From: Peter Roan
Sent: Friday, 4 May 2018 11:15 a.m.
To: 'Rachelle McBeth' <Rachelle.McBeth@npdc.govt.nz>
Subject: Mt Messenger Geotech Specialist

Hi Rachelle - Further to your emails on geotechnical matters over the last couple of days I set out below and attached some further information on the mass-landslide feature north of the Mt Messenger tunnel and on the geotechnical investigations completed by the Alliance.

Option Z and the Landslide Feature:

I've attached the 2016 Opus report referred to, but it isn't very useful as you will see in terms of comment on the landslide feature. I've also attached the Opus drawing for route MC 10, which has the landslide feature plotted on it from the QMap information (note that at the time Opus was considering options there wasn't an equivalent Z alignment – of the Opus drawings referred to in our Shortlist Resilience report, the MC10 drawing best shows the landslide feature in relation to the existing SH3 alignment).

I'd note that as part of the options assessment process completed by the Mt Messenger Alliance our designers & geotech team produced Option alignment drawings. I've attached the drawing for Option Z which better shows the extent of the landslide than the Opus drawings. This extent is as mapped by our geotechnical specialists (this mapping process is referred to in the Shortlist Resilience report (Appendix E of the Short List report)). I've attached a plan showing the location of geotechnical investigations progressed on the land to the west of SH3; boreholes BH101 – 105 were progressed to better understand the geotechnical conditions of the landslide feature.

In terms of design for Option Z, and to ensure that a resilient alignment was possible, the design along the northern section of Option Z included a soldier piled retaining wall along the area of geotechnical risk (approximately 1.5 km of this section of the alignment). (The length of retaining wall is shown on the Option Z drawing).

The Shortlist Resilience report (Appendix E of Short List report) reports on this landslide (refer notes on Option Z in Appendix A of this report) as follows:

> Traverses landslide headscarp area for about 1km.
> Low to moderate potential for landslide movement causing prolonged road closure. However, significant designed retaining structures are proposed to isolate new Z route from landslide. Moderate to significant improvement in resilience for and earthquake instability.

As we have discussed, amongst the matters that informed the decision not to progress Option Z was its cost. At the shortlist option stage, the Option Z cost estimate was $382.5M (cf $199.6M for Option E). In this estimate some $112M was allowed for construction of the retaining wall referred to above (i.e. the retaining wall made up about 30% of the cost).

Accordingly, and taking into account this significant cost differential, and also the matters highlighted through the MCA process such as the complex constructability issues, and the scoring on cultural values due to proximity to the maunga, the Transport Agency determined that it would not progress further consideration of Option Z.

You have asked also about local maintenance costs associated with maintaining the existing SH3 alignment as it traverses the landslide. We have not looked into this in detail and do not really consider it to be a relevant consideration. The incorporation of the significant

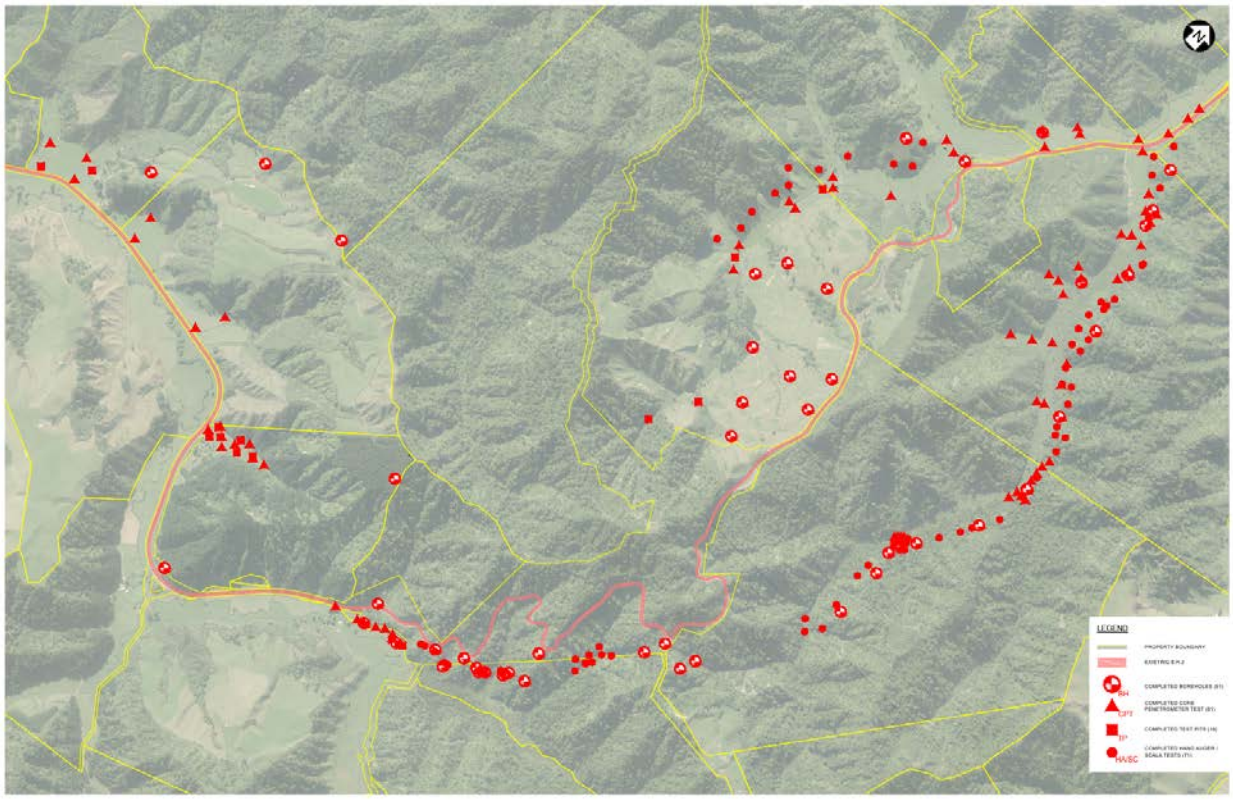
retaining structure into the design for Option Z was to account for the possibility of a significant landslide event and the need for resilience in relation to such an event, rather than to respond to more 'regular' and localised land slippage as might be accounted for in recent maintenance work.

Geotechnical investigations

I've included below an image that identifies all of the geotechnical investigations that have been completed to date for the project (both those associated with the options assessment process and for the development of the preferred alignment design). These investigations include some:

51 Boreholes
81 CPTs
18 test pits
71 hand augers

That's a whole heap of drilling! (and there will be more over the coming months)



I trust this additional information is of assistance. Just yell if there is more you need.

Kind regards

Peter

From: Rachelle McBeth
Sent: Thursday, 3 May 2018 9:14 AM
To: 'Peter Roan' <Peter.Roan@mtma.co.nz>
Subject: RE: Mt Messenger Geotech Specialist

Fantastic thanks Peter.

On that matter, another piece of useful information might be from NZTA, if they have had to do repairs on that stretch of road over previous years due to the landslide, then that might further demonstrate the resilience/cost risks. Perhaps something to mention in evidence unless you have something to add to the email you hope to send today. Even if you can verify whether this is the case. I note the AEE discusses maintenance costs associated with the existing route and wonder if you have any comments specifically about the northern landslide.
Have a good day, Rachelle

From: Peter Roan [mailto:Peter.Roan@mtma.co.nz]
Sent: Thursday, 3 May 2018 8:55 AM
To: Rachelle McBeth <Rachelle.McBeth@npdc.govt.nz>
Subject: RE: Mt Messenger Geotech Specialist

Morning Rachelle – I've got the team sending me drawings showing the location of our geotechnical investigations. I'll package up all of the information into 1 email and send across to you. I think it should all be with me today, so with you late today I hope.

Cheers
Peter

From: Rachelle McBeth [mailto:Rachelle.McBeth@npdc.govt.nz]
Sent: Wednesday, 2 May 2018 2:24 p.m.
To: Peter Roan <Peter.Roan@mtma.co.nz>
Subject: RE: Mt Messenger Geotech Specialist

Hi again Peter

I'm just after a wee bit of extra geotec data for our engineer (who by the way has changed recently due to health reasons of the earlier engineer – so we now have Russell Allison of AECOM – he is up to speed but requesting this extra info).

Russell has asked for the following:

"to sufficiently understand the geotechnical characteristics (of the proposed route) it would be useful if I could have a summary of the geotechnical work completed. In Section 2.3 of the GAR (Technical Report 14) the applicant refer to previous geotechnical investigations completed by Opus. However, they don't include details regarding the number or location of boreholes etc. These will be included in the Opus factual geotechnical reports and are likely to be large documents. However, I don't need to see all the details but it would be useful if the applicant could provide a summary of the number and location of the exploratory points, such as a table and location plan(s), so I can see what has been completed. Alternatively if it is easier for them to provide the complete reports then that is fine. "

Is it possible please to provide the Opus factual geotechnical reports or summary as per above?

Thank you, Rachelle

From: Peter Roan [mailto:Peter.Roan@mtma.co.nz]
Sent: Tuesday, 1 May 2018 2:40 PM
To: Rachelle McBeth <Rachelle.McBeth@npdc.govt.nz>
Subject: RE: Mt Messenger Geotech Specialist

Hi Rachelle – sorry; has taken longer to get this to you than it should have (and I still don't have the Opus files). I've been reliably told that I should have the relevant drawings this afternoon and will forward these on. I've also pulled out geological mapping material that had been produced by our geologists as part of the options process that better defines the landslide feature than does the QMap information, and will provide that to you also. Don't think you need a s92 letter, unless you feel you need to.

In terms of talking tomorrow, my day is already pretty full and agree that we are pushing on!

We are definitely working towards providing you and TRC with an updated set of conditions (but that will likely be early next week).

Cheers
Peter

From: Rachelle McBeth [mailto:Rachelle.McBeth@npdc.govt.nz]
Sent: Tuesday, 1 May 2018 10:58 a.m.
To: Peter Roan <Peter.Roan@mtma.co.nz>
Subject: RE: Mt Messenger Geotech Specialist

Hi Peter

Any response on this matter? Is it also possible to provide the details to support the conclusion that the southern section of the large landslide is actively moving, as stated on Page 5 of the Resilience Assessment, Technical Report 3, dated December 2017. No such details appear to be included in the Geotechnical Appraisal, Technical Report 14, Volume 3 of the AEE.

Would you prefer I ask this officially under section 92?

Do we need to meet/chat this week? I think we're just pushing on and don't have anything to talk about, having met last week.

Rachelle

From: Peter Roan [mailto:Peter.Roan@mtma.co.nz]
Sent: Thursday, 26 April 2018 9:56 AM
To: Rachelle McBeth <Rachelle.McBeth@npdc.govt.nz>
Subject: RE: Mt Messenger Geotech Specialist

Morning Rachelle – I've followed up with our geotechnical team and will come back to you.

Cheers
Peter

From: Rachelle McBeth [mailto:Rachelle.McBeth@npdc.govt.nz]
Sent: Wednesday, 25 April 2018 10:33 a.m.
To: Peter Roan <Peter.Roan@mtma.co.nz>
Subject: FW: Mt Messenger Geotech Specialist

Hi Peter

Following from our discussion at Tuesday's meeting regarding the large landslide, Council's engaged geotechnical engineer has identified this landslide area as per the attached extract of the geological QMap. We understand that the online route approximately follows the eastern margin of this landslide on the attached extract from Figure 1.1 of the AEE Volume 1.

Section 3.1 of Appendix E – Resilience of the Shortlist Report (pdf Page 101 0f 296) refers to drawings prepared by Opus as below:

Opus route option drawings, 2016 for MC10, MC20/23, MC70/71 route options, ex Opus 2016 SH3/Route Options/Feasibility report. These drawings identified areas of landslide risk (from GNS "QMaps"), likely areas of liquefaction, watercourses, property boundaries and Ngati Tama and DoC land.

We don't appear to have a set of these drawings or the Opus report.

The report may be referred to as

Mt Messenger Options Assessment – Resilience. Prepared by Opus International Consultants Ltd. 15 June 2016. File: 5-C3195.02.

or

Opus International Consultants (Opus); SH3 Mt Messenger Route Options Feasibility Report, 2016

Are these documents available to help us better understand the landslide?

Rachelle