is to identify if the turbidity at the Downstream Turbidity Monitoring Site exceeds the turbidity at the Upstream Turbidity Monitoring Site, with an initial trigger level of 2,000 NTU.

24) If the turbidity reading at the Downstream Turbidity Monitoring Site exceeds 2,000 NTU, the following protocol shall be followed:

   a) If the NTU at the Downstream Turbidity Monitoring Site is higher than the turbidity at the Upstream Turbidity Monitoring Site, with the concentration at the downstream site >2,000 NTU, then:
      i. Action 1: a data exceedance alert shall be sent to the consent holder to review and track. The consent holder shall compare the turbidity reading at the Downstream Turbidity Monitoring Site to the turbidity reading at the Upstream Turbidity Monitoring Site, noting travel delay[7].
      ii. Action 2: The Site manager shall be informed, and the current site activities shall be recorded.[8]
      iii. Action 3: The consent holder shall undertake a Site check of the sediment controls in the CCBZ or BVRZ .

   b) If the NTU at Downstream Turbidity Monitoring Site remains >20% higher than the Upstream Turbidity Monitoring Site and >2,000 NTU for >48 hrs, then:
      i. Action 1: The data trend shall be assessed to determine if the turbidity levels are increasing, reducing, or stable. If the turbidity levels are reducing, the consent

[7] **Advice note 5**: To be determined once further continuous monitoring data is available.
[8] **Advice note 6**: If no quarrying activities or placement of overburden is taking place at the site at the time of the turbidity reading, then other activities in the catchment, such as farming activities or forestry harvesting, shall be considered as a source of the sediment.

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holder shall prepare a report to Council addressing the trigger exceedance, summarise available data and steps undertaken by the consent holder.

ii. Action 2: If the data trend is not reducing at the downstream site, works within the CCBZ or BVRZ will be put on hold until NTU reduces below the turbidity at the upstream site or returns to <50 NTU.

c) If the NTU at Downstream Turbidity Monitoring Site remains >20% higher than the Upstream Turbidity Monitoring Site and >2,000 NTU for >72 hrs, with no reducing trend, then:

i. Action 1: The consent holder shall not resume works within the CCBZ or BVRZ until NTU reduces below the turbidity at the upstream site or returns to <50 NTU and results as per action 2 (condition 24(c)(ii)) and action 3 (condition 24(c)(iii) are confirmed.

ii. Action 2: The consent holder shall take an eDNA sample at Pōtea Spring and send it to an accredited laboratory for processing.

iii. Action 3: An independent suitably qualified and/or experienced expert(s) appointed by the consent holder shall undertake macroinvertebrate and deposited sediment surveys in the Mangawhitikau Stream 20 m upstream and 100 m downstream of the Pōtea Spring confluence. Macroinvertebrate samples are to be sent to an accredited laboratory for urgent processing. Samples to be taken when safe instream conditions allow.

iv. Action 4: The results of ecological monitoring shall be reviewed by an independent suitably qualified and/or experienced expert(s) appointed by the consent holder. The consent holder shall resume works in the CCBZ or BVRZ and prepare a report that shall be submitted to the WRC no more than two weeks after works resume, if the following are met:

- A <20% increase in deposited sediment percent cover at downstream Mangawhitikau Stream monitoring site compared to the upstream site;
- MCI and QMCI scores remain in the same NPSFM attribute band at upstream and downstream Mangawhitikau Stream site.

d) If condition 234(c)(iv) cannot be met, the independent suitably qualified, experienced person/expert(s) appointed by the consent holder shall prepare a report, investigating the actual and potential short- and long-term effects of the activity. This includes an investigation into the source of the increased turbidity. This report shall include:

i. Data collected, and actions taken by the consent holder.

ii. A summary of site works immediately prior to the turbidity exceedances, weather conditions, and investigations into alternative sediment sources, if applicable.

iii. Recommendation of measures to address the adverse effect(s) to the point whereby it will be, in the opinion of the independent suitably qualified and/or experienced expert(s), be acceptable. The recommended measures shall identify the timeframes associated with their implementation, and the monitoring that is to be undertaken (including its frequency and duration) to assess the effectiveness of the measures.

iv. Recommended monitoring to determine persistence of effects.

v. Recommend timeframes for restarting works.

vi. Recommend mitigation, offsetting or compensation, if required.

The consent holder shall submit the report referred to in this condition to the WRC within six weeks of the monitoring referred to in condition 20(c)(iv) being taken.

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All excavations / quarrying or other earth disturbance within the Camelot Cave System CCBZ or BVRZ shall not re-commence until the measures recommended by the independent suitably qualified and/or experienced expert(s) are in place / are being implemented.

25) Where a report produced in accordance with condition 24(d) recommends the adoption of additional measures to address an unacceptable adverse effect, the WRC shall certify that the additional measures will, in their opinion, ensure that any adverse effect(s) will be acceptable. If the WRC is unable to certify the additional measures, the process set out in conditions 24(c) and 24(d) shall be followed.

Certification

26) Where any condition of this resource consent requires the consent holder to submit a draft management plan or other document to the WRC for 'certification' the process set out in clauses 25 (a) to (e) shall be followed by the consent holder:
   a) The consent holder shall supply the draft management plan or other document to the WRC, and the WRC will assess the documentation submitted to ensure that it achieves the requirements of the relevant condition(s) of consent (for management plans, this will include if the plan meets the purpose(s) and content requirements set out in the condition(s) of this resource consent);
   b) Should the management plan(s) or other document(s) supplied in accordance with clause (a) of this condition, in the opinion of the WRC, achieve the requirements of the relevant condition(s), the WRC will issue written confirmation (which shall constitute '**the certificate**') to the consent holder that the requirements of the relevant condition(s) have been satisfied;
   c) If the WRC is not satisfied that the management plan(s) or other document(s) supplied in accordance with clause (a) achieve the requirements of the relevant condition(s), the WRC shall advise the consent holder (in writing) of the changes, including additional information or measures, it considers necessary to meet the requirements of the relevant condition(s) and ask that the management plan(s) or document(s) be modified so as to address the concerns, and then be resubmitted;
   d) This process shall be repeated until the WRC is able to certify that the requirements of the applicable condition(s) have been satisfied; and

27) The consent holder shall exercise this resource consent in accordance with:
   a) The conditions of resource consent; and
   b) A certified version of all management plans and other documents required by the conditions of this resource consent.

Independent Suitably Qualified Experienced Person / Expert

28) For the purposes of this resource consent, the phrase 'Independent Suitably Qualified and/or Experienced Expert' means a person or persons:
   a) That is not an employee of the consent holder;
   b) Who has a recognised qualification(s) relevant to the topic being assessed; and/or
   c) Who has relevant experience in the topic being assessed.

Site Representative

29) The consent holder shall appoint a representative to be the principal contact person with respect to all to matters relating to the exercise of this resource consent. The consent holder shall inform the WRC of the representative's name and how they can be contacted not less than two months prior to this resource consent being exercised. Should that person(s) change during the term of this resource consent, the consent holder shall, within five working days of any

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change occurring, inform the WRC and shall also give written notice to the WRC of the new representative's name and how they can be contacted.

Site Meeting

30) The consent holder shall, not later than two calendar months prior to earthworks commencing in accordance with this resource consent, arrange and conduct a Site meeting to discuss the full suite of the applicable resource consent conditions and content of the management plan(s) which have been developed and supplied to the WRC in accordance with condition 26 of this resource consent. The consent holder shall invite, with a minimum of 10 working days' notice, the WRC, the Site Representative nominated in accordance with condition 29 of this resource consent, at least one representative of each of the contractors that will assist the consent holder in giving effect to this resource consent, and representatives of Oparure Marae and Te Nehenehenui (hereafter referred to as '**TNN**').

SW Pit & Haul Road Site Management Plan

31) The consent holder shall, not later than two months prior to the exercise of this resource consent, submit a SW Pit & Haul Road Site Management Plan ('**the P&HMP**') to the WRC for certification that the P&HMP meets the objectives in condition 32 and addresses the matters set out in condition 33.

32) The objective for the P&HMP shall be to avoid, remedy, manage or offset the identified environmental effects of the Project.

33) The P&HMP shall include but not be limited to the following subparts, all of which shall be undertaken to achieve the objective set out in condition 25:
    a) An outline of the new pit and haul road operation and processes;
    b) An Ecological Betterment Plan ('**EcoBP**') (which shall include but not be limited to a Pest Management Plan ('**PMP**'), a Bat Management Plan ('**BaMP**'), a Bird Management Plan ('**BiMP**'), a Lizard Management Plan ('**LMP**') and a Karst and Riparian Management Plan ('**KRMP**')) and shall accord with the requirements of conditions 35 and 36;
    c) An Air Quality Management Plan ('**AQMP**') in accordance with conditions 36;
    d) An Erosion and Sediment Control Plan ('**ESCP**') in accordance with condition 9;
    e) A Spill Response Plan ('**SRP**') in accordance with condition 3;
    f) A Topsoil Management Plan ('**ToMP**') in accordance with condition 43;
    g) Detailed descriptions of all of the contingency and control measures that are not set out within the EcoBP, AQMP, ESCP, ToMP or SRP and that are to be employed by the consent holder to avoid the generation of adverse effects in the first instance, and the remediation and mitigation measures that are to be employed to minimise any adverse effects where avoidance is not practicable and/or is not required by these conditions of consent; and
    h) The reporting that is to be undertaken by the consent holder. This shall include the detail of what is to be reported when for each year for the term of the resource consent.

34) The consent holder shall provide a draft copy of the P&HMP to TNN and Oparure Marae no later than two (2) months prior to submitting the P&HMP to the WRC for certification. All comments received from the Oparure Marae and TNN, together with the consent holder's responses to the same, shall be provided to the WRC at the same time that the P&HMP is submitted to Chief Executive Officer of the WRC (or delegate) for certification.

35) The consent holder shall review and update the P&HMP (including all of its sub-plans) at least once every five years. A review of the Pit Rehabilitation Plan ('**PRP**') and an Ecological Betterment Plan (or '**EcoBP**') shall also be undertaken not later than six months after any

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decision to permanently cease quarrying at the Site. Any updates to the P&HMP (or any or all of its sub-plans and, in the event that quarrying is to permanently cease, the PRP and EcoBP) shall be provided to the WRC for certification that the revisions accord with conditions 53 and 54.

36) The consent holder shall also immediately review the ESC Stage Plan, and if determined necessary, the ESCP if either its monitoring or monitoring conducted by the WRC shows that the consent holder's discharges are not achieving water quality set out in condition 26 of this resource consent.

37) Any revisions to the P&HMP (or any or all of its sub-plans) required as a consequence of a review undertaken in accordance with condition 31 shall be provided to the WRC for certification that the revisions accord with condition 53.

38) The consent holder shall ensure that an electronic copy of the most up to date version of the certified P&HMP (including all of its sub-plans) is kept on-site at all times.

Ecological Betterment Plan

39) The consent holder shall prepare an EcoBP as part of the P&HMP. The objective of the EcoBP is to set out the measures and the actions that the consent holder shall undertake to achieve a net ecological gain from the implementation of the betterment measures. This shall include setting out the measures that the consent holder shall implement to:
   a) Compensate for the loss of indigenous terrestrial, karst and any impacts on aquatic (freshwater) habitat as a consequence of the Project and provide betterment in accordance with the Vision and Strategy for the Waikato River; and
   b) Reduce the net contribution that the Project makes to the contaminant (sediment and nutrient) load that is discharged to the downstream surface and groundwater resources; and
   c) Advance measures and initiatives to address the actual and potential cultural effects of the Project.

40) The EcoBP shall include, but not be limited to, the following:
   a) The methods to be implemented to reduce the sediment load entering the Camelot Stream Catchment. The methods, the timeframe for their implementation, the programmes of monitoring to confirm their effectiveness, and the nature and frequency of the reporting to the WRC shall be set out in a KRMP, which is to form an appendix to the EcoBP; and
   b) A plan which shows the eco-sourced native planting that is to be undertaken and maintained by the consent holder in the improved sediment control within steep pastoral land within the Mangawhitikau Stream catchment and riparian margins around Gate (Pōtea) Spring. The planting, its stages, the proposed planting schedules and the on-going maintenance requirements are to be set out in a KRMP which is to form an appendix to the EcoBP.

Betterment Initiatives

41) The consent holder shall ensure that the following betterment initiatives are identified and implemented no later than three (3) years after the commencement of this resource consent. The EcoBP shall set out how each of the following betterment initiatives are implemented:
   a) Not less than 21 cave entrances shall be protected from stock and enhanced by planting and pest control. The cave entrances that are protected and enhanced shall be identified by an independent suitably qualified and/or experienced expert and the cumulative floor

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area of the cave shall sum to not less that 224 square metres in area. All of the cave entrances that are protected and enhanced by the consent holder shall be within 10 kilometres from the cadastral boundaries of the Site;

b) Not less than 6.7 hectares of planting between and around SNAs;

c) Improved sediment control within pastoral land on not less than 9.4 ha within the Mangawhitikau Stream catchment to reduce sediment loads entering downgradient waterways;

d) Not less than 14.4 hectares of significant forest fencing and pest control within and around the existing Significant Natural Area vegetated areas;

e) Not less than 11.8 hectares of riparian planting or enhancement of existing native vegetation (using appropriate, locally sourced, indigenous/native plant species) shall be undertaken in the catchment of the Camelot Cave Stream. The areas of riparian planting shall be identified by an independent suitably qualified and experienced expert. The 11.8 hectares of riparian planting shall be in addition to the habitat that is to be protected and enhanced in accordance with the other clauses of this condition;

f) Restore and maintain not less than 314 m2 of vegetation restoration at Potea Spring;

The cave entrance enhancement and lizard release habitat required by this condition shall be established, and associated plant and animal pest control shall be operating, prior to the first clearance of any karst feature or indigenous lizard habitat authorised by this consent.

41A) The consent holder shall implement the Ecological Betterment Plan required under Conditions 39 of this consent, including the following certified sub-plans:

a. the Karst and Riparian Management Plan;

b. the Bat Management Plan;

c. the Bird Management Plan;

d. the Lizard Management Plan; and

e. the Plant and Animal Pest Management Plan.

41B) Prior to certification of the Ecological Betterment Plan and its sub-plans, the WDC and WRC shall obtain a review of the relevant plan by an independent suitably qualified and experienced ecologist. The independent review shall assess whether the plan adequately gives effect to the ecological requirements of these conditions and shall inform the Councils' certification decision. The reasonable costs of the independent ecological review shall be met by the consent holder.

Pest / Weed Control

42) The consent holder shall ensure that all machinery used in the exercising of this resource consent is cleaned prior to being transported to the Site for use at the quarry to ensure that all seed and/or plant matter has been removed and documented in accordance with the "*National Pest Control Agencies A series, best practice (Code A16) guidelines*", available to download from http://www.npca.org.nz/index.html.

Topsoil Management Plan

43) The consent holder shall engage an independent suitably qualified and/or experienced expert to prepare a Topsoil Management Plan (or '**ToMP**'). The purpose of the ToMP is to guide all

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topsoil reclamation activities undertaken on the Site such that the soil stockpiled as part of the Project retains its soil nutrient level and/or is suitable for the proposed progressive rehabilitation activities.

44) The ToMP shall include, but shall not be limited to the following:
   a) The approach that the consent holder shall adopt for the reclamation of both the topsoil and subsoil layers on the site;
   b) The measures that the consent holder shall take in relation to the immediate placement of reclaimed topsoil;
   c) How the consent holder is to stockpile all topsoil on the site;
   d) The minimum nutrient levels that are to be retained for the topsoil stockpiled on the Site and the proposed sampling and testing procedures; and
   e) Where applicable, the soil amendments that the consent holder is to apply for nutrient deficient topsoil.

45) The consent holder shall keep a record of the quantity of topsoil that is stockpiled on site, and make this available to the to the Chief Executive Officer of the WRC (or delegate) within five working days of receiving a request to do so from the WRC.

Tangata Whenua Monitoring & Accidental Discovery Protocol

46) The consent holder shall appoint a representative nominated by the Oparure Marae and TNN to monitor any earthworks undertaken by the consent holder in accordance with this resource consent that are associated with the development of the SW Pit or the establishment of the Haul Road that will disturb any areas of the ground that has yet to be disturbed on the site. Monitoring shall occur while the topsoil layers of all previously undisturbed ground are removed. No monitoring of the disturbance of subsurface substrates (including the quarrying of the limestone in the pit) is required to satisfy this consent condition.

47) In the event of any archaeological site, taonga (Maori artefacts) or koiwi being uncovered during the exercise of this resource consent, the accidental discovery protocols under Kō Tā Mahere Taiao will be followed. All activities / works within a 20-metre diameter of the discovery shall cease and a representative of Oparure Marae and TNN, the WRC, Heritage New Zealand and the Ministry of Culture and Heritage shall be notified. The notification, which shall be in writing, must occur within 48 hours of a discovery.

48) The consent holder shall consult with the Oparure Marae and TNN and Heritage New Zealand over a discovery that falls within the ambit of condition 47, and shall not recommence any activities / works within 20 metres of the discovery until any relevant approvals (including any authorisations from Heritage New Zealand to damage, destroy or modify such sites) have been obtained. If no further approvals are required, all activities / works may recommence within a 20 metre diameter of the discovery with the written approval of the Chief Executive Officer of the WRC (or delegate). Such written approvals shall only be given after the Council has considered:
   a) Tāngata Whenua interests and values;
   b) Any protocols agreed by Tāngata Whenua and the consent holder and if those protocols have been followed;
   c) The consent holder's interests;
   d) Any Heritage New Zealand authorisations; and
   e) Any archaeological or scientific evidence that relates to the discovery, particularly any recommendations that have been made in relation to the discovery and its treatment.

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Annual Hui

49) The consent holder shall invite, with a minimum for 20 working days' notice, the Oparure Marae and TNN to attend a hui, on an annual basis. The purpose of the hui shall be to provide a forum for discussion of:

a) The results of all monitoring undertaken in accordance with the conditions of this resource consent (which includes monitoring that is undertaken in accordance with the management plans (including the Cultural Monitoring Plan – if one is produced) that are to be produced, certified, maintained and reviewed in accordance with this resource consent);

b) The details of all complaints that have been received that are related to the proposed haul road and the SW pit, and the results of all investigations into them and any changes that have been made to the activities / works authorised by this resource consent as a consequence;

c) Any instances where the accidental discovery protocol set out in the conditions of this resource consent is implemented / followed. This shall include setting out what was discovered and the process followed as a consequence of the discovery;

d) The ecological betterment activities and works that have been completed by the consent holder in the period since the preceding hui, and the betterment activities and works that are planned for the calendar year that will follow the hui;

e) The areas that have been quarried in the SW pit, the areas where overburden has been removed, the areas that have been restored / rehabilitated, and the works that are planned for the calendar year that will follow the hui; and

f) Any other matter the consent holder considers could be relevant by the Oparure Marae and TNN to the exercise of this resource consent. This may include the pit closure and rehabilitation measures.

Complaints

50) The consent holder shall maintain a 'Complaints Register' for the activities that are conducted in accordance with this resource consent. The Complaints Register shall specify:

a) The date and time of the complaint;

b) The name and contact details of the complainant (if they are provided to the consent holder);

c) A description of the complaint, including the nature of the complaint, the duration of the event giving rise to the complaint, and the location from which the complaint arose (if available);

d) The cause or likely cause of the event and any factors that influenced its severity;

e) The nature and timing of any measures implemented by the consent holder to avoid, remedy or mitigate any adverse effects;

f) The steps to be taken in future to prevent recurrence of similar events; and

g) Any feedback provided to the complainant.

51) The consent holder shall provide a copy of the complete complaints register to the Chief Executive Officer of the WRC (or delegate) within five working days of receiving a request to do so from the WRC.

Annual Report

52) The consent holder shall, in addition to any reporting required by the other conditions of this resource consent (including the management plans that are prepared in accordance with the conditions of this resource consent) provide the WRC with a report by 31st of March in each year that this resource consent is in effect. As a minimum this report shall include the following:

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a) Any water quality analysis and reports that are prepared in accordance with the conditions of this resource consent;
b) All daily rainfall records;
c) Recommendations pertaining to alterations to monitoring required by resource consent conditions; and,
d) Any other issues considered relevant and important by the consent holder.

Pit Closure

53) The consent holder shall, prior to the commencement of the quarry expansion activities authorised by this resource consent, prepare a Pit Rehabilitation Plan (or '**PRP**') and submit it to the WRC for their certification that it achieves the objective stated in this condition and the matters set out in condition 53. The PRP shall ensure that the long-term physical, chemical and biological/ecological stability of the Site is achieved at closure. The specific closure objectives shall include, but are not limited to:
   a) Returning the land to a form and appearance that is in keeping with the Site's surroundings and the proposed measures set out in the report prepared for Graymont (NZ) Limited by Enspire, entitled *Oparure Quarry South-Western Pit – Substantive application under the Fast-Track Approvals Act 2024''* and dated the xxx of June 2026 and any subsequent amendments and further information ('the application documentation'); and
   b) Provide for an environmentally sustainable use of the rehabilitated land.

54) The PRP shall include the following information:
   a) A description of the current state of the site;
   b) A description of the intended (final) land use and the closure operations and ;
   c) A breakdown of the rehabilitation activities on a year by year basis;
   d) A description of the proposed final state of the site and details on how the site will be considered to be in a stable, self-sustaining, and rehabilitated state;
   e) Designs and plans showing the final landform and drainage pathways;
   f) The methods to that are to be implemented to protect the Site's hydrology (surface and sub –surface) and water quality during the site rehabilitation activities;
   g) The methods to stabilise the quarry pit slopes and engineered landforms;
   h) The requirements for the uplift and removal of any buildings, utilities and infrastructure, not required for the future land use;
   i) The specific environmental rehabilitation activities (that is, planting and revegetation) that are to be undertaken consistent with the EcoBP (Ecological Betterment Plan) required by condition 38;
   j) A cost estimate for closure and rehabilitation operations;
   k) Post closure monitoring and maintenance requirements and the measures that the consent holder shall take should the monitoring show that the site (or part thereof) is not in a stable, self-sustaining, and rehabilitated state; and
   l) A requirement for the consent holder to provide (if applicable) as built plans of all structures associated with rehabilitation for the site.

55) A final draft of the PRP shall be submitted to the Oparure Marae and TNN for its review and comment prior to the plan being submitted to the Waikato Regional Council for certification. The consent holder shall review all comments provided by the Oparure Marae and TNN when it completes the PRP (which shall occur prior to the consent holder submitting the PRP for certification). A copy of the comments from the Oparure Marae and TNN, and a separate document that records the consent holders responses to each

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comment and highlights the changes made to the PRP as a consequence of the Oparure Marae and TNN's comments shall be attached to the PRP as an appendix.

56) The PRP shall be reviewed by the consent holder every three years. The process set out in conditions 58 to 69 shall be followed should the three (3) yearly reviews identify any changes that need to be made to the PRP.

57) The consent holder shall implement the PRP once it is certified by the Chief Executive Officer of the WRC (or delegate). For the avoidance of doubt, the consent holder shall only implement a modification to the PRP where it has been certified by of the WRC.

Bond

58) The consent holder shall, prior to the commencement of quarry activities authorised by this resource consent, provide and maintain, or shall have a third party provide and maintain, a bond or if agreed in writing with the WRC an alternative equivalent form of guarantee that provides the same level of assurance as a bond and meets the purpose of conditions 58 through to 69. Agreement of an alternative equivalent guarantee is at the discretion of the WRC, should agreement not be reached a bond shall be established within the timeframe specified above. The bond or guarantee shall be in favour of the WRC to:

a. Secure compliance with all the conditions of this consent and to enable any adverse effects on the environment resulting from the consent holder's activities and not authorised by a resource consent to be avoided, remedied or mitigated;
b. Secure the completion of rehabilitation and closure in accordance with the certified PRP;
c. Ensure the performance of any monitoring obligations of the Consent Holder; and
d. Enable the WRC to undertake monitoring and management of the site until completion of closure of the site.

59) The rehabilitation bond or guarantee must be in a form approved by the WRC and must, subject to these conditions, be on the terms and conditions agreed with the WRC.

60) The rehabilitation bond or guarantee must provide that the consent holder remains liable under the Resource Management Act 1991 for any breach of the conditions of consent which occurs prior to the completion of closure.

61) Unless the rehabilitation bond is a cash bond, the performance of all the conditions of the bond must be guaranteed by a guarantor acceptable to the WRC. The guarantor must bind itself to pay for the carrying out and completion of the PRP in the event of any default of the consent holder.

62) The amount of the rehabilitation bond or guarantee must be fixed initially prior to the commencement of quarry expansion activities authorised by this resource consent, and every three (3) years thereafter following the submission of the PRP. The WRC shall take into account any calculations and other matters submitted in the PRP, or otherwise, by the consent holder which are relevant to the determination of the bond amount. The amount of the rehabilitation bond shall be advised in writing to the consent holder at least one month after certification of the PRP.

63) The amount of the rehabilitation bond to achieve the purposes set out in condition 58 must include:

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a. The estimated costs (including any contingencies necessary) of rehabilitation and closure in accordance with the conditions of this consent, on completion of the quarrying operations proposed for the next year and described in the PRP;
b. Any further sum which the WRC consider necessary for monitoring any adverse effect on the environment that may arise from the site including monitoring anything which is done to avoid, remedy, or mitigate an adverse effect; and
c. The estimated costs of monitoring required under the PRP until this consent expires; and
d. Any further sum which the WRC considers necessary for monitoring any adverse effect on the environment that may arise from the exercise of this consent including monitoring anything which is done to avoid, remedy, or mitigate an adverse effect.

64) Should the consent holder not agree with the amount of the rehabilitation bond fixed by the WRC in accordance with Condition 63, then the matter must be referred to arbitration in accordance with the provisions of the Arbitration Act 1996. Arbitration must be commenced by written notice by the consent holder to the WRC advising that the amount of the rehabilitation bond is disputed, such notice to be given by the consent holder within two weeks of receipt of notification of the amount of the rehabilitation bond. If the parties cannot agree upon an arbitrator within a week of receiving the notice from the consent holder, then an arbitrator must be appointed by the President of the Institute of Professional Engineers of New Zealand. Such an arbitrator must give an award in writing within 30 days after his or her appointment, unless the consent holder and the WRC agree that time must be extended. The parties must bear their own costs in connection with the arbitration. In all other respects, the provisions of the Arbitration Act 1996 must apply. Pending the outcome of that arbitration and subject to Condition 58, the existing bond must continue to be in force. That sum must be adjusted in accordance with the arbitration determination.

65) If, for any reason other than default of the WRC, the decision of the arbitrator is not made available by the 30th day referred to in condition 62, then the amount of the bond must be the sum fixed by the WRC, until such time as the arbitrator does make his/her decision. At that stage the new amount must apply. The consent holder must not exercise this consent if the variation of the existing bond or new bond is not provided in accordance with conditions 58 to 64.

66) The rehabilitation bond may be varied, cancelled, or renewed at any time by agreement between the consent holder and the WRC provided that cancellation will not be agreed to unless a further or new rehabilitation bond acceptable to the WRC is available to replace immediately that which is to be cancelled (subject however to the condition below as to release of the rehabilitation bond on the completion of closure of the site to the WRC satisfaction).

67) If the amount of the bond to be provided by the WRC is greater than the sum secured by the current bond, then within one month of the consent holder being given written notice of the new amount to be secured by the bond, the consent holder and the guarantor shall execute and lodge with the WRC a variation of the existing bond or a new bond for the amount fixed on review by the WRC. The activities authorised by this resource consent shall not be undertaken if the variation of the existing bond or new bond is not provided in accordance with this condition.

68) The WRC must release the rehabilitation bond on the completion of closure of the site. "Completion of closure of the site" means when the quarrying operations and progressive rehabilitation have been demonstrated by the consent holder to have reached a stable, self-sustaining state in accordance with the approved PRP. This includes, but is not limited to:

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a. All disturbed areas, including quarry pits, overburden disposal areas, stockpile sites and road cuttings, being rehabilitated and revegetated to a standard suitable for the final land use;
b. Any water discharging from the site, and any ground water under and around the site, being of a quality such that it will not adversely affect aquatic life, or other users of the water resource;
c. Erosion and sediment control devices being removed and the natural drainage of the site being reinstated; and
d. The removal of all buildings, plant and other quarry infrastructure from the site, unless otherwise agreed with the landowner for their ongoing use.

69) All costs relating to the rehabilitation bond shall be paid by the consent holder.

Review

70) The WRC may one year after the commencement of this resource consent, and at two yearly intervals thereafter, serve notice on the consent holder under sections 128 to 131 of the Resource Management Act 1991 of its intention to review the conditions of this resource consent. The review shall be for one or more of the following purposes:
a) To review the effectiveness of the conditions of this resource consent in avoiding or mitigating any adverse effects on the environment from the exercise of this resource consent and if necessary, to avoid, remedy or mitigate such effects by way of further or amended conditions; and/or
b) If necessary and appropriate, to require the holder of this resource consent to adopt the best practicable option to remove, or reduce, adverse effects on the environment resulting from the discharges to air and surface water that are authorised by this resource consent; and/or
c) To review the adequacy of and the necessity for monitoring (including, but not limited to, environmental monitoring and biosecurity monitoring) undertaken by the consent holder.

71) The Chief Executive Officer of the WRC (or delegate) may, within 12 months of a regional plan review or plan change becoming operative, serve notice on the consent holder under section 128(1)(b) and (bb) of the RMA of its intention to review the conditions of this resource consent for the purpose of ensuring that the consent is consistent with the provisions of operative plan or plan change.

Administration

72) The consent holder shall pay the WRC any administrative charge fixed in accordance with section 36 of the RMA, or any charge prescribed in accordance with regulation made under section 360 of the RMA.

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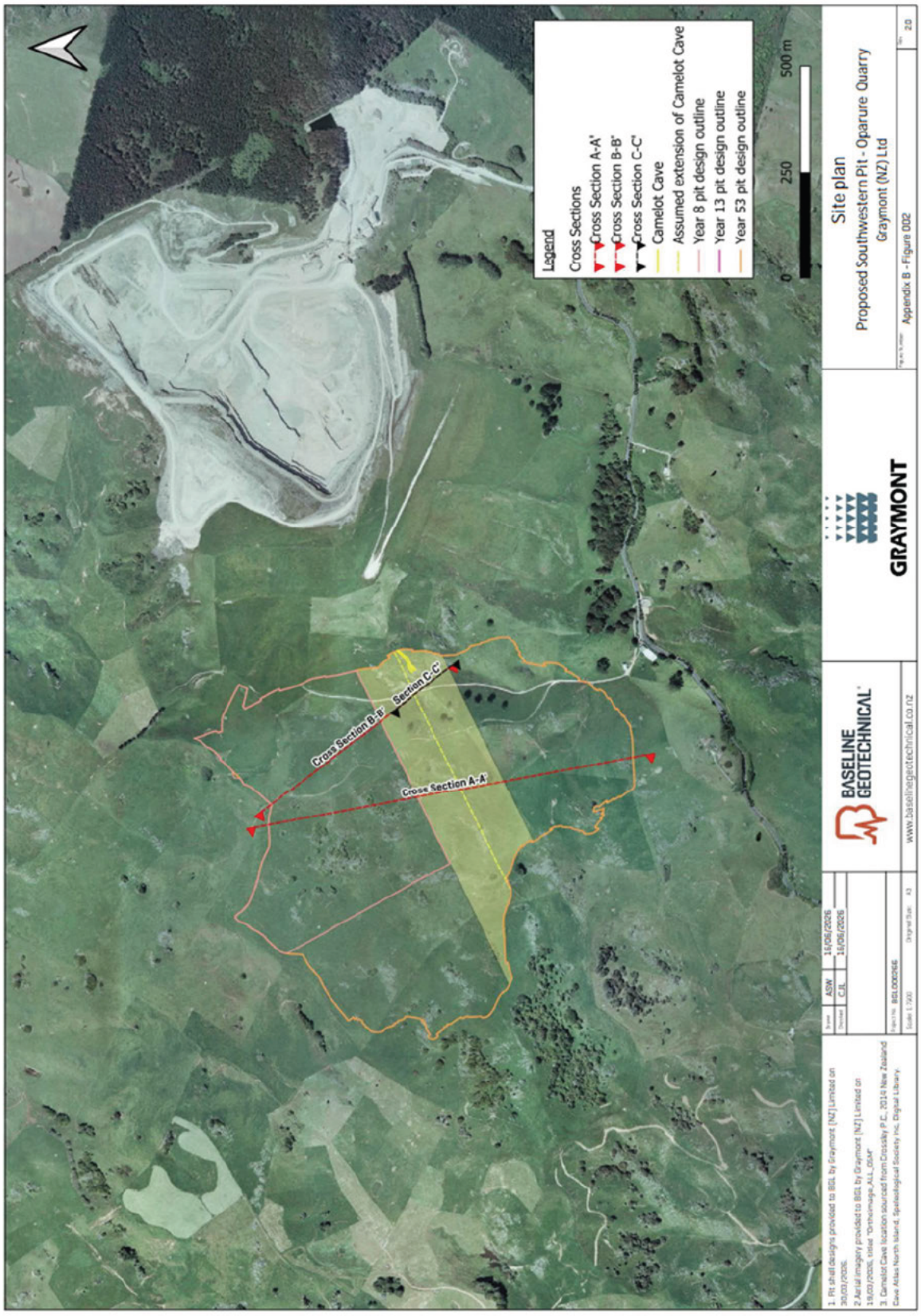
Appendix A


Legend
Cross Sections
Cross Section A-A'
Cross Section B-B'
Cross Section C-C'
Camelot Cave
Assumed extension of Camelot Cave
Year 8 pit design outline
Year 13 pit design outline
Year 53 pit design outline
0
250
500 m
Cross Section B-B'
Section C-C'
Cross Section A-A'
Site plan
Proposed Southwestern Pit - Oparure Quarry
Graymont (NZ) Ltd
Appendix B - Figure 002
BASELINE GEOTECHNICAL
www.baselinegeotechnical.co.nz
GRAYMONT