Pattle Delamore Partners Limited

TECHNICAL MEMORANDUM

INVESTIGATION	Peach Island Groundwater Effects Assessment Summary	**PROJECT**	Peach Island Proposed Quarry
CLIENT	**CJ Industries Limited**	**PROJECT NO**	C04627800
CLIENT CONTACT	Desmond Corrie-Johnston	**PREPARED BY**	Ryan Nicol
CLIENT WORK ORDER NO/ PURCHASE ORDER		**SIGNATURE**	
		DATE	1 May 2024

1.0 Introduction and Hydrogeological Setting

This memorandum provides a summary of my assessment of effects of a proposed quarry (and associated deposition of clean fill to reinstate ground levels) at Peach Island. It concludes that with implementation of recommended management requirements, the project can be undertaken in a manner that will have a less than minor effect on groundwater.

The proposed Peach Island Quarry (the 'site') is located on the western bank of the Motueka River and is around 6 km upstream of the Motueka township.

Groundwater resources at Peach Island occur within Pliestocene and Holocene gravels, which overlie Moutere Gravels and (under the Moutere Gravels) Separation Point suite granitic rocks (Cretaceous). Groundwater flows in an overall north-north easterly direction, generally subparallel to the Motueka River. There is strong hydraulic connection between the Motueka River and groundwater at Peach Island. In the area within 500 m downgradient of the proposed quarry the Tasman District Council database shows 5 privately owned bores (i.e. not owned by CJ Industries Limited) ranging in depth from 5 to 12 metres below ground level (m bgl) that use groundwater for domestic and irrigation supply. Reported groundwater levels across the site have been measured within a range of around 0.5 to 5.1 m bgl. CJ Industries Limited intend to quarry down to a depth of around 4 m bgl and therefore, excavations and the material used to backfill the excavations will occur within the range of groundwater level fluctuations.

Groundwater sampling undertaken by CJ Industries Limited indicates that groundwater quality at the site and the neighbouring vicinity is generally of good quality that mostly complies with maximum acceptable values1 for drinking-water supplies, with the exception of occasional E. coli detections caused by agricultural and lifestyle activities. Sampling has also shown some occurrences of naturally occurring iron concentrations at concentrations above aesthetic guideline values2 for drinking-water supplies.

2.0 Potential Groundwater Effects

Potential effects on groundwater from the project are:

- Adverse changes in groundwater quality from:
  - Contaminated material used to backfill excavations.
  - Spills.
  - Exposure of groundwater within excavations.

[1] Maximum acceptable values (MAV) from the Water Services (Drinking Water Standards for New Zealand) Regulations 2022

[2] Aesthetic values (AV) for drinking water notice (2022)

- Mounding and/or drawdown effects caused by a difference in hydraulic conductivity between the material used to backfill excavations and the surrounding, undisturbed natural strata.

3.0 Management of Groundwater Issues

The key mitigation measures to avoid contamination of groundwater are:

- Use of quality material to backfill excavations.
- Managing the risk of spills (e.g. of machinery fuel).
- Avoiding exposure of groundwater within open excavations.

All fill material (excluding any uncontaminated material sourced from the site) will be sourced from a single offsite location, which is a Limestone Quarry owned by CJ Industries Limited. A highly weathered granitic material occurs at the Limestone Quarry but has a low economic value and is therefore considered to be waste rock. CJ Industries Limited intend to use the waste granitic material to backfill excavations at the Peach Island quarry site. This granitic material also occurs naturally in the mountains immediately to the west of the site, forms the basement rocks beneath the Peach Island area and is one of the sources for the naturally occurring sand and gravel strata that has formed at Peach Island. To provide additional reassurance that the backfill will not have adverse effects on water quality, we have carried out chemical testing on samples, along with contaminant transport modelling (PDP, 20243). The testing and modelling indicated that there would be no adverse effects on groundwater quality at neighbours' bores. We also carried out a numerical modelling assessment to quantify potential changes in groundwater levels that could arise from the placement of this backfill. The results indicated that any changes in groundwater level would not result in any adverse effects on neighbours' bores (PDP, 2024).

Potential issues from spills associated with machinery fuel spills and hydraulic hose leaks/breaks can be managed via consent conditions which include no refuelling of machinery within 10 m any excavation, limiting only the excavator boom to enter an excavation (i.e. no machinery physically operating within any excavation), training staff in the use of spill kits and having spill kits available at the site, and also by not exposing groundwater within any excavation.

Avoiding the exposure of groundwater within an excavation can be managed through consent conditions. These requirements include real time, continuous (hourly) groundwater level measurements in four dedicated monitoring bores at the periphery of the site, only excavating when groundwater levels and flow/stage within the Motueka River are stable or declining, maintaining at least 1 m of material between groundwater and the base of any open excavation at the end of each day, as well as a requirement for an adequate volume of fill material to be stored at the site to be able to completely backfill any open excavations if weather and/or river flow conditions indicate rising groundwater levels are likely to occur.

The RMA application was subject to conferencing between groundwater experts who recommended in a joint witness statement (JWS4) that some further investigations should be undertaken. These have now been completed and reviewed by a groundwater expert engaged by the regulatory authority (Tasman District Council) who has concluded that "it did not seem likely that there would be any major water quality issues" and that the PDP (2024) report about the further investigations "provides an appropriate description of the likely potential effects on changes to groundwater level

[3] Pattle Delamore Partners (PDP). 2024. Peach Island Propose Quarry: Additional Groundwater Investigations. Prepared for CJ Industries Limited. April 2024.

[4] Joint Witness Statement (JWS) – Groundwater scope of further works. Dated January 2024. Prepared by Helen Rutter, Anthony Kirk and Ryan Nicol.

and groundwater quality on neighbouring properties and downgradient bores not owned by the appellant (JWS, 20245).

Therefore, with implementation of the management requirements, it is expected that CJ Industries Limited will be able to undertake the proposed quarrying and clean filling activities in a manner that will have a less than minor effect on groundwater at Peach Island.

Limitations

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[5] Joint Witness Statement (JWS) – Outcomes of the further groundwater investigations. Dated 19 April 2024. Prepared by Helen Rutter and Ryan Nicol (Anthony Kirk (who was an internal reviewer for the appellant) was unavailable at the time this JWS was prepared).