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Central Otago District Council
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Parkburn Quarry - FHLD Parkburn FTAA – Substantive Application

Dear Sirs

Further to instructions received from Walt Denley (CODC) and Louise Taylor (Taylor Planning) we have now completed an independent review of supplied geotechnical reports associated with a fast track planning application for a residential development of the Parkburn Quarry site in Cromwell.

As part of the peer review a site visit was completed with Fulton Hogan representatives and select other technical experts (contaminated land, ecology, water and wastewater) on 28 May 2026.

Due to the limited timeframes available and at the request of CODC no correspondence with the applicants design team or geotechnical consultant has been possible.

Following completion of the site walkover the following relevant information has been supplied for review:

1. Parkburn Masterplan Layout Plan, dated January 2026
2. Geotechnical and Earthworks, Assessment for Proposed Residential Subdivision at Parkburn Quarry, 922 Luggate-Cromwell Road (SH6), Cromwell. Prepared by consultants Insight Engineering, dated May 2026.

The substantive application geotechnical report relates to the reclamation and redevelopment of the Parkburn Quarry site, Cromwell. The supplied masterplan shows an extensive residential development area of approximately 124 hectares.

At this stage the geotechnical appraisal of the site has been limited to a desk based assessment of geology, past investigations and publicly available information, together with a detailed site inspection by a geotechnical professional.

In addition to the geotechnical appraisal a preliminary geotechnical assessment of the stockpiled pea-gravel materials as a potential earthworks material has also been completed as part of the initial geotechnical appraisal.

The Site

The site is currently an operational gravel quarry, cleanfill site and asphalt plant operated by Fulton Hogan. The site has been extensively quarried since the 1980s with excavations up to ~15m below original ground level. The base of the quarry is limited by the presence of groundwater which is closely associated with the adjoining Lake Dunstan lake levels.

The western and southern boundaries of the quarry are marked by substantial excavation faces (see image below).

Figure 1: View of south west corner of site looking north

Within the southern and western areas of the quarry, large amounts of pea-gravel materials (by product) have been stockpiled (see image above).

The reclamation of the quarry requires extensive earthworks to cut and fill the open quarry areas back to a design development level. These works require site levels to be lifted by circa ~15m at the western end of the site and taper to the eastern margin and lake front.

The north-eastern corner of the site is currently a clean fill waste disposal area and has been systematically filled to around 5-6m above original ground level over many years. This area has been identified as requiring further investigation and assessment by other technical specialists (contaminated land and ecology).

The north western corner of the site is generally untouched and remains as level undeveloped and un-quarried ground identified as greenfield.

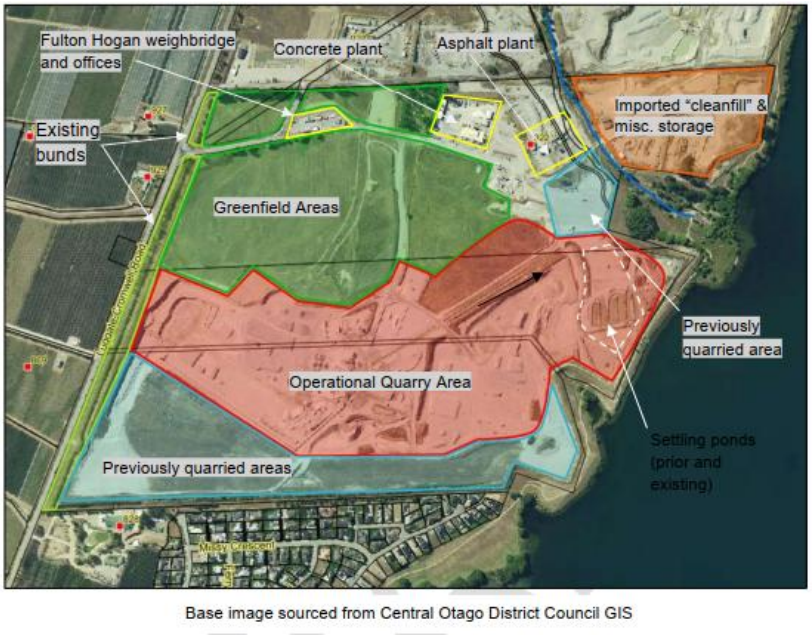

Figure 2: General site layout - taken from IE report, 2026.

Geotechnical Desk Study

The report compiled by Insight Engineering Ltd (IE) has reviewed previous investigations completed by Geotago Ltd (2022) and previously completed boreholes for areas across and in close proximity to the subject site.

The appraisal has concluded that the site geology consists of natural outwash gravels with local loess and alluvial silts, along with extensive areas of uncontrolled fill (clean fill areas) and pea-gravel backfill from historic quarrying.

In terms of natural hazards IE identify the potential for alluvial fan hazard debris flow (flood dominated) to be present on the site area associated with the Park Burn stream in the north eastern portion of the site. They also consider the seismic hazard posed by both the Dunstan Fault and the Alpine Fault zones including the potential for liquefaction and lateral spread risk across the eastern site areas associated primarily with Lake Dunstan and current settling ponds.

Based on the desk based assessment IE have presented a preliminary ground model for the site and identified three key reclamation areas requiring cut and fill earthworks.

Geotechnical Assessment

The appraisal completed is preliminary and relies on investigation works previously completed by others.

The ground model produced is considered to be an appropriate level of investigation for the preliminary stage and considers the key elements required to support a subdivision consent application.

The conclusions reached by IE are that the site requires substantial cut/fill earthworks to facilitate the development level and that filling depths could be of the order of 15m or greater.

The underlying geology and groundwater conditions appear to be competent to support future filling operations, however IE note that settlement considerations (both immediate and longer term creep) will need to be considered as part of the earthworks design.

In addition to the identified geotechnical challenges it should be noted that the future earthworks and development layout design will need to accommodate potential high wall scenarios at the boundaries of the site area and also between earthworks panels. IE note the requirements for future settlement monitoring of earthworked fill areas prior to permitting development accordingly.

Engineering Assessment of Quarry By-products

As part of the geotechnical appraisal IE have considered the presence of large quantities of pea-gravel materials stockpiled around the perimeter of the site (southern and western areas). This material is a by product of the gravel quarry, screening and grading operations and consists of a relatively uniform sand and fine gravel faction material.

Insitu, this material is typically relatively loose and does not meet typical grading distributions of other controlled engineering fills.

IE and Fulton Hogan have completed crushing and compaction trials of the materials to determine their suitability for re-use as engineering fills as part of the proposed reclamation works.

The limited trials completed to date indicate that with processing (crushing and grading) the material can be used as a controlled fill. However, the provided information indicates that the materials are particularly dry and have a limited particle size distribution together with a relatively high portion of finer grained/fines material. This suggests that compaction works would most likely require large amounts of water to be

added to facilitate acceptable compaction and that layers / passes would need to be controlled together with plateau validation testing to confirm acceptable compaction.

Based on the limited tests/trials completed the pea gravel materials may be considered suitable fill materials for bulk filling following processing and carefully controlled placement, compaction and verification testing.

Opinion

In terms of the existing site condition and use, as well as the residential development proposals, the site requires substantial earthworks through cut and fill to facilitate a safe and usable development platform. As such investigations and assessments completed at this stage can only assess the existing ground conditions for the base of the quarry and associated undisturbed quarry areas.

We are of the opinion that the appraisal completed does present an appropriate assessment of the existing ground conditions of the site. On this basis the provided report would be considered sufficient to address the minimum requirements of NZS4404-2010: preliminary site evaluation.

Whilst the appraisal has considered natural hazard occurrence it does not present a qualitative risk assessment of natural hazard risk as required by the National Policy Statement for natural hazards, 2025. This policy relates to hazards such as liquefaction, lateral spread, seismic risk and flooding and requires the assessor to qualitatively assess the risk to property and people. Whilst it is accepted that IE note that associated effects of such hazards is likely to be minor the assessment should provide a substantiated assessment to that effect.

As such we concur with IE in that the site is potentially impacted by alluvial fan hazards and that liquefaction/lateral spread effects will also need to be considered as part of the detailed design for the development, particularly along the site's eastern margins. We would however recommend that a NPS, 2025 qualitative risk assessment be completed with supporting justification of both likelihood and consequence and demonstrate that the associated risks are either manageable or low accordingly.

Based on our site inspection it is evident that the existing western and southern boundaries of the site form steep high walls to the quarried areas and based on the provided development plans it is also evident that further excavation and filling of the site is required. The boundary high walls will require further stability analysis and detailed design of earthworks will need to consider the requirements for benching and tie-in of earthwork panels. Careful consideration will need to be given to material selection and placement as well as compaction controls to ensure settlement profiles of the fill are consistent and controlled.

Differential settlements between earthwork panels and in areas that straddle high wall scenarios will need to be managed by the geotechnical engineer. Detailed design of roading, utilities such as water and wastewater and the proposed development plots will need to consider settlement of fills and bearing capacity requirements accordingly.

The provided reports give only limited information at this stage for earthworks and base layer performance however we would expect a detailed earthworks design to be provided that determines the minimum performance of the associated filling operations, clarifies settlement performance and lays out the requirements for control monitoring and performance testing.

It is our opinion that the site will require substantial import of materials together with cut and re-use of existing pea gravel fills.

As required by NZS4404:2010 appropriate Schedules and Completion Reports will be required and these must be signed off by an appropriate suitably qualified geo-professional.

Conclusion

The IE report provides a preliminary appraisal of the site conditions and existing natural hazard occurrence but does not present a qualitative risk assessment as required by the NPS2025.

The redevelopment and reclamation of the Parkburn Quarry site will require substantial earthworks and engineering controls to be applied. The existing high walls that surround the quarry will require further assessment and re-profiling as part of the detailed design of the earthworks to ensure settlements are controlled and do not affect the future placement of roads, utilities or foundations. Likewise design of earthworks panels and control of materials will need to be carefully specified and verified accordingly.

Earthwork survey monitoring and engineer validation will need to determine that total settlements are within tolerable levels for the proposed development and that longer term consolidation settlements meet the NZ building code accordingly.

We are in general agreement with IE regarding the occurrence of hazards at the site and consider the provided report to be sufficient to meet the requirements of NZS4404:2010 in terms of a preliminary site evaluation.

Further geotechnical investigations and assessments will be required to support detailed design elements (for example the Park Burn bridge) and various other developments however at this stage of the application the provided information would be considered suitable to support a subdivision consent once a NPS Natural Hazard risk assessment has been completed.

We trust this is sufficient for your present requirements however if you require any further clarification please do not hesitate to contact us.

Yours sincerely,

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Technical Principal - Geotechnical Engineering