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Highlander Trusts Ltd
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Ref: 6-XQ509.00

Coneburn Development - Roundabout Concept

Dear Dan

WSP Opus has been engaged by Highlander Trusts Ltd to assess the engineering feasibility of constructing a roundabout on State Highway 6 (SH6) approximately 3.8km south of the Kawarau Falls Bridge, to provide access to a proposed Coneburn residential development under the SHA provisions of the Queenstown Lakes District Plan.

This letter provides a high-level overview of the issues, and concludes that, without completing full concept investigations, there do not appear to be any issues which would make a roundabout in this location unfeasible.

Site Context

Figure 1 shows the site location.

Figure 1: Location within the wider area (left) and aerial imagery of the site (right)

The proposed Coneburn residential development would be located on the west side of SH6. There is an access on the east side of SH6 which is proposed to eventually provide access to an industrial development, known as 'Coneburn Industrial'. Currently the access is gated and is formed for only a short length before reverting to a dirt track.

In the vicinity of the proposed intersection SH6 is straight and relatively flat, with excellent visibility in both directions. The posted speed limit is 100km/h. In this location SH6 currently (2017 data) carries approximately 5,600 vehicles per day (average annual daily traffic).

Woolshed Road intersects SH6 approximately 250m to the south, at a give way controlled Y-intersection. There are no turning bays, although the shoulders have been widened to NZ Transport Agency Diagram E standard on both sides of SH6 through the intersection.

Approximately 420m to the north is a formed and sealed access to Stoney Creek quarry, whose intersection with SH6 is uncontrolled. Again, there are no turning bays but the shoulders have been widened to Transport Agency Diagram E standard on both sides of SH6 through the intersection.

Proposal

The Coneburn Development proposal is still in the early stages of development, but it is understood that the intention is that it will comprise approximately 600 residential dwellings, plus a small number of ancillary uses such as playing fields, local shops, etc.

The proposed developments primary access is proposed to be a roundabout on SH6. This could be:

1. A four-arm roundabout providing access to both the west and east, aligned with the centreline of SH6; or
2. A three-arm roundabout providing access to the west only, offset slightly from the centreline so as not to encroach on private land to the east of SH6.

From our discussions with the NZ Transport Agency they have advised that a roundabout would be the most appropriate form of intersection for this situation from a safe systems approach to provide safe access to/from SH6 for the proposed Coneburn Development.

Following acceptance of the SHA proposal further assessment of the roundabout would be required, including traffic generation, traffic modelling and conceptual design to determine the most appropriate roundabout layout for now and into the future.

Intersection Assessment

1.1 Roundabout Geometry

To comply with Transport Agency requirements and Austroads design guidelines, a single-lane roundabout would need to have a central island radius of 14m minimum, 22m desirable. A dual lane roundabout would need to have a central island radius of 20m minimum, 24m desirable. Traffic modelling will be required to determine the number of lanes.

The roundabout would be of regular geometry – that is the three or four legs would all be at 90 degrees to each other with no unusual angles. This makes the roundabout more legible and easier for drivers to understand, and markings would be standard with no need for spiral markings.

1.2 Woolshed Road

Woolshed Road would be located approximately 250m south of the proposed roundabout.

Woolshed Road is earmarked for future connection to the Jacks Point Resort Zone. From our discussions with the Transport Agency, they would like to see how Woolshed Road, and access to the Jacks Point Resort Zone could be integrated and accommodated through the Coneburn Development proposal.

1.3 Gradients

There is a relatively shallow downward gradient from east to west. This will necessitate some earthworks and batter slopes, but these will be relatively minor, such that they are not expected to constrain the roundabout design to any significant degree. Contours are shown in Figure 2.

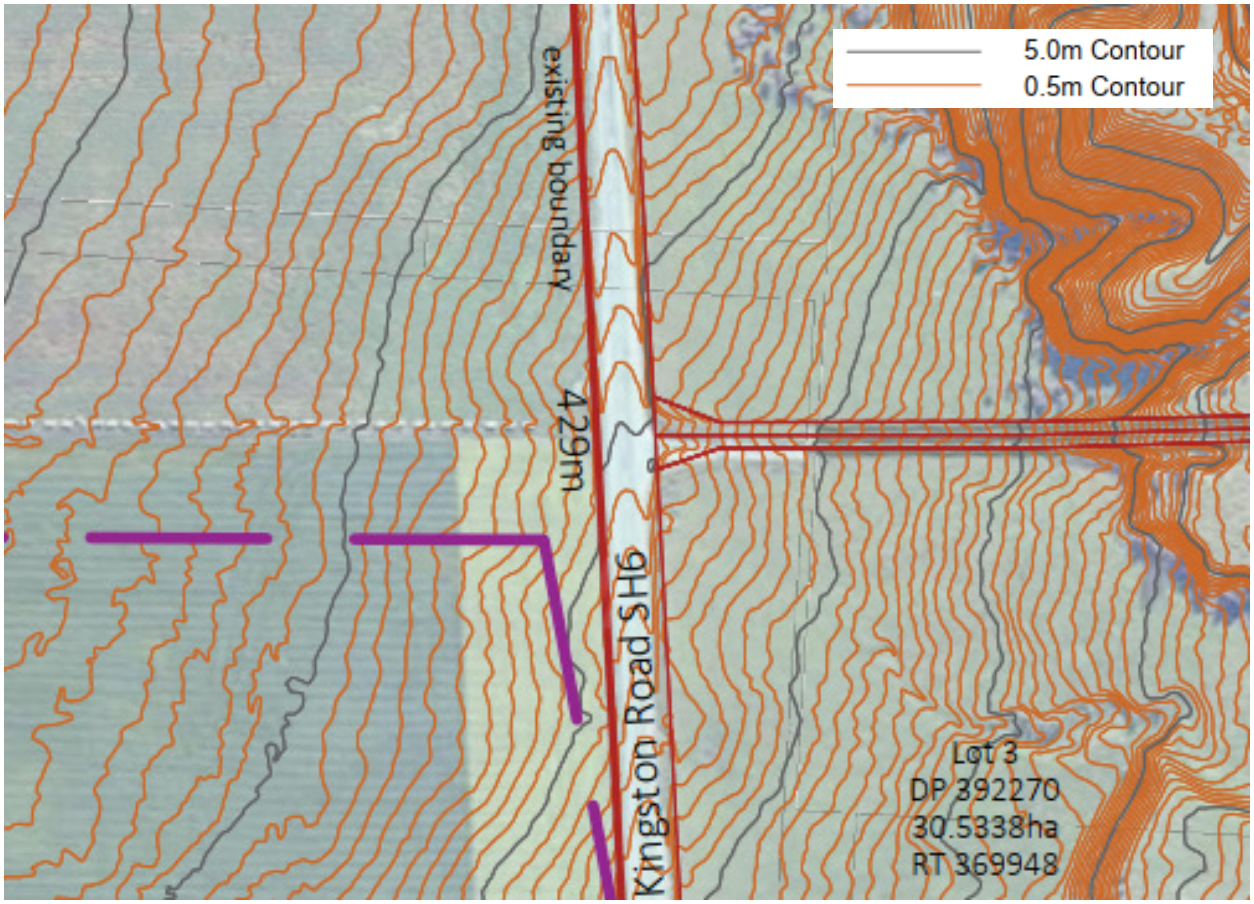

Figure 2: Contours from QLDC Lidar dataset (2016)

1.4 Adjacent Land Uses

There are no buildings or structures near the intersection, the surrounding land is all grazed pasture. The closest building is a quarry-related shed some 450m away.

1.5 Coneburn Industrial

The proposed Coneburn Industrial Development to the east side of SH6 is also seeking improved access to SH6 as indicated in the Coneburn Structure Plan from Chapter 44 of the District Plan review, which is currently under appeal. The proposed Coneburn Industrial SH6 access is opposite the proposed Coneburn Development roundabout.

The Transport Agency would like to see the Coneburn Industrial access worked in with the Coneburn Development roundabout proposal. This would be straightforward from a design

perspective with the Coneburn Industrial directly opposite Coneburn Development, and a roundabout centred on SH6 would have all four legs at 90 degrees to each other.

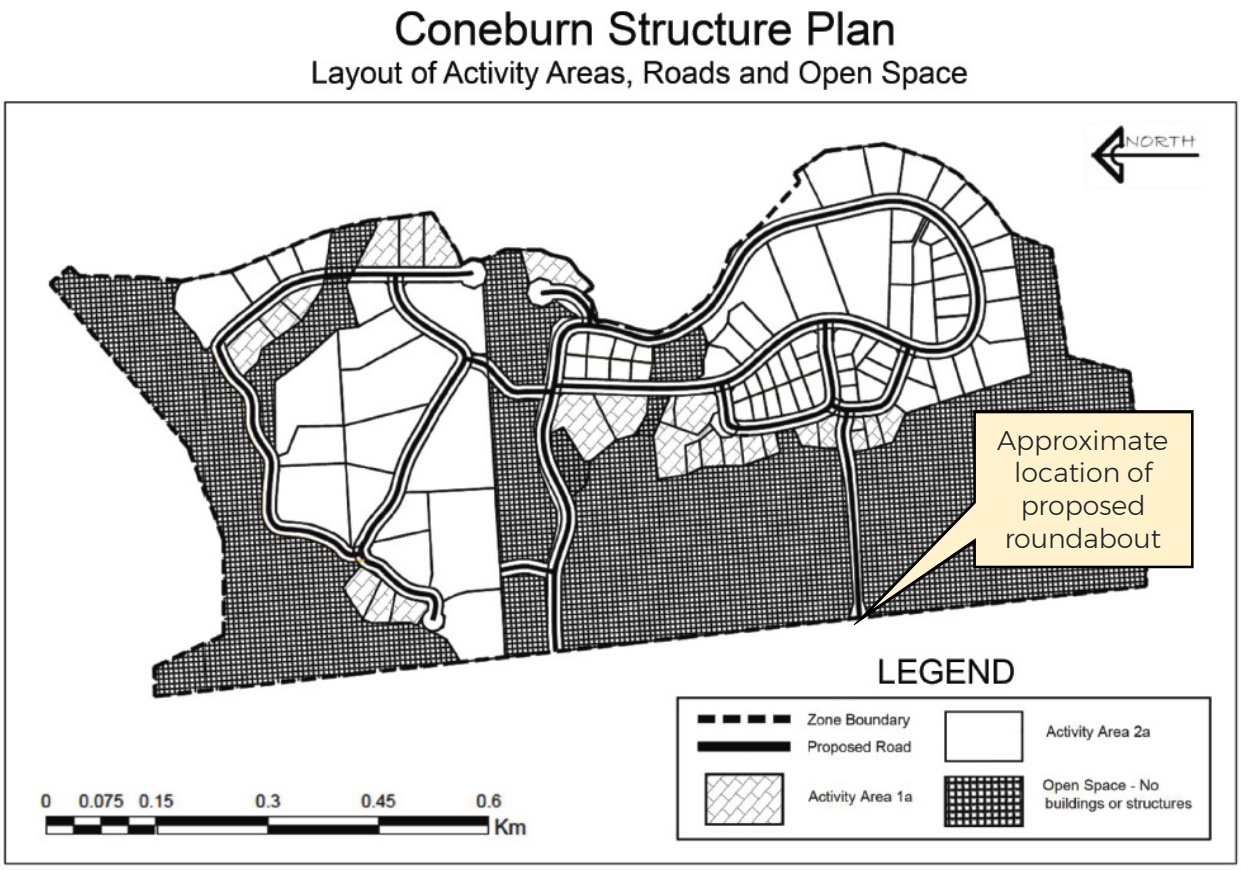

Figure 3: Coneburn Industrial Structure Plan from Chapter 44 of the Proposed District Plan (currently under appeal).

1.6 Storm Water

Storm water currently drains to surface water channels on the sides of the highway where it runs to a side drain approximately 220m to the north of the proposed roundabout location. The storm water then runs south along the side drain across private land to natural drainage paths and eventually drains to the Kawarau River to the north.

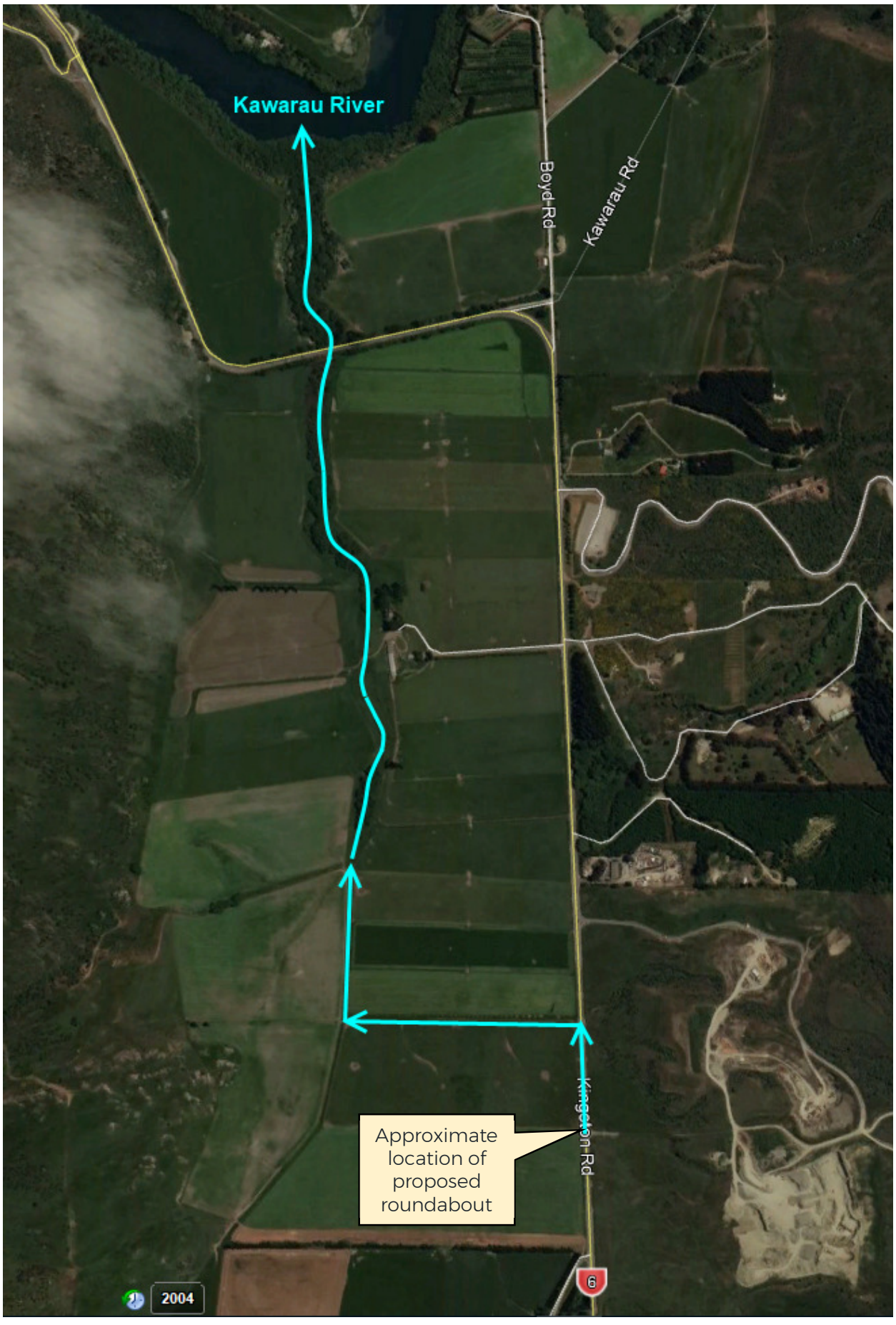

Figure 4: Overland storm water flow path.

A roundabout would contain kerbs and channels which would direct storm water to the surface water channels on either side of the roundabout. Treatment of storm water runoff would need to be considered as part of the roundabout design.

1.7 Land Requirements

The roundabout would require more land than the current highway reserve provides. If the roundabout was constructed on the centreline of SH6, then land would be required on both the east and west sides of SH6. If the landowners on the east side of SH6 (Coneburn Industrial) did not want to sell any land for the construction of the roundabout, then it could be constructed slightly offset to the west, in which case it would require more land from the proposed Coneburn Development.

1.8 Pedestrians and Cyclists

SH6 is currently a rural environment with no dedicated provision for pedestrians or cyclists. Pedestrians are required to use the grass berm, or the sealed shoulder where available.

Cyclists share the traffic lane or use the sealed shoulder where available. There is an alternative lakeside route to Kelvin Heights as shown in Figure . The Queenstown Trails Trust have a desire to develop an off-road route from Jack's Point to Frankton.

Active Travel (walking and cycling) connections from Jacks Point to Frankton are also currently being considered through the Queenstown Lakes District Council's Wakatipu Active Travel Single Stage Business Case.

Figure 5: Queenstown Trails Map

Further design of the roundabout would need to consider the appropriate level of provision for pedestrians and cyclists. It would need to take into account these alternative routes, as well as the nature of the developments on both the east and west sides of SH6 and the desire lines for people to walk and cycle between them.

1.9 Public Transport

Bus route 4 (Jacks Point to Lake Hayes Estate) travels north-south along SH6.

The Transport Agency, along with its collaborative working partners, Otago Regional Council and Queenstown Lakes District Council, are currently assessing the future (2028 and 2048), public transport demand. This will likely see an increase in bus frequency and potential ferry services from Woolshed Bay and/or Homestead Bay depending on ease of access.

The use of public transport should be considered and integrated into the design of the proposed Coneburn Development to help reduce private car trips and congestion on the wider roading network.

Traffic modelling should be undertaken to ascertain likely level of service for buses. If it was desired, there is the potential to build bus priority into the roundabout or design the roundabout to allow this to be added in future. Any changes to the bus route to service the new 600 dwelling development should also be considered, and whether this means bus movements in other directions need to be accommodated through the roundabout.

Recommendation

No constraints have been identified which would threaten the feasibility of a roundabout at this location. Subject to further investigations and conceptual design, there do not appear to be any reasons why a roundabout could not be physically constructed at this site.

Items that need to be addressed going forward include:

- Whether the roundabout will be 3-leg or 4-leg and connection to Coneburn Industrial;
- Whether land from both sides of SH6 are able to be acquired, or whether the roundabout must be offset so as to only require land from the west side of SH6;
- Connection with Woolshed Road/Jacks Point Resort Zone;
- Traffic modelling to determine optimum lane layout (single-lane versus dual-lane);
- Optimal roundabout size;
- Level of provision for pedestrians;
- Level of provision for cyclists; and
- Level of provision for public transport (buses).

Please let us know if you have any queries or require any further information.

Regards

pp R Gibson

Chris Morahan
Senior Transportation Engineer