

10 February 2021

Hamish Watson
Parks and Recreation Manager
Kaipara District Council

Rangiora Car Park

1-14133

Dear Hamish,

Further to our discussions on the 26th January, please find attached the detailed design drawing set (Appendix A), Engineers Estimate (Appendix B) and Risk Register (Appendix C) for the Rangiora Reserve carpark upgrade.

The main philosophy of the design was to provide a top-end product, thus to determine the potential cost. A value engineering exercise can then be applied if the construction budget results higher than the Council and community expectations.

Below there are a few key discussion items that WSP wish to highlight to KDC regarding the project.

1.1.1 Seismic Review

Our review from the GNS Database indicates that there are no known active faults within the study area. However, an inactive fault line has been mapped to the south parallel to Rangiora Road. – very low project risk.

1.1.2 Geology Desktop Review

A geological review was undertaken with reference to the Geology of the Whangarei area (Scale 1:250,000)¹ which indicates the geological formation beneath Rangiora Road and adjacent surrounds is underlain by Melange of Northland Allochthon with lithology of [KOM] which locally forms as a thick and extensive unit of the Allochthon with bonding matrix which is predominated by grey mudstones of Mangakahia Complex. The Waitemata Group bedrock is likely below this Melange formation.

Terrain in this area is occupied by mostly rolling hills with little evidence of pre-existent landslide features

Elevated ground watertables are likely to be present throughout the site, adjacent to the Otamatea River foreshore, groundwater levels may be affected by the tidal movement.

1.1.3 Geometric Considerations

The proposed geometric design was developed in accordance with the Kaipara Engineering Standards. The following deviation from standard 5.2.10 (1) *The maximum*

¹ Edbrook, 2009: Geology of the Whangarei area. Scale 1:250,000, Institute of Geological & Nuclear Sciences geological map 2. Institute of Geological & Nuclear Sciences Ltd., Lower Hutt, N.Z

longitudinal gradient and maximum crossfall on any area used for parking, loading and manoeuvring shall be 6%. The design crossfall varies from 4% for the top vehicle parking to 12% for the boat and trailer parking. We believe this deviation to be fit for purpose and low risk due to the nature of users and frequency of use. In order to flatten out the grade significant increase in earthworks would be required.

1.1.4 Boat Trailer Parking Considerations

The length and width of the styles for the boat parking have been inferred from Austroads Guide to traffic management, Part 11 and are based on a 6m long vessel and 5.5m long utility tow vehicle.

1.1.5 Subgrade Assumptions

No geotechnical investigations have been performed by WSP. WSP have based the design on having a minimum CBR of 5. The data from the 2020 pavement pits (supplied by others) has also been reviewed and demonstrates a marginal thickness of pavement. It is therefore recommended a minimum dig out and replace as per typical section.

1.1.6 Stormwater Considerations

The catchment area has not been modelled and the pipe sizes have been assumed based on engineering experience. It is believed that any potential surcharge will flow downstream into the harbour without any inundation risks.

The design details a soakage field, however no soakage testing has been completed, this is further compounded by the expectance of groundwater. Therefore, two scruffy domes have been specified on the adjacent manholes to act as a bubble up system, with overland flow to Otamatea River. A dry pond has been allowed at the 3m contour (adjacent to the foreshore) as per KDC request.

Head walls adjacent to the carriageway have been specified as transit concrete culvert ends with grating to improve safety for road users, restrict child access and minimise debris entering the piped stormwater network.

1.1.7 Footpath

The footpath between the disabled carparking space, picnic area and ablution facilities has been designed for disabled access. The footpath north of the ablution facilities is not designed to cater for disabled access to due to the grade being greater than that allowed. If it is essential that disabled access be provided to the water's edge then this could be catered for through a design of a ramp access system. Handrails have been specified in this section to demark a change in treatment.

1.1.8 Engineers Estimate

An Engineers Estimate has been prepared based on the design. The Engineer's Estimate is derived from a schedule of standard rates, typical NZ construction costs and supplier information. Refer Appendix B. Assumptions for programme and project cost estimates include:

- No significant geotechnical issues
- Works would commence over the summer months
- All works would be completed as a single contract – securing volume of works
- Works would be tendered to a competitive market

1.1.9 *Project Risk*

A number of key project risks have been identified as per the previous workshop between WSP and KDC and approach to minimise impact has been proposed as outlined in the risk register provided in Appendix C. Below we provide a list of the most significant risks:

- **Geotechnical Conditions.**
Ground conditions have not been investigated. This could lead to the need for unbudgeted remediation or changes in design.
- **Posted Speed Limit.**
Due to adding 90 degrees parking, the speed limit of Rolleston Road should be reduced from that of 100km/hr to 50km/hr.

Appendix A – Detailed Design Drawings

Appendix B – Engineers Estimate

Appendix C – Risk Register

Regards



Alastair King
Senior Civil Projects Engineer - Whangarei

