

1.0 APPLICATION DESCRIPTION

Application and property details

Fast-Track project name: Hunua Quarry Development Substantive Application

Fast-Track application number: FTAA-2603-1185

Council application numbers: BUN60464053 (LUS60464055 & LUC60464054)

2.0 Technical Specialist Memo – Earthworks & Erosion and Sediment Control

To: Emma Chandler, Consultant Planner
Warwick Pascoe – Principal Project Lead

From: **Andrew Rossaak** - Freshwater and terrestrial ecology (for Earth Streams & Trees and Ecological Advice teams)

Qualifications & Relevant Experience:

I hold the qualification(s) of: Masters of Science in Ecology and have 30 years of experience in preparing and reviewing environmental and ecological assessments. I have prepared expert evidence and technical assessments for resource consent applications, plan changes, notices of requirements, and have appeared as an expert witness before consent authorities on multiple occasions.

I confirm that I have read the Environment Court Practice Note 2023 – Code of Conduct for Expert Witnesses (Code) and have complied with it in the preparation of this memorandum. I also agree to follow the Code when participating in any subsequent processes, such as expert conferencing, directed by the Panel. I confirm that the opinions I have expressed are within my area of expertise and are my own, except where I have stated that I am relying on the work or evidence of others, which I have specified.

I attended a site visit in January 2026, although the location where the proposed ecological impacts would occur were not able to be accessed.

Preparation in Accordance with the Code of Conduct:

I confirm that I have read the Environment Court Practice Note 2023 – Code of Conduct for Expert Witnesses and have complied with it in the preparation of this memorandum. I also agree to follow the Code when participating in any subsequent processes, such as expert conferencing directed by the Panel. I confirm that the opinions I have expressed are within my area of expertise and are my own, except where I have stated that I am relying on the work or evidence of others, which I have specified.

Signature:



Andrew Rossaak

Date:

29 July 2026

3.0 Executive Summary

I consider that there are risks in achieving the required outcomes of the stream diversion. In this regard, I recommend that there is either an adaptive management mechanism in the consent conditions to increase offset should it not achieve and maintain the values (or potential) of the impact stream, or the stream offset is increased to account for this potential shortfall now.

The offered offset and compensation has demonstrated shortfalls and lacks the detail required to provide confidence in its calculated extent. For example, the offset streams for the SEV – ECR have no width indicated and no assessments, so stream offset is limited to simply riparian planting extent with little regard to the stream ecological value.

The resolution of a partial fish passage barrier as compensation for the loss of stream extent is considered an unusual approach. Removal of artificial barriers, like perched culverts, are not generally considered compensation as they should have been maintained to provide for fish passage under the Freshwater Fisheries act. The resolution of 1 barrier for the loss of 1 km of extent is not evaluated in the application (that the positive effects outweigh the adverse effects) and is considered insufficient without further evidence.

I do not accept that the offset and compensation package as presented demonstrates no net loss of freshwater values or net gain in terrestrial indigenous biodiversity.

My recommendation is that the residual effects are not adequately managed on the information before the Panel. I have recommend amendments to the conditions and these are provided separately.

4.0 Documents Reviewed

This assessment is limited to terrestrial and freshwater ecological aspects of the application. I have reviewed application documents relating to the site ecology and where I have been pointed by the applicant to relevant information such as in the groundwater assessment reports.

5.0 Additional Reasons for Consent Not included in AEE / Incorrect Reasons for Consent

The applicant has identified the reasons for consent relating to chapters E3 and E15 of the Auckland Unitary Plan (AUP), and the National Environmental Standards for Freshwater (NES-F). I concur with those reasons for consent.

6.0 Specialist Assessment

The greatest adverse effects are: The reclamation of watercourses (streams and wetlands) and the removal of native forest (scheduled as a Significant Ecological Area). Ecological effects management for terrestrial and freshwater have been provided through avoidance, mitigation (through fauna management plans) as well as biodiversity offsetting and compensation.

Information has been provided following reviews and meetings with the applicant ecologists. Whilst many aspects have been addressed, there are aspects that remain unresolved.

The Project is bundled and assessed overall as a non-complying activity. The non-complying status derives from two ecological triggers — E3.4.1(A19), stream diversion within the SEA and ONL overlays, and E3.4.1(A49), new reclamation or drainage within those overlays. The other triggers are controlled, restricted discretionary or discretionary.

I have not undertaken a review against the Waikato Regional Planning documents and the applicant has not provided this for the proposed wetland and streamworks at Meremere. I am advised that the proposed activities are permitted in the Waikato are permitted activities.

6.1 Site overview of ecological values

Hunua Quarry is located on the western slopes of the Hunua Ranges, within a mosaic of remnant forest areas. Several Significant Ecological Areas (SEAs) are scheduled in the Auckland Unitary Plan (AUP) in the vicinity, including SEA_T_5323 which surrounds the existing Symonds Hill Pit and into which the expansion is proposed. In addition, covenanted planting areas also exist in the proposed expansion areas (fig. 25 in the EclA).

6.1.1 Terrestrial fauna and flora values

The values for the impacted terrestrial vegetation have been assessed using standard RECCE plots and PCQ (Point-Centred Quarter) methods. The high ecological value forest provides habitat for birds, bats and lizards and these have been drawn from previous surveys and field assessments using standard techniques.

The surveys have identified 14 threatened or at-risk plant species in the project area.

The valuation of the terrestrial values surrounding the quarry and of the impact areas of the proposed expansion are accepted.

6.1.2 Freshwater values

Wetlands have been delineated using the wetland delineation protocols (Ministry for the Environment). Field assessment was undertaken in mid-summer and based on the number and location of the vegetation assessment plots, the rapid technique was primarily used and supported by evidence of plots in the wetlands. Some areas that were less accessible (eg. 270 m of the Mangapū Stream reach was deemed too steep to access) have wetland extents estimated or were identified using aerial imagery. The methods used may result in an under assessment of wetland extent, although this may depend on the season and year of the aerial imagery used for delineation. Nevertheless, at the scale provided, I consider the wetland extent and values assessed acceptable, although this uncertainty would need to be refined should any future management plans require more detailed assessments. Nine wetlands were delineated with a total of 0.44 ha mapped. Seven of these are considered to currently have high ecological values (fig 27 of EclA).

Streams have been assessed using the Stream Ecological Valuation (SEV) method. Three sites were assessed for this application and past assessments from 2021 were also relied upon. The SEVs for Mangapū Tributary and mainstem were within the expected range for native forested stream (0.89 and 0.91). Industry standard surveys using eDNA and MCI data is provided for these sites.

MCI scores from 2010 to 2020 for two sites are presented, however, the value of 6 year old data is considered limited as both sites showed a decline in MCI from excellent (143) to the middle of the 'good' range (110) (figure 30 in EclA). The monitoring was undertaken for quarry sediment discharges.

The headwater in the vicinity and to the west of Middleton Road were assessed with one SEV being located here. The streams are reported to be mostly confined to gullies running generally north to south through the SEA_T_5323. Most headwater watercourses were classified as ephemeral, with some intermittent reaches also identified, although this was based on Geomaps rather than field assessments. The applicant has assessed that the proposed works will not adversely affect the ecology, functionality, connectivity or fish passage of the Mangapū Tributary headwaters. I accept this assessment and have not assessed these headwaters further. I note that the land use approvals sought run in perpetuity while the associated water permits and streamworks consents are limited to 35 years, and recommend the Panel satisfy itself that the approvals granted do not authorise works that would in practice adversely affect the headwater streams before that later application is lodged.

I have reviewed the applicant's response regarding the offsets established under the 2009 Symonds Hill Pit consent and the proposed relocation of the 'covenanted areas', and whilst there is some complexity in this regard, I am satisfied that the ecological objectives of that consent are upheld.

6.2 Potential adverse effects

A total of 44.46 ha of terrestrial indigenous vegetation communities (native forest) will be cleared over the life of the proposed expansion, along with 4.15 ha of exotic vegetation. This amounts to 4.55% of the total of SEA_T_5323 area being lost.

The quarry expansion will result in the direct removal of 0.22 ha of wetland features, including 0.12 ha of ecologically significant forest seepage, and 0.1 ha of degraded exotic grass-dominated swamp.

527 m of intermittent and permanent stream length will be lost from tributaries 3 and 4, and a length of 1,200 m from the Mangapū Tributary, totaling 1,727 m (although these lengths are not consistent throughout the reporting eg. Table 19, table 37 and text). This includes culverts that will need to be installed on the haul road. The diversion is proposed and thus the extent of stream loss is 1,157 m.

6.3 Terrestrial effects management

The loss of habitat and vegetation is unavoidable in enabling the proposed activity.

6.3.1 Avoidance, mitigation and restoration

This is largely achieved through fauna management plans for birds, bats and lizards. These plans provide for survey and salvage. The application considers salvage of fauna avoidance of harm and relocation as mitigation with no residual effects. I would consider avoidance to include only the protection area for native nesting birds and ensuring bats are not present in trees prior to felling. All salvage efforts (eg. Lizards) and relocation is considered mitigation.

The management plans are, in general, accepted and subject to finalisation and certification by Council. In addition, Department of Conservation (DOC) are reviewing these in terms of the Wildlife Act.

6.3.2 Offset and compensation

The proposal includes a biodiversity offset of 44.5 ha of planting around the quarry site; 21 ha planting at Meremere quarry site and more than 20 ha planting in the Hunua Regional Park.

Compensation is proposed to be provided in the form of 16.3 ha of enhancement to existing native vegetation.

Formal protection of the offset area and compensation area (including within that extent the wetland offset and compensation) are proposed and discussed further below. This is limited to focus areas 1 (Hunua quarry) and 2 (Meremere) the Hunua Regional Park offset area is already protected.

The offset and compensation extents have been evaluated using the Biodiversity Offset Accounting Model (BOAM). I provide further comments on this below, particularly around the metrics used.

The applicant's BOAM calculates 96.7 ha of revegetation as the minimum required to offset the loss of 44.46 ha of indigenous vegetation. 85.62 ha offset is identified, leaving an acknowledged shortfall of 11.08 ha, proposed to be

addressed by compensation. I accept compensation is available for that purpose. I note, however, that the shortfall is derived using the five structural attributes discussed in 3.4.3 below; a model incorporating the omitted attributes would be more likely to increase than reduce the offset requirement, and therefore the shortfall would be greater.

The planting at Meremere does not meet the offsetting principles of the AUP, Appendix 8 (3) regarding proximity to the impact and effects management undertaken at this site I consider to strictly be compensation.

The proposed planting is predominantly of early succession forest species at focus areas 1 and 2, with limited infill and valley bottom with later succession forest species. This does not appear to be in the same proportion to the vegetation types lost, with the applicant relying on natural successional development. For example, Meremere's planting has no equivalent statement of the target ecosystem type, so the like-for-like case is asserted rather than demonstrated for Focus Area 2.

The application acknowledges the presence of threatened vegetation species (most regionally, not nationally threatened), however, there is no measures provided to address these. There is no pre-clearance survey to relocate threatened plant specimens, no salvage, no spore or cutting collection and no inclusion of any threatened species in the offset planting schedules.

6.4 Freshwater effects management

6.4.1 Avoidance, mitigation and restoration

An Erosion and Sediment Control Plan (ESCP) is proposed for all earth/streamworks.

Fish salvage is proposed for instream works and reclamation.

Provided management plans are *prepared and implemented in accordance* with best practice these *would* be considered appropriate to address fauna impacts and the potential for sediment discharges, noting the ESCP is assessed by Council's Consultant Specialist, Steve Bryant.

6.4.1.1 Augmented flows for dewatering effects

The quarry expansion is predicted to have a dewatering effect on streams. These effects range in pure volume (which the applicant has focused on) and in reduced flow % of MALF (which I consider more critical). The estimates for flow loss ranges from -10% (and increase) to 76%. A reduction in flow may cause a contraction of the water channel, reduced habitat, increased water temperature, reduced dissolved oxygen, and reduced foodscapes in the water column.

There has been no modelling of potential effects of the reduced flows, however, stream augmentation is proposed to maintain flows at the existing Mean Annual Low Flow (MALF) based on calculated, correlated and existing flow measurements. I consider this maintenance of MALF and above to be appropriate to maintaining stream habitat

extent, noting that flow reductions of 5% or more are generally outside of natural variability (as noted in the PDP groundwater effects report).

I have some concern regarding the water quality of the augmentation flows as these are likely to be pumped from sumps in the base of the pit and could well carry contaminants from the works, have low dissolved oxygen being groundwater sourced. I have recommended monitoring of the groundwater to address these issues.

6.4.1.2 Stream diversion

The stream diversion is a core part of this application. I also consider it to be the highest risk from an ecological effects assessment point of view in terms of certainty of achieving the proposed outcomes (maintenance of stream potential value), in being able to be realised (constructability) and in managing the potential effects of the construction. The resultant stream diversion is to be carved out of rock with a very steep battered bank on the True Left Bank (TLB) and a haul road and ultimately a drop off into the quarry on the True Right Bank (TRB). Instream features such as pools and riffles are proposed. Riparian areas are, for much of the length, to be between 1 m and 5 m in width established on a shallow soil layer overlaying the rock.

The applicant considered the diversion to replace a portion of the reclaimed stream and its tributaries. The applicant proposes that this diversion will maintain the ecological values of the impact stream and therefore it is only the length difference that is required to be addressed through effects management. I do not concur with this and consider that, whilst the intention may be to create a biodiverse channel, there is a very low likelihood that this will achieve the equivalent ecological values of the high quality stream that currently exists. The riparian filtration function and natural flow regime along its length will be absent as will the wide (>20m) mature woody riparian vegetation of the current stream. The riparian vegetation is unlikely to thrive under the new alignment to the extent of the current stream. In addition, the narrow riparian margins (<5 m) of the diversion will be subjected to edge effects that will make maintenance of them an ongoing requirement. The resulting outcome is that there will likely be an unaccounted loss of stream ecological value on the diversion stream.

The applicant has provided monitoring for the diversion and performance is currently measured against three metrics — RHA, sediment and MCI — set below the condition of the reach being reclaimed. Large woody debris, a critical structural component of these watercourses, is not provided for, and canopy planting is delayed. My recommendation to use the SEV (for which values for the impact stream are provided – 0.91 and 0.83) as an outcome target has not been accepted. Should consent be granted, monitoring using the SEV and with agreed values outcome as a condition (along with water quality) would enable adaptive management to be implemented through additional offset/compensation actions should the stream not reach targets of maintaining potential and value.

The ecological performance target proposed for the realigned channel is MCI Band C (from the NPS:FM attribute tables). The reach to be replaced records MCI 115 (Band B) and QMCI 6.81 (Band A) at Site 3. The applicant justifies

the lower target by reference to the range of MCI values across the catchment, including downstream reaches. I do not accept this. The relevant comparison is the reach being lost, not a catchment continuum. The applicant's position is that the realignment maintains the values of the impact stream; a target set one to two bands below the existing condition is inconsistent with that position and is, in my view, an indication that equivalence will not be achieved.

6.4.2 Freshwater Offset and compensation

Stream loss is offset and compensated through riparian planting of 600 m in the quarry area, 400 m at the Meremere quarry and riparian planting along 2.58 km of the Mangatawhiri Stream within Hunua Regional Park. Total stream restoration/riparian planting length is 3,580 m. No SEV has been undertaken at the Meremere and Mangatawhiri locations, however, desktop estimates are provided from proxy sites to inform the SEV – Ecological Compensation Ratio (ECR) . An SEV was undertaken at the offset site for the Waipokapū tributary (482/484 Hunua Road), however, this is not used in the ECR calculations. The total area of stream of SEV value 0.39 (SEVi-P) required to be improved (excluding the diversion) to a score of 0.71 (SEVm-P) is calculated by the applicant to require an offset of 3,980 m², equating to approximately 4,500 m of stream length (2,602 m at 1.1 m mean width for the Mangapū Tributary residual, plus 1,898 m at 0.59 m for tributaries 3 and 4). The applicant states 3,938 m² is provided, along 3,580 m length of stream.

Therefore, there is a shortfall of about 1,000 m of stream length. There is also a shortfall is 42 m² in area, however, the offset length and area is calculated from proxies and therefore unverified.

The full 1,157 m of stream extent is permanently lost and is not offset. The applicant acknowledges that the creation of additional new stream length and channels is not a feasible option, a position I agree with. Extent lost is proposed to be addressed by compensation through fish passage reconnection to 2,500–4,000 m of currently inaccessible watercourse to climbers. Addressing artificial barriers is a requirement under the Freshwater Fisheries Act.

In stream classification, there is inherently a transitional area where the ephemeral channel becomes intermittent. This transitional area moves within from season to season depending on antecedent environmental conditions. The timings of the assessments is mostly outside of the Auckland Council's timing window for stream classification. The impact is that extent of stream classified as intermittent that is to be reclaimed may be underestimated and therefore insufficient offset and compensation is provided to address the loss.

The applicant's assessment of offset and compensation extents are desktop estimates. For example, the Mangatawhiri River offset includes weeding and planting, however, there is no verification of the extents available for restoration.

The planting at Meremere is alongside the existing quarry and is only in the headwaters of the watercourse. There is a modified channel of over 1,000 m with narrow, poor riparian cover and culverts beyond the property before the Whangamarino wetland is reached. The assertion that this is a critical stream connection that is being restored is ambitious.

Wetland offset is calculated through the use of the BOAM. A total of 0.22 ha wetland is likely to be lost with the expansion and another similar extent lost through drainage, being close to the pit wall. A total of 0.44 ha (the application provides different extents as the addition comes to 0.45 ha, however, this is not considered to be material) requires 2.4 ha offset restoration using the applicant's BOAM calculator. A total of 2.5 ha wetland extent is proposed for offset restoration across the three focus areas, however, as previously discussed, the restoration at Meremere would be more appropriately considered compensation.

The BOAM has again been used with aggregated sites and offset locations providing uncertainty in the offset calculation and this is discussed below.

6.4.3 Overall Offset and Compensation

A biodiversity offset, under the AUP appendix 8 and the NPS:FM criteria, requires no net loss in the biodiversity values be achieved. However, the NPS:IB is more restrictive and only provides for *net gain*. In further consideration, the effects management hierarchy is applied sequentially, with each setting a higher bar for achievement of the residual effect, therefore, NPS-IB Appendix 4 / NPS-FM Appendix 7 require compensation to have demonstrated positive effects that outweigh the adverse effects, which is a higher outcome standard than offsetting's "no net loss".

The applicant has used the BOAM for terrestrial vegetation and wetland offset calculations. This is an industry standard tool to use for this, however, the manner in which the applicant has applied this creates uncertainty in the output. These are:

- For the terrestrial vegetation, the offset sites are calculated as having 'zero' across the ecological attributes assessed, which is unlikely to be the case as even pasture grass would provide some value.
- No data is provided for offset focus areas 2 and 3.
- In both the terrestrial vegetation and wetland calculations, the applicant has used 5 attributes which more appropriately describe functions rather than biodiversity values. Some of these attributes are aggregated metrics. On request of the applicant, I provided a list of over 50 metrics that can be considered in a BOAM assessment for wetlands. The attributes provided to the applicant included, among others, hydrological integrity, hydric soil condition, canopy cover and browsing damage. Each is measurable, each is a component of the Clarkson WCI already relied on by the applicant, and each converts readily into the area × condition currency the BOAM requires. None of the applicant's attributes capture the water table depth or hydric soil structure on which the forest seepages were delineated. Further the low number of

attributes used and their aggregated nature are not considered to address key ecological components of the wetland's values and may lead to hidden losses

- All the wetland offset areas, across the three locations, were assessed as having identical values which could be subject to restoration.
- Only two of the impacted broad vegetation type offsets are calculated using the BOAM. There is a separate BOAM for late successional forest (Tawa-taraire forest with mature kanuka/Kauri, podocarp, broadleaf forest) and another for Early successional vegetation. Seven distinct vegetation types are impacted.
- Four of the five wetland attributes score systematically higher on the offset sites than on the impact sites for reasons of ecosystem type rather than ecological condition. Planted farm-pond wetlands and alluvial terraces can score strongly on indigenous wetland plant dominance, hydrological connection, hydraulic function and open-wetland habitat value. Forest seepages score ambiguously or low on all four, not because they are degraded but because they are a different type of wetland.

I am uncertain if these factors in the applicant's application of the BOAM would greatly alter the calculated offset extent (and I acknowledge that complexity can create false precision), however, I do consider that amending these calculations would at least provide a more transparent and robust offset assessment.

The use of the Meremere site as an *offset* is not supported due to its lack of proximity to the impact site, it is therefore more appropriate to consider it as a *compensation* site. The site is surrounded on three sides by pine plantations and is at least 300 m from the Whangamarino wetland. The watercourse that flows to the Whangamarino has culverts under a road and in private land and there is no evidence provided that these are not also fish passage barriers. The stream on the compensation site, for the most part, runs alongside the open quarry operation, has narrow sparsely vegetated riparian areas that are not subject to any improvement. The result is potentially a restoration wetland and stream that is somewhat isolated (1 km) from the Whangamarino wetland, reducing potential outcomes and benefits below that considered by the applicant when considering this landscape scale.

The Meremere site is also within a Quarry Zone under the Waikato District Plan and is therefore land identified for quarry purposes. The applicant proposes to secure it by covenant and has indicated no quarrying is planned. In my view that does not fully address the long-term (in perpetuity) outcomes principle, particularly given that this application itself proposes to remove offset planting established under a 2009 consent.

Suggested S67: The offset calculations, being the BOAM and SEV-ECR are updated with improved assessment attributes and receiving site values in BOAM and receiving site metrics for the SEV-ECR calculations to demonstrate no net loss and net gain.

The "net gain in net present biodiversity value" conclusion is untestable without the model. This is the key component of the claim in the whole vegetation and stream offset and is not easily addressed by a condition.

8.0 Recommendation

I do not accept that the offset and compensation package, as presented, demonstrates no net loss of freshwater values or net gain in terrestrial indigenous biodiversity.

In particular:

- The BOAM model has not been used in a robust manner and contains errors, impacting robustness and assurance of offset extent (terrestrial and wetland).
- The SEV/ECR method has not been applied appropriately. If consent is granted, it should be incorporated into stream diversion monitoring, to enable adaptive management and quantification of additional offset and compensation actions in a robust and transparent manner, if the monitoring identifies shortfalls.
- The SEV -ECR assessment is based on proxy receiving streams and the offset and compensation extents must be verified to ensure that the requirements of no net loss and net gain are achieved.
- The Offset and compensation offered for both terrestrial and freshwater have indicated shortfalls in the application and lacks the detail of how these will be resolved. The Meremere site is not appropriate for offset due to its lack of proximity to the impact site, and its zoning under the Waikato District Council as a Quarry Zone. Any effects management here must be considered as compensation. Assurance of protection in perpetuity is uncertain.
- The resolution of a partial fish passage barrier is not appropriate to address the loss of stream extent.
- Measures to address rare and threatened vegetation species must be provided.

I do not support the proposal as the residual adverse effects on vegetation, wetlands and streams are not fully addressed by the application as lodged, and on that basis I am not able to support the application in its present form.

My position is directed at the adequacy of the effects-management package, not at the Project in principle. The deficiencies identified are capable of resolution — through combination of further information under s 67 of the FTAA and through amendment of the proposed conditions.

Suggested S67: The offset calculations, being the BOAM and SEV-ECR are updated with improved assessment attributes and receiving site values in BOAM and receiving site metrics for the SEV-ECR calculations to demonstrate no net loss and net gain.

Consent condition amendments to include details on targets, monitoring frequency and thresholds, adaptive management, certification and re-certification to ensure offsets and compensation envisaged is achieved in the timeframes offered.

9.0 Proposed Conditions

This is an ongoing review and will be provided separately.