31 October 2023

Attention: Alister Hartstone

Email: alister@setconsulting.co.nz

ref. 16782.blh

Dear Alister

RE: MERIDIAN ENERGY LIMITED (MEL) – APP.045356.01.01 – LU2300093 – RFI RESPONSE No# 2

This is the second response to the s92 RFI dated 3 October 2023.

Please see **attached** the following requested information:

- Stormwater (RFI Items 2 and 5)
- Construction noise (RFI Item 9)
- Updated traffic impact assessment (RFI Item 6) - cycle connection

RFI Items 2 and 5

Please see **attached** a response to the requests from Water Technology Limited (WTL) and Metis Consultants Limited (MCL). The proposed condition under 2a of the response is supported by the applicant.

Please note that the draft stormwater response is being discussed directly with MCL and will be finalised following those discussions.

RFI Item 3

Please note that the applicant no longer requests consent to extract ground water, meaning that RFI Item 3 is no longer relevant.

RFI Item 6

The updated traffic impact assessment **attached** includes updated vehicle tracking confirming that the light pole will be unaffected by the proposal.

Regarding the cycleway, both the MEL development and construction teams have engaged with Stephen Gibson of Marsden Maritime Holdings (MMH) to discuss the cycleway. MEL is supportive of the cycleway in principle and will continue to engage during the detailed design phase. That said, these discussions are separate to and outside the scope of the consents currently before the respective Councils.

Item 9

Please see **attached** a response received from Marshall Day. The response proposes conditions to manage construction noise and vibration which are supported by the applicant.

Yours faithfully

Brett Hood
Director

Encl. Stormwater and flooding responses (Beca), Construction noise response (Marshall Day), Updated traffic impact assessment (Beca)

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27 October 2023

Attention: Micah Sherman

Dear Micah,

Civil and Flooding Responses to S92

The recent consent application in support for the Ruakaka Solar Energy Park attracted comments under the provisions in section 92 of the RMA. Below are the comments received and responses to each of those comments.

Comment 1:

The model methodology appears to be fit for purpose to assess relative effects of filling the site on flood extents, noting the results are comparable to the Regionwide flood model (where it overlaps). There are some differences between underlying assumptions but this is expected in modelling. We note that Beca relied on the RCP 2090 HIRDS dataset though we would expect RCP8.5 to be more appropriate (noting that relatively speaking, this is unlikely to affect the findings)

Beca Response:

We are of the opinion that RCP8.5 temperature changes are unrealistically high (see for example Hausfather & Peters, 2020), however we agree that RCP8.5 is unlikely to affect findings.

Comment 2:

SITE 1: No impact is achieved via a bund with outlet structures along the downstream (north-eastern) boundary but little detail is provided in terms of what the bunds/outlets would look like.

a. We note there are little details on these assets provided in the flood modelling report. Given they are critical in protecting downstream properties, it would be good to see. They may be included in the Civil Design Report (Beca).

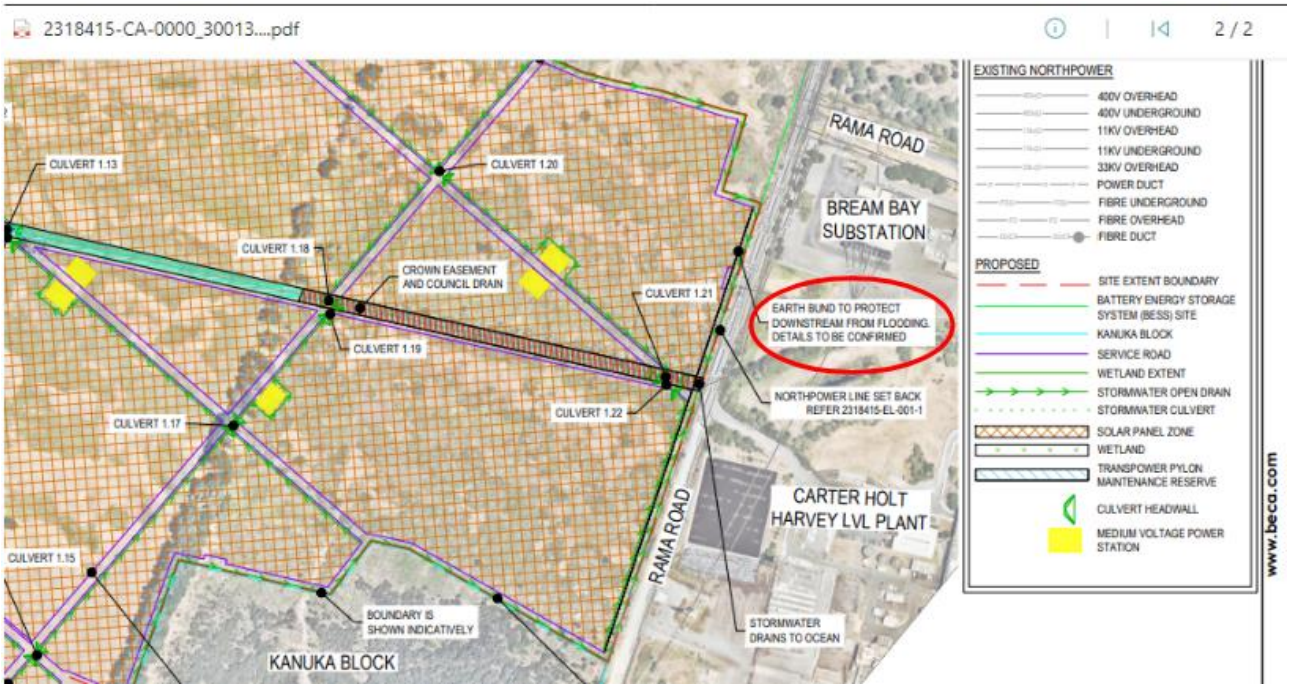
b. Consideration of maintenance would be important too, dependent on height of bund.

c. Details can likely be addressed at the detailed design stage. However, modelling will be needed to confirm that there is no detrimental impacts off-site.

Beca Response to 2a

A bund is shown on the civil drawings with the note and line type shown in in the circled area as a clip shown below. This bund was specifically sized for the earthworks profile modelled for the site. If the earthworks

profile changes, the bund will need to change. Similarly, if the imperviousness of the site changes, this bund can be modified to hold water back to achieve a neutral flood effect.

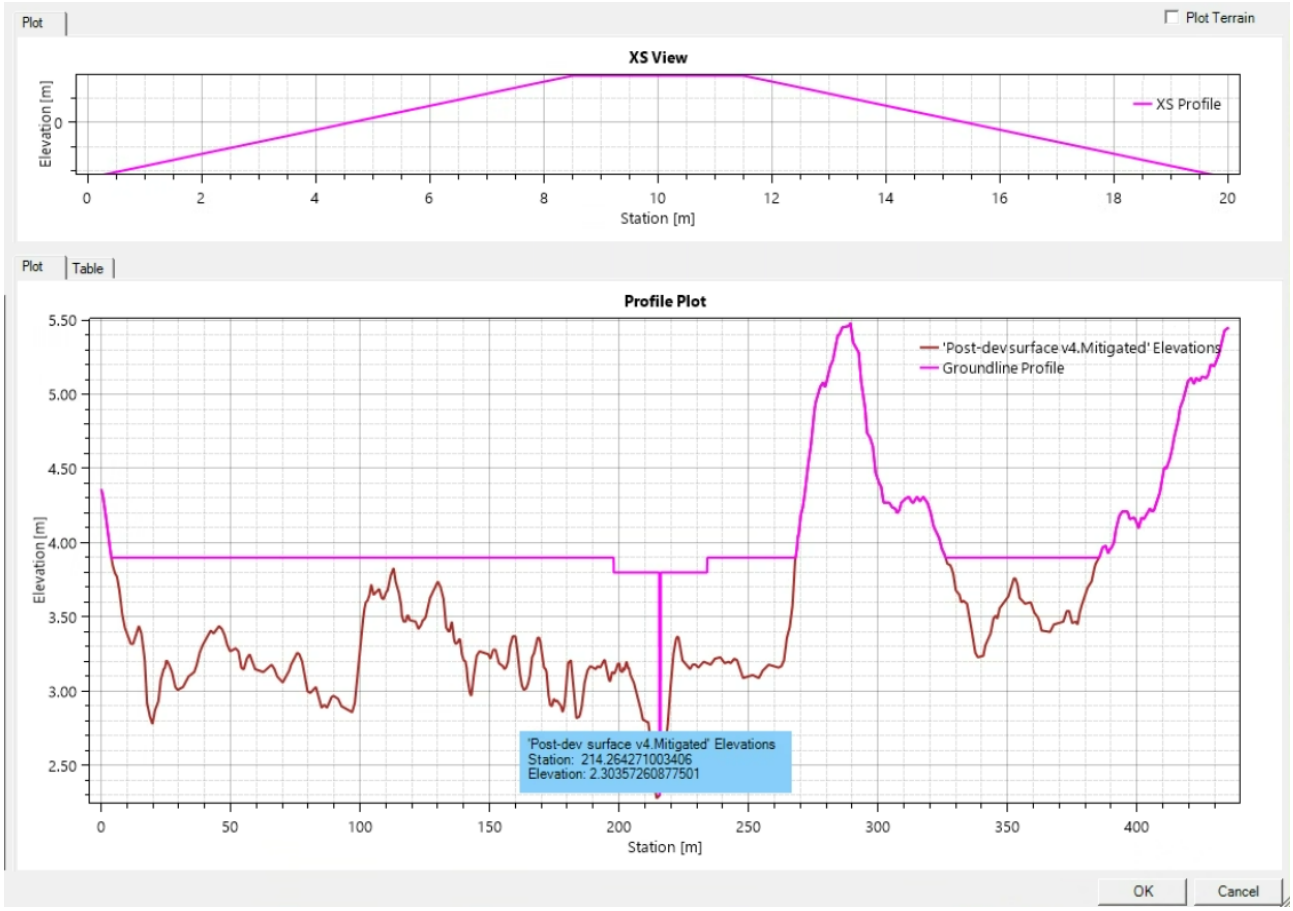


To maintain flexibility in design and still consent the project, a condition is proposed to be added to the consent that addresses the flood effects as a result of the earthworks, surface roughness and impervious surfaces changes in combination. This consent condition may read:

> "*The consent holder shall achieve a flood level increase of not more than 5mm on any land outside the project site in the 100 year ARI rainfall event. This shall be demonstrated using a hydraulic model and submitted to Council and approved 40 days prior to construction commencement. The flood model shall take earthworks, ground roughness and soil infiltration changes into account. Soil infiltration changes shall be calculated using the PV-SMaRT Solar Farm Runoff Calculator Version 3.0 tool from the University of Minnesota*"

Beca Response to 2b

The bund is between 100mm and 1500mm high (see screenshot from model below). Maintenance shall be carried out as per usual site activities. A consent condition is proposed requiring regular maintenance of the site including but not limited to the preservation of the flood control bund.



The consent condition for consideration may read:

> "*A flood control bund along the south-western side of the Rama Road (site referred to as Site 1), shall be maintained at all times to the approved height width and length as part of regular site maintenance activities*"

Beca Response to 2c

We agree and therefore the condition proposed in response to comment 2a will manage this.

Comment 3:

SITE 2: Flooding at this site is mostly from local rainfall. Earthworks on the site can likely readily be designed to ensure hydraulic neutrality.

Beca Response

We agree and therefore the condition proposed in response to comment 2a will be helpful in allowing change in the design and still require modelling to achieve the consented outcome.

Comment 4:

SITE 3: Earthworks at the site are predominantly cut, which would explain why there is generally betterment offsite as a result of work.

Beca Response

We agree, and no flood effects have been modelled, any change to this will be modelled and sent to Council for compliance under the proposed condition in response to 2a.

Comment 5:

The maps in the Appendices of the Flood Modelling Report are low resolution. It would be good to get higher resolution maps.

Beca Response

This was our error (due to the PDF compilation process). Updated maps have been supplied with this response.

Comment 6:

Get a copy of the HEC RAS 2D model to check how the post-development scenario was modelled relative to the existing.

Beca Response

We would not typically supply the complete model for consent applications. Please advise if there are any further outputs from the model required.

Comment 7:

Note that maps show some afflux (increase in flood levels) on the wetland on an adjacent property but we would need higher res maps to confirm extent of increase.

Beca Response

This is largely because culverts were not included in the model. These culverts would need to be surveyed and then included in the modelling at detailed design.

Comment 8:

Metis opinion that proposed solar panels would increase impervious areas, differs from the current assumption that the pervious and porous nature of the site would be maintained. Should the assumption change, the Ruakaka Flood Model would need to factor these changes in, to confirm that the increase in impervious areas and associated runoff doesn't impact adjacent properties during the flood events.

Beca Response

Following a meeting with Metis, Water Technology, Meridian and Beca on 13 October 2023, it was agreed further studies are required to confirm that there are no hydrologic effects of solar panels and ground compaction. We agreed the tool proposed should be used without more robust local evidence. The tool will require a more certain layout showing panel sizes and row spacing for the solar farm which may change post consent. It is proposed that the consent condition in response to comment 2a be used to cover the effects of the solar panel changes to soil infiltration and be used in the modelling to manage the effects.

It is noted that Site 3 will be fully submerged in a flood resulting from a 100 year ARI rainfall event. This will render the use of soil permeability reduction immaterial. It is proposed that Site 3 be excluded from the use of this tool.

Comment 9:

Metis document stormwater management notably associated with impervious areas. Please respond to the queries in the advice and as listed below:

1. Please review available international research and best practice guidance documents on managing stormwater runoff from solar farms, then provide revised SW calculations at pre-and post-development to confirm changes in runoff peak flow & volume. The calculation should take into account all the parameters that could impact the peak flow rate as per international best practice approaches. If the revised stormwater calculations show an increase in peak flow and / or volume, please provide revised stormwater management proposals.
2. Please provide evidence to show that the SW detention ponds are designed to mitigate SW peak flow from the development. Given that there is also a subdivision development nearby, the sizing of pond for SW management should take into account also the potential future development in the area.
3. Please also confirm if SW is to be discharged to the detention ponds, there is consented from the private owners of these ponds.
4. Please confirm that the vertical clearance of any solar array is no greater than 10 feet or 3.048m both during construction and operation.

Beca Response

It is proposed the consent condition in response to comment 2a be used to cover the effects of the solar panel changes to soil infiltration and take international best practice into account when managing the effects.

The stormwater management ponds between Sites 2 and 3 are not presently being relied on for attenuation of flows from Meridian's sites. If attenuation is required, it may be managed with check dams in the site swales or though a flood mitigation ponds that hold runoff on site before discharging. As the site layout may change and refine post-consent, the following consent condition is proposed relating to attenuation of peak flows prior to discharge from the site:

> "*Peak flows discharged from the site shall be attenuated on site such that the 100 year ARI post-development peak flows do not exceed the pre-development peak flowrate. The on-site detention systems and comparison of peak flows shall be submitted to Council and approved 40 days prior to construction commencement.* "

The maximum vertical clearance of the panels is approximately 3.2m which was agreed at the meeting held on 13 October 2023 as reasonably consistent with the advice from the Minnesota Pollution Control Agency (MPCA) suggestion of 10 feet (3.048m). On these grounds we consider the panel height and potential for drip line erosion adequately managed.

Yours sincerely,

Justin Kirkman

Senior Associate - Civil Engineering

on behalf of

Beca Limited

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