1. Application Summary

Project Name	Kings Quarry – Stage 2
Applicant	Kings Quarry Limited
Site Address	162 Pebble Brook Road, Wainui, Auckland
Fast-track Reference Number	FTAA-2502-1018
Council reference numbers	BUN60450001 LUC60450002
Description of Proposal - (Earthworks)	Approximately 33.7ha of earthworks associated with quarrying and overburden disposal over a 45-year period.

2. Specialist Response Details

Author: Matthew Byrne

Specialist Area: Earthworks & Erosion and Sediment Control – Consultant to Earth, Streams & Trees Team, Specialist Unit, Resource Consents

Date: 2 July 2025

3. Executive Summary

This document outlines the application and specialist assessment for Stage 2 of the Kings Quarry project, located at 162 Pebble Brook Road, Wainui, Auckland. The proposal involves approximately 33.7 hectares of earthworks for quarrying and overburden disposal over a 45-year period. The assessment focuses on the project's proposed earthworks erosion and sediment control (ESC) measures, their potential effects, and compliance with Auckland Council guidelines.

Potential effects of the proposal include erosion of exposed surfaces and sedimentation of the Waitoki Stream, which could degrade water quality and aquatic habitats. The application proposes ESC measures, including chemically treated sediment retention ponds (SRPs), diversion bunds, silt fences, and implementation of an adaptive management plan (AMP) to help mitigate these effects.

Overall, I support the proposal subject to minor amendments to standard earthworks related conditions, and the acceptance of an additional condition which restricts non-rock extraction earthworks during the winter period. My support is also subject to a more significant amendment to the applicant's proposed Adaptive Management Plan condition.

4. Specialist Assessment

4.1 Reasons for Consent

- Regional land use consent for a controlled activity under rules H28.4.2 (A17) and (A18) of the AUP:OP is required as the earthworks proposed are greater than 2,500m^2 on land with a slope greater than 10 degrees (A17), located within the sediment control protection area (A18).

- Regional land use consent for a restricted discretionary activity is required under rules E11.4.3 (A28) and (A30) of the AUP:OP as the application proposes greater than $5m^2$ of earthworks (A28) and $5m^3$ of earthworks (A30) within a significant ecological area (SEA_T_6454).

4.3 Assessment of Effects

The potential environmental effects of the proposed earthworks are those primarily associated with erosion of exposed surfaces at the site and the subsequent sedimentation of the receiving environment, being the Waitoki Stream which flows from northeast to southwest along the site's southern boundary.

Sediment can degrade aquatic values such as water quality, smother habitat for aquatic fauna within these receiving environments, and directly impact aquatic fauna by blocking their breathing apparatus. The applicant has stated that the project will utilise erosion and sediment control (ESC) measures, designed in accordance with Auckland Council guideline document number 5, "Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, June 2016 (GD05), to help ensure the proposal does not result in any adverse sediment related effects on the receiving environment. This is summarised below.

4.3.1 Summary of proposed Earthworks and Erosion and Sediment Control

Earthworks at the site are proposed over two main areas, identified by the applicant as Pit-A and Pit-B. Both quarrying (cut) and overburden disposal (fill) activities are proposed at each of the two Pits. Earthworks consisting of approximately $654,000m^3$ of cut and $306,000m^3$ of fill over 6.11ha, are proposed at Pit-A, followed by approximately $8,000,000m^3$ of cut and $1,200,000m^3$ of fill over 26.46ha at Pit-B. An additional 1.10ha of earthworks are proposed for construction of access tracks from the existing Stage 1 area to the Stage 2 areas.

The quarry activities will be undertaken in a staged manner over a period of 45-years. Earthworks to quarry and then overburden fill the Pit-A area will be completed during the first 5-years of the project, whilst quarrying and overburden filling of Pit-B will commence from year 6.

The applicant has proposed ESC measures throughout the earthworks operation which are described in detail in an Erosion and Sediment Control Report, included with the application documents.

ESC measures for the initial 6-years of the project within Pit-A include:

- The construction of two chemically treated sediment retention ponds (SRPs) as the main method of sediment control for the pit area itself.
- The construction of a third SRP to manage runoff from a stabilised haul road from the current Stage 1 area to the Pit-A area.
- The construction of dirty water diversion bunds to direct sediment laden water to a respective SRP, and the establishment of a sump in the pit's low point from which dirty

runoff will be pumped to an SRP as required due to insufficient gradients to allow for gravity-fed diversion channels.

- The construction of clean water diversions above areas subject to earthworks, to direct clean water around exposed areas. These diversions will be relocated up-gradient of earthworks areas as the quarrying of Pit-A extends towards its upslope boundaries.
- The construction of silt fences in areas where runoff cannot be directed to an SRP, and,
- Monitoring and maintenance of all ESC measures throughout the earthworks operations at the Pit-A area.

The ESC proposal for years 6-11 within Pit-B includes:

- The construction of two chemically treated SRPs to manage earthworks associated with overburden stripping ahead of quarrying within the Pit-B area. Each SRP will manage a catchment of approximately 5ha.
- The construction of dirty water diversion bunds to direct sediment laden water to an SRP, and the establishment of a sump in the pit's low point from which dirty runoff will be pumped to an SRP as required due to insufficient gradients to allow for gravity-fed diversion channels.

The ESC proposal for years 11-20 within Pit-B includes:

- The construction of a third chemically treated SRP to manage an expanding Pit-B area. The applicant's ESCPs indicate that the three SRPs will be relocated towards the south (down gradient) to allow for ongoing quarry expansion.
- The construction and reconstruction of dirty water diversion bunds to direct sediment land runoff to a respective SRP, and the establishment of at least two sumps in the Pit-B areas' low points to pump sediment laden runoff to a respective SRP.

The ESC proposal for years 21-30 within the Pit-B area includes:

- The construction of a fourth chemically treated SRP to manage continued expansion of the Pit-B area. SRPs will be decommissioned and reconstructed along the downgradient boundaries of the expanding Pit-B area as required.
- The construction and reconstruction of dirty water diversion bunds to direct sediment land runoff to a respective SRP as required.

The ESC proposal for years 31-40 in the Pit-A and Pit-B areas:

- The decommissioning of the two SRPs and associated ESC measures within the Pit-A area, followed by final stabilisation and closure of the area.
- The construction and reconstruction of all four SRPs in the Pit-B area and the construction and reconstruction of associated dirty water diversion bunds to manage sediment laden runoff, including the establishment of sumps in the pit's low points from which water will be pumped to an SRP.

The ESC proposal for years 40-45 in the Pit-B area includes:

- The construction of a fifth SRP in the Pit-B area to manage the fully expanded quarry, including the construction and reconstruction of associated dirty water diversion bunds to manage sediment laden runoff as necessary, and the establishment of a final sump from which water will be pumped to an SRP.

A set of erosion and sediment control plans (ESCPs) showing the proposed locations of the controls noted above, has been included in the application documents.

The diversion of clean water around exposed areas of earthworks in the Pit-B area has not been proposed as the northern, eastern and western boundaries of the Pit-B area form a ridge line, down from which, all Pit-B quarrying activity will eventually occur, therefore, the diversion of clean water will be unnecessary.

The applicant proposed monitoring and maintenance of all ESC measures throughout the earthworks operation, however, they have not proposed progressive stabilisation of exposed surfaces throughout the earthworks. They have stated that progressive stabilisation is impractical due to large catchments and multiple areas being quarried at the same time. To address stabilisation, the applicant has stated that remediation and revegetation of the quarries' slopes "will follow when appropriate".

The applicant has proposed that the earthworks be staged and have provided high level staging plans in the application documents. The applicant has also proposed that these staging plans be finalised ahead of earthworks commencing. This proposed requirement has been included in the conditions requiring provision of a finalised ESCP ahead of earthworks commencing.

The application has also proposed development and implementation of an adaptive management plan (AMP) throughout the earthworks operation. Provision and implementation of the AMP has been proposed as a condition of consent.

As noted above, chemical treatment of all eight (8) SRPs proposed for sediment control during Stage 2 quarrying and earthworks has been proposed, and a chemical treatment management plan (ChTMP) has been provided in the application documents.

4.3.2 Chemical Treatment

I support the applicant's proposal to utilise chemically treated SRPs as the main method of sediment control as this is considered industry best practice for an earthworks operation of this size and will help ensure that sediment removal efficiencies are maximised within each respective device. The applicant has provided an SRP summary table, however, the calculations provided are incorrect and do not reflect the requirements of GD05. Regardless, as the applicant has proposed that the ponds be constructed in accordance with GD05, it is expected that the correct volume for each SRP will need to be confirmed and the ponds constructed accordingly, ahead of earthworks commencing in their respective catchments. For the avoidance of doubt, GD05 recommends that each SRP for this project will be required to maintain a design volume

equal to 3% of its contributing catchment, being 300m^3 for every hectare of contributing catchment. This volume combined with chemical treatment will help ensure a high degree of sediment removal efficiency is achieved.

As noted above, a ChTMP has been included with the application documents, however, this plan is associated with earlier stages of quarrying at the site and is applicable to four (4) decanting earth bunds (DEBs) and not to any of the proposed SRPs. Further, during a site visit, no DEBs were observed and therefore no indication of the existing ChTMP's effectiveness was able to be ascertained. Regardless, the applicant has proposed conditions of consent that require provision of a ChTMP ahead of Stage 2 earthworks commencing, and implementation of that plan throughout the quarrying and earthworks. I have reviewed these conditions, identified as proposed conditions 11 and 12, and consider that minor amendments are required to help ensure all sediment control devices utilised throughout the Stage 2 earthworks and quarrying operation, are incorporated into the ChTMP. These amendments are detailed below in Table 1.

4.3.3 Staging

The applicant's ESCPs and Staging plans have been proposed as draft plans, and the application documents indicate that detailed design plans for construction of the ESC devices themselves, and which indicate the various stages of quarrying and overburden filling, are to be submitted ahead of the commencement of physical works on site. This is considered appropriate as the draft plans included with the application are very high level and lack the detail necessary to ensure appropriate management of exposed areas and of clean and dirty water. I have reviewed the applicant's proposed conditions requiring provision of a final ESCPs and Staging plans ahead of earthworks commencing (proposed conditions 7 and 8) and consider that they are appropriate given the nature and type of earthworks proposed.

4.3.4 Progressive Stabilisation

Regarding progressive stabilisation, the applicant, as noted above, has not proposed this and has instead stated that that remediation and revegetation of the quarries' slopes "will follow when appropriate". For a typical earthworks operation, progressive stabilisation is employed by covering an exposed surface with hay or straw mulch to protect it from raindrop impact erosion, and whilst I would not typically support an earthworks operation that does not include progressive stabilisation of surfaces as they reach the desired gradients, in this case, progressive stabilisation, at least in the "traditional" sense, is unnecessary. The desired surfaces of the quarry will be rock faces and rock benches which are resistant to the type of erosion that contributes to sedimentation of the receiving environment. Further, whilst traditional stabilisation using hay or straw has not been proposed, replanting and rehabilitation of all quarry surfaces, including overburden disposal areas, has been proposed. The applicant has provided details of their proposed replanting program and although an assessment of this program has been undertaken by others under separate cover, provided the exposed surfaces at the site are covered by some form of permanent vegetation, it will help reduce the potential for erosion and any subsequent sedimentation of the freshwater receiving environment.

4.3.5 Adaptive Management

The applicant has proposed the provision and implementation of an AMP throughout the earthworks phases of the project and I consider this to be appropriate. Auckland Council's AMP Guidance Document suggests that adaptive management should be applied to the most significant and/or long-term earthworks activities, and as this proposal is for 33.7ha of earthworks over a period of up to 45-years, I consider that the proposal is indeed significant and should therefore be subject to adaptive management practices.

Proposed condition 57 requires provision of an AMP for written certification by the Council ahead of earthworks commencing, and proposed condition 58 sets out the minimum information requirements that the AMP must contain. Based on my experience of both assessing and monitoring of AMPs, I consider that proposed condition 58 requires significant amendments to help ensure it is fit for purpose as it is not prescriptive enough in my opinion. For example, the condition as proposed does not include a requirement for a freshwater baseline report ahead of earthworks commencing, nor does it include a requirement for automated weather forecasting throughout the life of the consent. A freshwater baseline report allows for "real time" responses to adverse changes in the receiving environment as a result of sediment discharge from earthworks, and whilst the conditions include a requirement for a Water Quality Monitoring Plan (proposed condition 4), this condition does not specifically relate to baseline water quality from a sediment discharge point of view. Determining the state of the Waitoki Stream along the site's southern boundary, including the state of its banks, its bed, presence of sensitive habitat or aquatic fauna, and any pre-works sediment levels, is important for determining the potential sediment related effects of the Stage 2 earthworks. As such, I have included my recommended amendments to proposed condition 58, in Table 1 below.

Regarding weather forecasting, automated forecasting allows for better preventative ESC maintenance by quarry staff, and more accurate monitoring by Council staff. It also provides both quarry staff and Council staff, a definitive "level" for when AMP sampling, investigations, or remedial actions are required. Based on this, I have detailed my recommended amendments to condition 58, in Table 1, below.

4.3.6 Remaining ESC Measures

The remaining ESC measures proposed throughout the quarrying and overburden filling operation include; the establishment of stabilised haul roads and accessways to the necessary areas of the site where construction vehicle access will be required, the installation of silt fencing at areas of the site where runoff cannot be directed to an SRP or other impoundment device, and the monitoring and maintenance of all ESC measures in accordance with GD05.

Additional measures not shown on any of the draft ESCPs include the installation of contour drains, check dams, pipe-drop structures, flumes, and surface roughening. These measures, including where and under what conditions their uses are applicable, are detailed in GD05. Provided they are implemented in accordance with GD05, I consider that they will be appropriate as they represent best practice.

Lastly, the applicant has proposed regular monitoring and maintenance of all controls in accordance with the guidance contained in GD05. Monitoring and maintenance of all controls throughout earthworks is considered industry best practice and is in accordance with the guidance contained in GD05. I support the applicant's proposal for monitoring and maintenance of all ESC measures in accordance with GD05.

4.3.7 Timing / Seasonal Restriction

The applicant has not stated when the earthworks associated with Stage 2 are to commence, however, they have stated that the existing rock resource within Stage 1 will be exhausted by the end of 2025, implying that earthworks for Stage 2 are imminent. Further, the applicant has proposed an expiry date of 35-years for the quarrying and earthworks permit, which, given that the staging plans propose work over a 45-year period, is considered appropriate. The applicant has also proposed a condition that allows review of the consent in order to deal with any adverse effect on the environment which may arise or potentially arise and which are appropriate to deal with at a later stage. This is typical of an earthworks operation granted consent for the maximum allowed under the RMA and is also considered appropriate in this case.

The applicant has not proposed any seasonal restriction for the permit. Seasonal restrictions are typically applied to consents and are useful for managing potential erosion and sedimentation effects during the wetter, winter months. In the case of a quarry, rock extraction activities are typically carried out all year long and due to the nature of the material being quarried, the potential for erosion and sedimentation of the receiving environment is less than that of an earthworks operation carried out over clay soils. As such, I do not consider that a seasonal restriction is required for those areas of the site where mineral extraction (quarrying) is being undertaken, however, I do consider that a seasonal restriction should apply for any areas where overburden stripping and overburden disposal are planned. Restricting earthworks in these areas will help ensure appropriate management of erodible soils during the wetter winter months. I have therefore included an additional recommended condition to this effect in Table 1 below.

4.4 Conclusion

The AEE and its accompanying ESC Report state that proposed ESC measures will ensure the proper management of any potential sediment related effects and that any resulting effects will be less than minor. An assessment of the technical aspects of the earthworks and sediment control methodology has been undertaken and provided the earthworks are completed in accordance with the application documents, all supporting information, and in accordance with any additional recommendations as noted above and included in Table 1 below, I concur with the applicant's assessment and consider that the potential effects associated with sediment discharge will be appropriately managed.

5. Comment on Proposed Conditions

Table 1 below contains the relevant conditions proposed by the applicant, alongside my recommended amendments. Table 1 also includes additional conditions as per the assessment above.

6. Review

Memo prepared by:

Matthew Byrne - Specialist Advisor – Earth, Streams & Trees Team, Specialist Unit, Resource Consents

Date: 2nd July 2025

Technical memo reviewed and approved for release by:

Fiona Harte - Team Leader, Earth, Streams and Trees Team, Specialist Unit, Resource Consents

Date: 2nd July 2025

Table 1 – Applicants Proposed Consent Conditions and Recommended Amendments and Additional Recommended Conditions

	Proposed Conditions		Proposed Amendments underlined
11	The consent holder must prepare and submit a Chemical Treatment Management Plan (ChTMP) in accordance with GD05 and the measures referred to in that plan for the sediment retention ponds and decanting earth bunds to Council at least 10 working days prior to earthworks commencing for certification. The CTMP must include as a minimum: (a) Specific design details of a chemical treatment system based on a rainfall activated dosing methodology for the site's decanting earth bunds; (b) Specific design details of a chemical treatment system based on both a rainfall activated dosing methodology and a batch dosing methodology for the site's sediment retention ponds for situations where automated, rainfall activation is not required for treatment of the quarry pit sediment retention pond; (c) Monitoring, maintenance (including post-storm) and contingency programme (including a record sheet); (d) Details of optimum dosage (including assumptions); (e) Results of an initial chemical treatment trial; (f) A spill contingency plan; and (g) Details of the person or bodies that will hold responsibility for long term operation and maintenance of the chemical treatment system and the organisational structure which will support this system.	11	The consent holder must prepare and submit a Chemical Treatment Management Plan (ChTMP) in accordance with GD05 and the measures referred to in that plan for the sediment retention ponds and decanting earth bunds to Council at least 10 working days prior to earthworks commencing for certification. The ChTMP must include as a minimum: (a) Specific design details of a chemical treatment system based on a rainfall activated dosing methodology for the site's sediment retention ponds, decanting earth bunds or any other approved impoundment systems; (b) Specific design details of a chemical treatment system based on both a rainfall activated dosing methodology and a batch dosing methodology for the site's sediment retention ponds, decanting earth bunds, or any other approved impoundment systems; ~~for situations where automated, rainfall activation is not required for treatment of the quarry pit sediment retention pond;~~ (c) Monitoring, maintenance (including post-storm) and contingency programme (including a record sheet); (d) Details of optimum dosage (including assumptions); (e) Results of an initial chemical treatment trial; (f) A spill contingency plan; and (g) Details of the person or bodies that will hold responsibility for long term operation and maintenance of the chemical treatment system and the organisational structure which will support this system.
12	All sediment retention ponds, decanting earth bunds and any other authorised impoundment devices must be chemically treated in	12	All sediment retention ponds, decanting earth bunds and any other approved impoundment devices must be chemically treated in

	accordance with the certified CTMP. All measures required by the CTMP must be put in place prior to commencement of the earthworks activity and be maintained for the duration of the earthworks activity.		accordance with the certified ChTMP. All measures required by the ChTMP must be put in place prior to commencement of the earthworks activity and be maintained for the duration of the earthworks activity.
58	The Adaptive Management Plan required by Condition 57 must include as a minimum, information on the following matters: (a) erosion and sediment control plan implementation; (b) receiving environment monitoring; (c) erosion and sediment control device monitoring; (d) data interpretation; (e) trigger thresholds; (f) management responses; (g) reporting. *Advice Note:* *Adaptive management applies in addition to, and not instead of, basic consent compliance. Council requires the development and implementation of AMPs on significant earthworks sites. Those AMPs typically require a range of monitoring based on various triggers, responses to identified effects, and reporting. The council has now sought an exemplar for AMPs included in the Erosion and Sediment Control Adaptive Management Plan Guidance Document. This document provides the discussion background to the development of the template.*	58	The Adaptive Management Plan required by Condition 57 must be prepared in general accordance with Auckland Council's guideline document "Erosion and Sediment Control Adaptive Management Plan Discussion Document", July 2020, and provided to the Council for written certification. The AMP must address monitoring requirements and changes to management procedures in response to the results of monitoring, and must include but is not limited to, the following details: (a) Preparation and provision of a Freshwater Baseline Report prepared by a suitably qualified and experienced Ecologist and/or Water Quality Scientist and provided to the Council for written certification, no less than 20 working days prior to any earthworks commencing. The purpose of the Freshwater Baseline Report is to confirm pre-construction baseline environmental conditions of the receiving environment and include pre-construction in stream monitoring results. The Freshwater Baseline Report must include as a minimum, information on the following matters: i. sediment quality such as description of sediment inputs, transport, substrate composition and embeddedness. j. water quality measurements such as total suspended solids (TSS) and turbidity. k. actual and potential inanga (Galaxias maculatus) spawning habitat. l. identify the pre-construction condition of any Erosion Prone Streams against which to measure construction effects and possible mitigation measures.

			m. The presence of any threatened aquatic species or habitat, susceptible to sediment discharge. (b) Details of weather forecasting and monitoring, including implementation of an onsite rain gauge with a telemetered system that provides text and email notifications; (d) Trigger levels for water quality and rainfall events (actual and forecasted events); (e) Details of an ongoing monitoring and sampling regime for the receiving environment, including turbidity and / or TSS monitoring downstream within the receiving environment; (f) An automated monitoring regime (inlet and outlet TSS and / or turbidity) on at least one sediment retention pond throughout the duration of earthworks at the site, and a manual sampling regime for all remaining sediment retention ponds and decanting earth bunds; (h) Management responses when a trigger level is exceeded; and (i) Reporting to Council. *Advice Note: Turbidity results can be substituted providing a correlation between TSS and turbidity has been established.* *Any proposed revisions to the AMP must be submitted to the Council for written certification prior to formalising and implementing the revised Plan.*
		58a	An appropriate efficiency of sediment retention ponds and/or decanting earth bunds should be established where efficiency measurements are only activated when inlet samples indicate high sediment loadings. i.e., the efficiency of a pond need not be scrutinised when both inlet and outlet samples show low TSS / NTU. *Advice Note: Further guidance on preparation of an Adaptive Management Plan can be found in Auckland Council guidance document - Erosion and Sediment Control Adaptive Management*

		58b	*Plan Guidance Document, Report to support preparation of Adaptive Management Plans, RC 3.2.22, July 2020.* All monitoring and management procedures as detailed within the certified Adaptive Management Plan required by condition 57, and any subsequent revisions, must be implemented on an ongoing basis throughout the duration of all earthworks activities on site. *Advice Note: The AMP is a live document, and updates are expected to address unforeseen circumstances or changes in the earthworks methodology as the site responds though its adaptive monitoring regime, to ensure sediment discharges are minimised and the potential for significant adverse effects are avoided.*
		58c	As a result of observed inefficiencies upon site inspection or identified within the site reporting, Council may request that the Adaptive Management Plan be updated to address those inefficiencies. If such a request is made by the Council, the revised plan must be submitted to the Council within 5 working days of the request. The updated AMP must not be implemented without the Council's approval.
		Additional Recommended Condition	
XX		Earthworks on site, other than rock extraction, must not be undertaken between 01 May and 30 September in any year, without the submission of a 'Request for winter works' for approval by the Council. All requests must be renewed prior to the approval expiring and works must not occur until written approval has been received from the Council. All winter works will be re-assessed monthly or as required to ensure that adverse effects are not occurring in the receiving environment and approval may be revoked by Council upon written notice to the consent holder.	