| | |
|---|---|
| **From:** | Alistair Osborne |
| **To:** | |
| **Cc:** | Nadia Nitsche |
| **Subject:** | Updated flood modelling in the vicinity of 23 Pomare Rd |
| **Date:** | Friday, 24 May 2024 12:01:55 pm |
| **Attachments:** | image002.png<br>Wellington Water Modelling Team - 23 Pomare Rd Assessment.pdf |

Kia ora John,

Thanks for your patience and apologies again for the length of time it has taken for this work to be completed.

Please find attached a technical memo outlining the error in our flood mapping that you identified, the work that Wellington Water has carried out to address it, and the updated model results. The updated model results do significantly change the mapped flooding in the vicinity of your property. I note that I have only been able to include a generalised flood hazard extent map as we are still working with HCC to develop an updated complete flood hazard map that includes hazard classification (eg, low, medium, and high) across the whole of the Hutt Valley for the upcoming notified Proposed District Plan. However, the classification process should not change the new extent.

I also want to note that in the memo and the updated modelling I have not explicitly addressed the 17 items that you have outlined but rather focused on the ones that have an impact on how the model functions in the vicinity of 23 Pomare Rd. The features I did focus on are as follows:

- Drains at the base of the hill slope in the western corner of the property and along the southwestern boundary.
- A raised retaining wall enclosing the southern edge of the tennis court (Figure 3).
- A brick wall along the eastern boundary of the tennis court (Figure 4).
- Gentle slope of the gravel carparking area falling towards the south (yellow arrows).

Some of the 17 items you highlighted would not have had an impact on the original modelled flooding. For example the ridge line near the northeastern boundary of your property was not related to the modelled flooding and was accounted for in a catchment draining the hillslopes to the north and east of your property.

I hope the memo is helpful and please let me know if you have any queries about it. I have not shared it with Hutt City Council, and if you would prefer I can generate a separate one for the council as I do need to provide an updated version of the modelling to them and the reasons for the changes.

Thank you again for your patience and I am sorry for any distress this process may have caused. Thank you also for raising the issue, our aim is to develop as accurate flood maps as we can so feedback from community members such as yourself is critical.

Kind regards

**Alistair Osborne (he, him)** **Senior Hydraulic Modeller**

**Tel** 04 912 4400 **Mob** 021 365 961

**Private Bag 39804, Wellington Mail Centre 5045**

**Level 4, 25 Victoria Street, Petone, Lower Hutt**

# Attachment

# MEMO

| | |
|---|---|
| TO | John Wadham |
| COPIED TO | |
| FROM | Alistair Osborne |
| DATE | 24/05/2024 |
| SUBJECT | Modelled Flooding at 23 Pomare Rd, Tirohanga |

**FOR YOUR INFORMATION**

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## Purpose

To assess model predictions for flooding at 23 Pomare Rd, Tiroghanga, considering modelled topographic discrepancies between the model data input and actual ground topography.

## Background

A customer has contacted Wellington Water (WWL) to ask for a review of the modelled flooding predicted at 23 Pomare Rd, Tiroghanga. A review of the model at the location indicated the flooding was predicted to originate from a gully in the northwestern corner of the property (Figure 1).

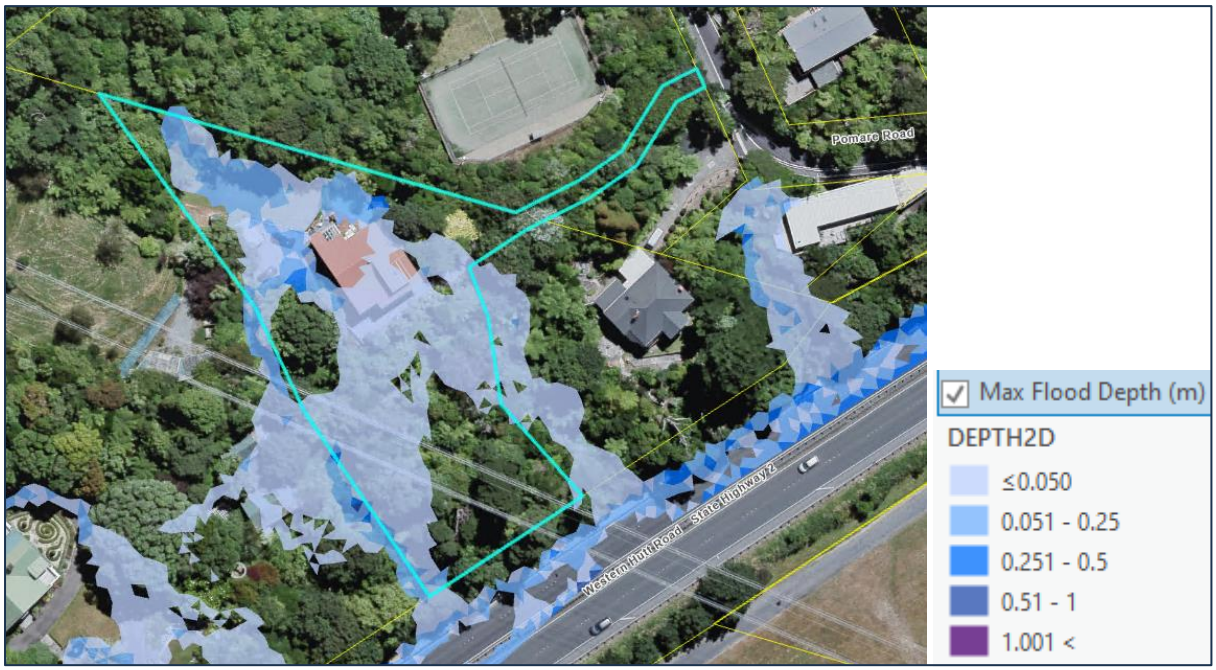


**Figure 1:** Current modelled flooding at 23 Pomare Rd during the 1% AEP event plus climate change

In a phone conversation with Wellington Water staff, it was noted by the customer that the local topography of the site and multiple features on the property meant that flooding on the property and, in particular, across the footprint of the dwelling was almost impossible. Wellington Water staff agreed to visit the property to discuss the site features and topography and update the hydraulic model if so needed.

## Site Checks

A Wellington Water representative visited the site on the 30th of April and confirmed, via visual assessment, the site features and topography of the site that were expected to impact the modelled flooding on the property. The site features reviewed on the property that were considered most critical to flooding and are different to the existing topography within the model are shown in Figure 2, below, and include:

- Drains at the base of the hill slope in the western corner of the property and along the southwestern boundary.
- A raised retaining wall enclosing the southern edge of the tennis court (Figure 3).
- A brick wall along the eastern boundary of the tennis court (Figure 4).
- Gentle slope of the gravel carparking area falling towards the south (yellow arrows).

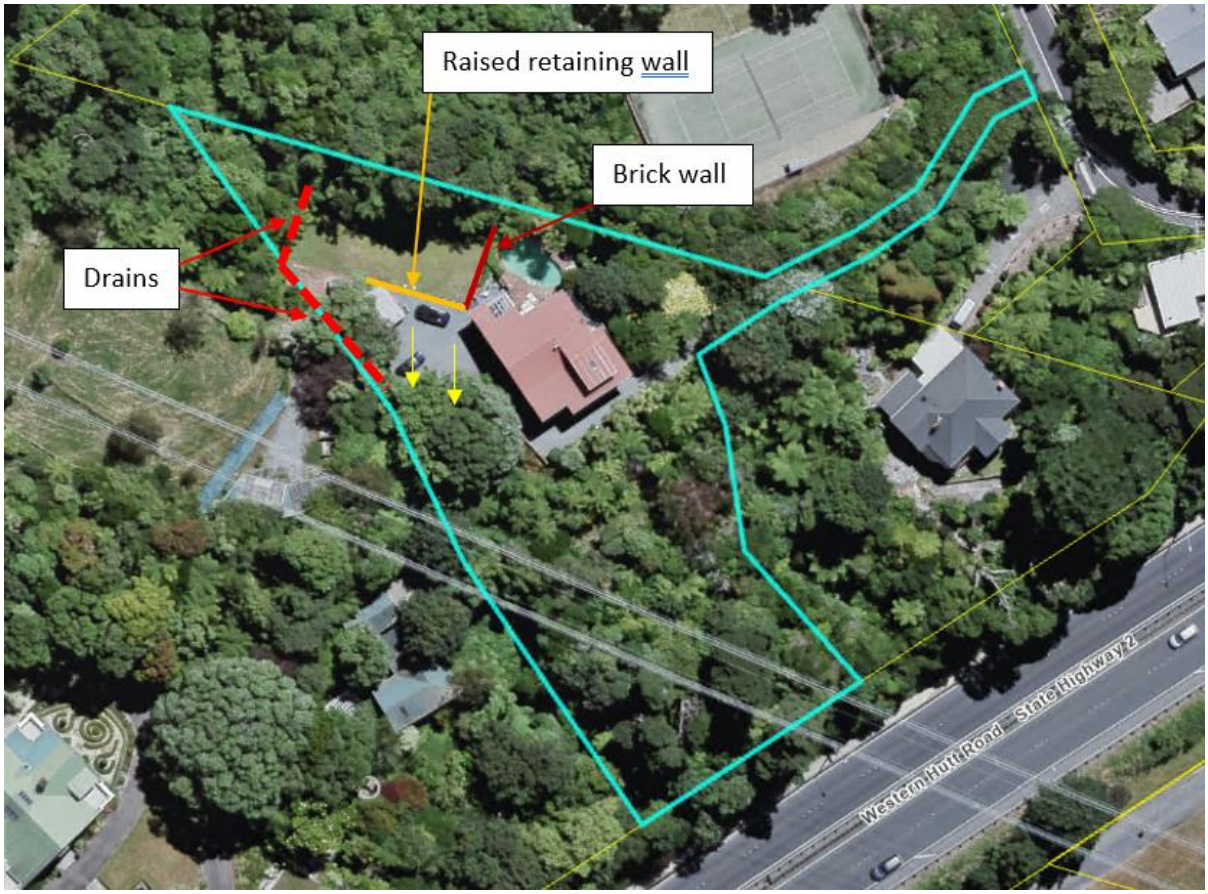


**Figure 2:** Critical site features

**Figure 3:** Raised retaining wall enclosing the southern edge of the tennis court.

**Figure 4:** Brick wall along the eastern boundary of the tennis court.

## Model

The property, 23 Pomare Rd in Tirohanga, is within the extent to the Petone stormwater hydraulic model. The model was developed in alignment with the Wellington Water Stormwater Hydraulic Modelling Specification (Wellington Water, 2017) and was validated. It was then peer reviewed by consultants independent from the modelling programme. Final sign off of the model was provided on 10 March 2023.

## Model review

WWL modelling staff reviewed the schema of the Petone stormwater hydraulic model in the vicinity of 23 Pomare Rd. It was found that two aspects of the model did not adequately represent the topography in the area; the first being the ground surface data applied in the model, and the second the subcatchment delineation around the property.

The ground surface data applied in the model was developed from LiDAR (collected in 2013), which has known issues with penetrating dense vegetation cover. In the modelled topography there is a rise in the ground surface on the western boundary of the site in the vicinity of the shed/garage (under the yellow circle in Figure 5). On site this is an open space (below tree cover) on the western side of the shed with a formed drain that can convey water through. In the model water is pushed around the rise onto the tennis court and across the footprint of the dwelling, Figure 5. Further, the topography did not include any representation of the drains on site, which would convey most, if not all water away from the tennis court area. These drains were not previously included as they were unknown due to a lack of definition in the ground surface data applied in the model. This lack of definition was likely due to the dimensions of the drains and vegetation cover in the area.

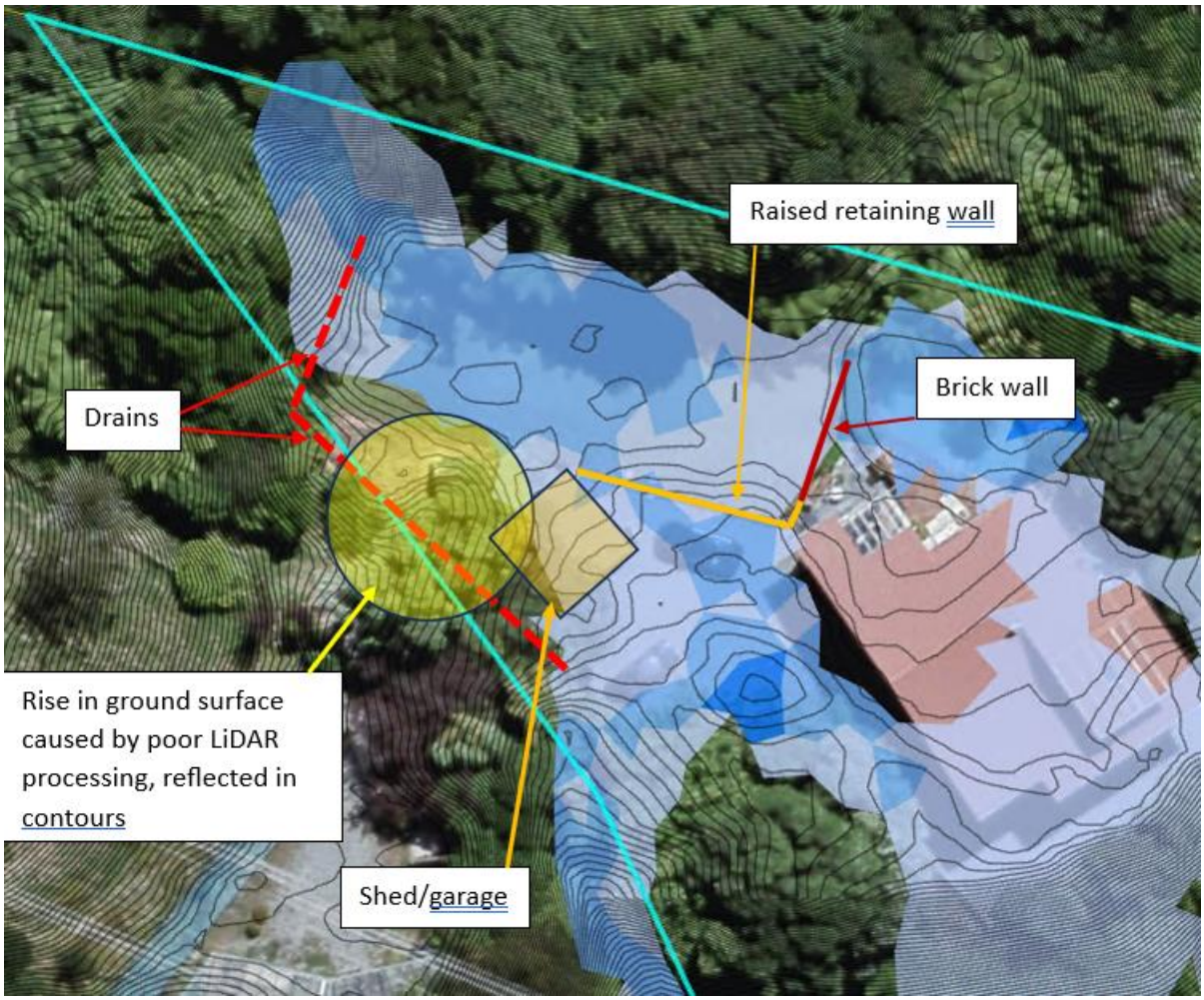


**Figure 5:** Critical site features and topographic discrepancies in the modelled ground surface

There are two subcatchments that have been delineated in the model that represent the rainfall runoff generated in the vicinity of 23 Pomare Rd. These are shown in Figure 6. The smaller of the two subcatchments sits upstream to the west of the property and the location it discharges on the model surface is upstream of the topographic rise described above which causes the modelled flooding across the property. The larger of the two subcatchments captures the remainder of the hillslope affecting 23 Pomare Rd but discharges it to the model surface downstream of the property (in the vicinity of State Highway 2).

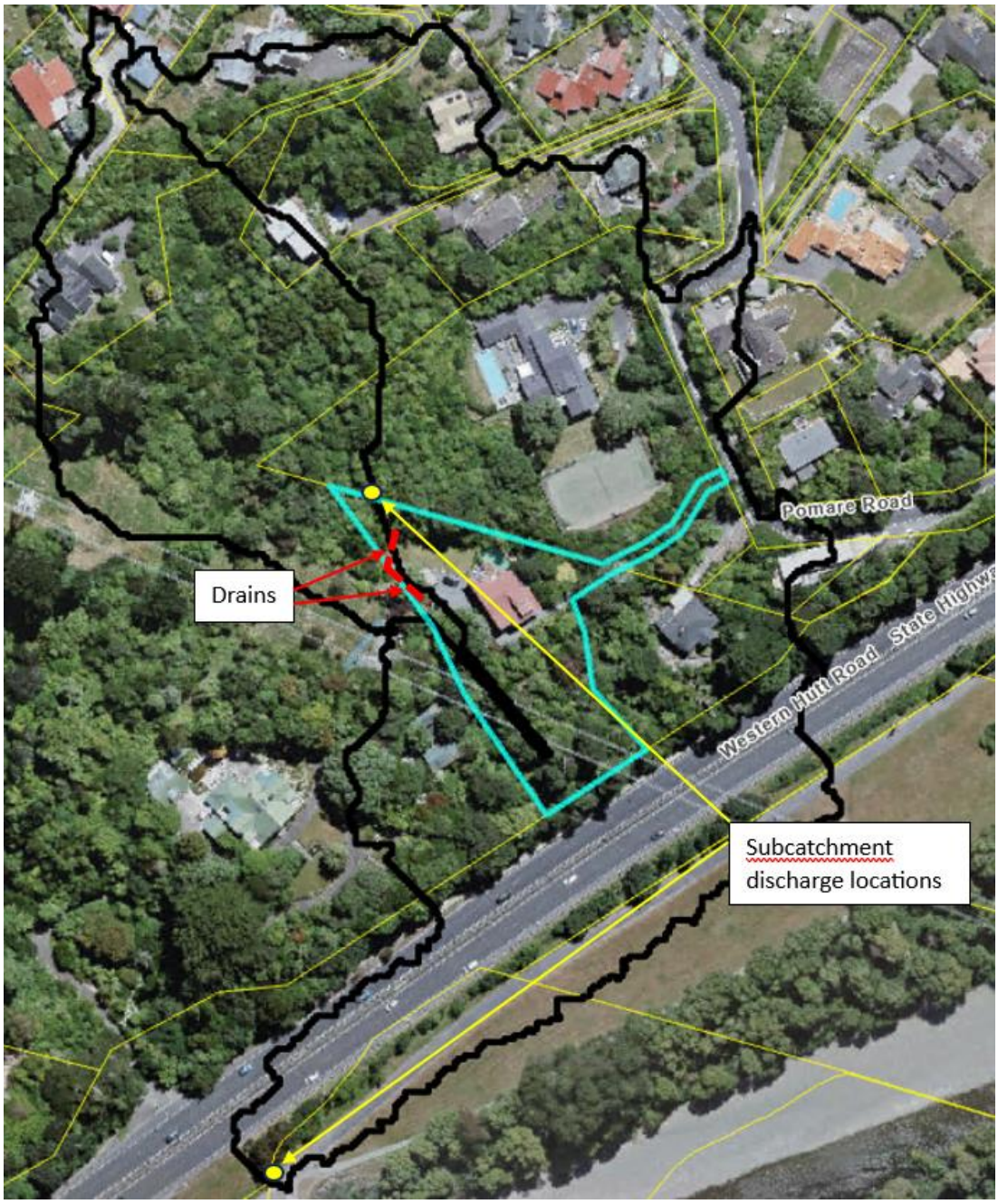


**Figure 6:** Subcatchments in the existing model

## Model update

The site visit to 23 Pomare Rd and the review of the Petone stormwater hydraulic model confirmed that the model should be updated to better reflect the nature of the topography and features of the property. The first step to updating the model comprised re-delineating and splitting the subcatchments to better represent the local topography. To this end, the two original subcatchments

were split into 4, as shown in Figure 7. It is considered that the 4 subcatchments provide a better representation of the topography and expected runoff pathways in this area.

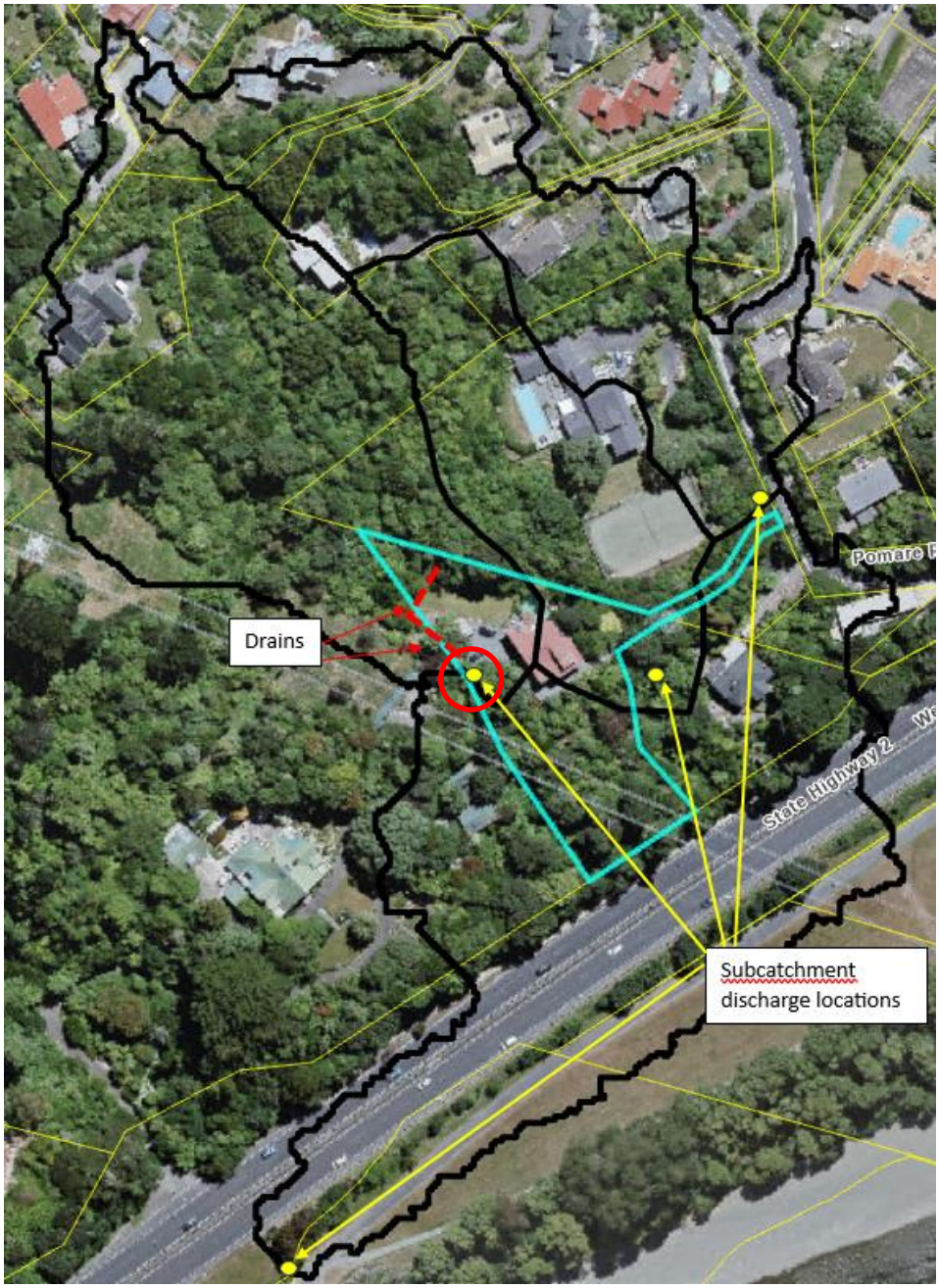


**Figure 7:** Updated model subcatchments

In addition to the use of 4 subcatchments, the location the subcatchment northwest of 23 Pomare Rd discharges to the model surface (circled in red in Figure 7), was shifted to the downstream end of the two drains on the property. This approach was taken as it meant the correct topography as well as the impact of the site features (the drains and walls) could be accounted for within the subcatchment

rather than the model surface. The new location (circled in red in Figure 7) discharges the subcatchment runoff to the model surface at the top of a gully that runs along the boundary between 23 Pomare Rd and 760 Western Hutt Rd.

The result of these model updates is shown below in the flood depth map **Figure 8.** The updated flood modelling results indicate 23 Pomare Rd is only impacted by flooding along the western boundary of the property.

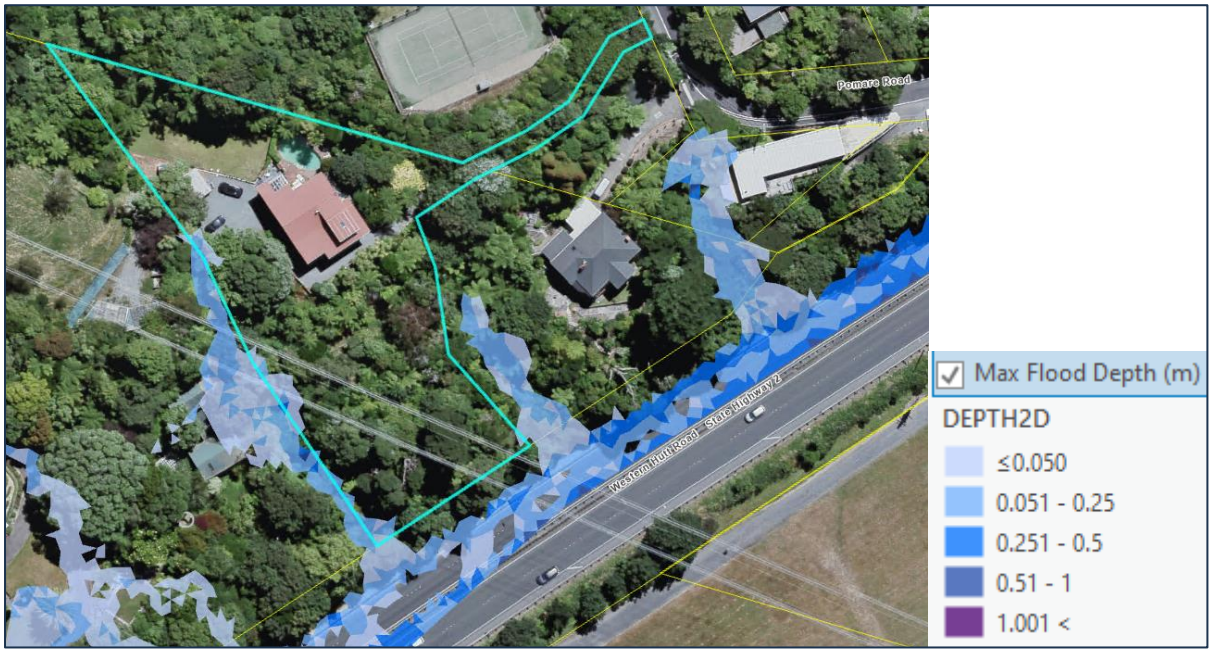


**Figure 8:** Updated model results in the vicinity of 23 Pomare Rd during the 1% AEP event plus climate change (a larger version of this map is provided at the end of this document)

Wellington Water undertakes additional analysis of the mapped flooding generated by the stormwater hydraulic modelling to develop the flood hazard maps applied by Hutt City Council. The Council are currently updating the flood hazard classification approach to align with the Greater Wellington Regional Council method (outlined in the GWRC document *Flood Hazard Planning Guidance, March 2023*).

Wellington Water is still working through the updated hazard mapping for the Petone stormwater model (covering Tirohanga) into which this work will be incorporated and do not have a final hazard layer available at this time. However, Figure 9 below shows the expected extent of the updated flood hazard mapping in the vicinity of 23 Pomare Rd.

**Figure 9:** Updated flood hazard extents in the vicinity of 23 Pomare Rd

## Statement

Wellington Water has updated the Petone stormwater hydraulic model to better reflect the topography and site features at 23 Pomare Road, Tirohanga. This modification was completed following a discussion with the property owner and a visit to the property to confirm the site features discussed.

The updated model results show that the property is only impacted by modelled flooding along its western boundary. This change will be reflected in the upcoming Hutt City Council notified Proposed District Plan superseding the current Draft District Plan maps. In addition, Wellington Water confirms they are satisfied with the outcome and consider the current building footprint to be flood free during the modelled design event.

For further information or additional details regarding the modelling please email the Modelling Team at Modelling.Team@wellingtonwater.co.nz.

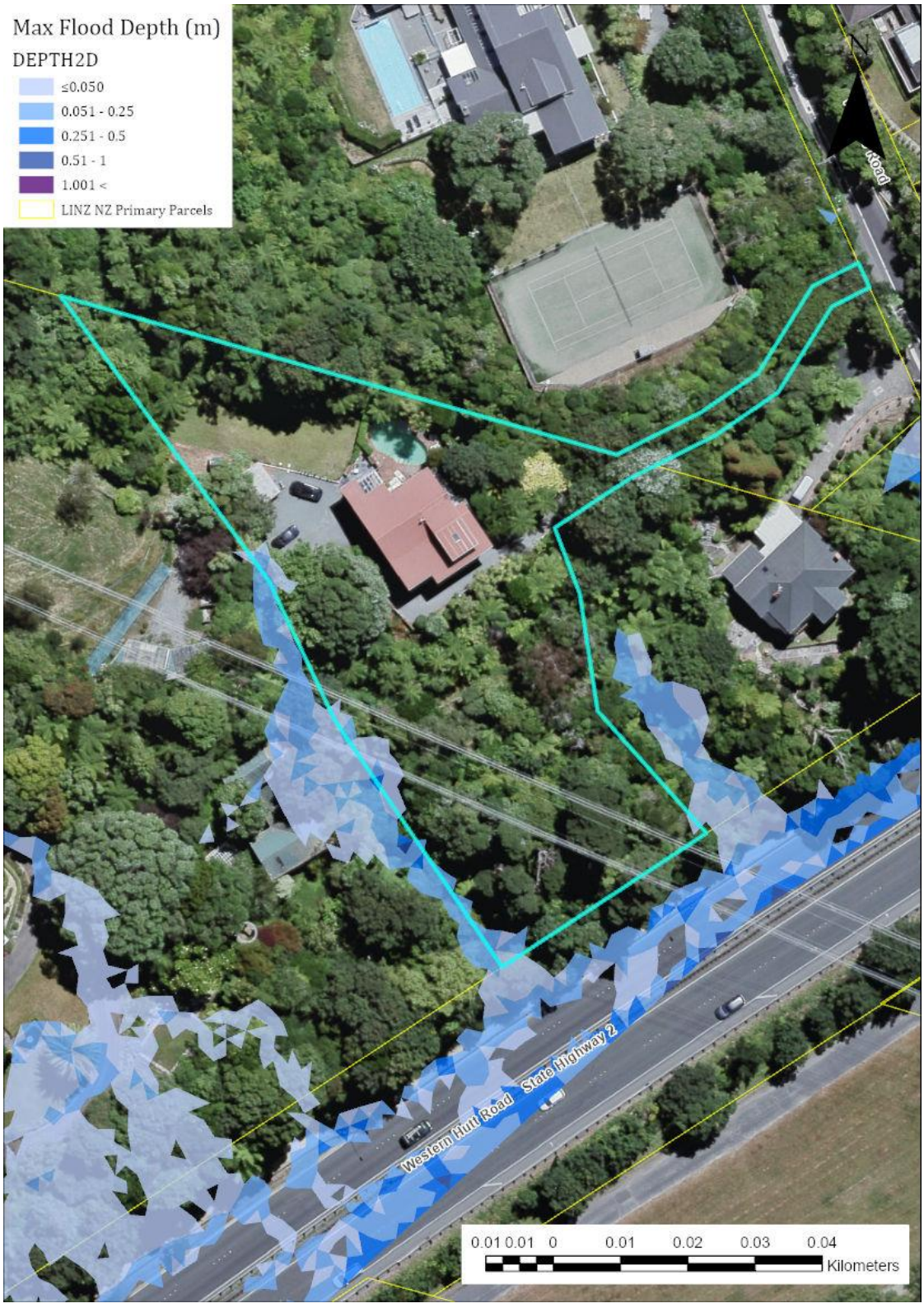


**Figure 8a:** Updated model results in the vicinity of 23 Pomare Rd during the 1% AEP event plus climate change

| | |
|---|---|
| **From:** | Alistair Osborne |
| **To:** | |
| **Cc:** | Tim Johnstone; Nadia Nitsche |
| **Subject:** | Updated flood mapping at 23 Pomare Rd |
| **Date:** | Tuesday, 2 July 2024 12:24:32 pm |
| **Attachments:** | image002.png<br>Wellington Water Modelling Team - 23 Pomare Rd Assessment - July Update.pdf |

Kia ora John,

Thanks for your patience. Attached is the new technical memo describing the model changes made subsequent to my second visit to your property to look at the gully.

In discussion with Tim, we have opted to clip/truncate our flood hazard extent to the boundary of your property, meaning there is no longer a flood hazard mapped on 23 Pomare Rd. The reasoning for this is as follows; our initial mapping of the new results showed only a sliver of the hazard extent crossing the boundary of your property in the south-western corner. The purpose the mapped flood hazard extent is to set planning rules and, pragmatically, the associated planning rules would not be applied to such a small portion of the property. As a result, it is considered reasonable to clip the hazard extent the property boundary. Further, clipping the extent does not meaningfully change the wider flood hazard extent, so the overall purpose of the mapping is maintained.

Thanks again for your patience and please let me know if I can provide any additional information.

Kind regards

**Alistair Osborne (he, him)** **Senior Hydraulic Modeller**

**Tel** 04 912 4400 **Mob** 021 365 961

**Private Bag 39804, Wellington Mail Centre 5045**

**Level 4, 25 Victoria Street, Petone, Lower Hutt**

# MEMO

| | |
|---|---|
| TO | John Wadham |
| COPIED TO | |
| FROM | Alistair Osborne |
| DATE | 02/07/2024 |
| SUBJECT | Modelled Flooding at 23 Pomare Rd, Tirohanga - Update |

**FOR YOUR INFORMATION**

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## Purpose

To investigate the gully draining beside the boundary between 23 Pomare Rd and 760 Western Hutt Rd and assess its impact on the model predictions for flooding.

## Background

Following an initial investigation into the modelled flooding predicted at 23 Pomare Rd, Tirohanga, and discussions with the property owner, Wellington Water opted re-visit the site to assess the gully along the western boundary of the property and its potential impact on modelled flooding. The initial investigation, reported in the technical memo *Modelled Flooding at 23 Pomare Rd, Tirohanga*, resulted in updated flood and hazard mapping for the site (Figure 1). However, there was still some uncertainty regarding the nature of flooding through the gully which appeared to let flow 'spread out' rather than focusing it within a confined channel.

To address this, Wellington Water staff visited the property a second time to investigate the nature of the gully and update the hydraulic model if needed.

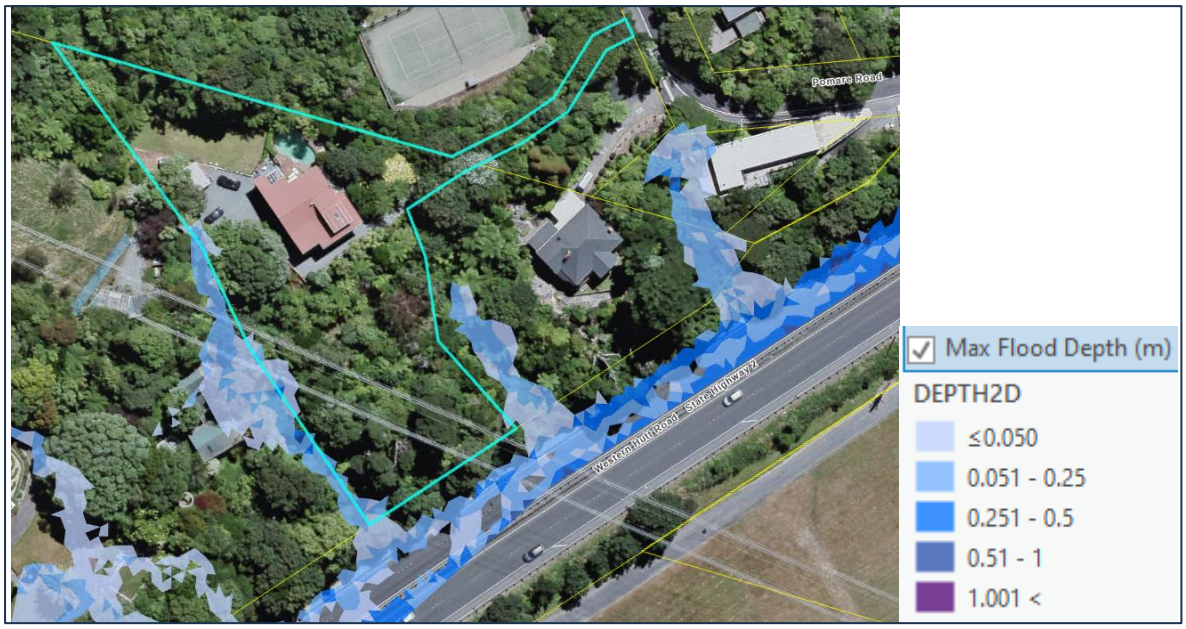


**Figure 1:** Current modelled flooding at 23 Pomare Rd during the 1% AEP event plus climate change

## Site Checks and Model Update

Wellington Water representatives visited the site on the 11th of June and confirmed where possible, via visual assessment, that the gully did have a formed channel that did not appear to be well represented in the modelled topography. To address this, changes were made to the model representation of the ground surface to accentuate the presence of a channel within the gully (Figure 2).

In addition to the gully, the Wellington Water representatives also inspected a stormwater sump located at the base of the gully (Figure 2). In Wellington Water asset data, the sump has been located in the southern corner of 23 Pomare Rd, however, the site inspection showed this sump is located on the footpath within the corridor parcel of State Highway 2. The sump location was also updated in the model to reflect this, see Figure 2.

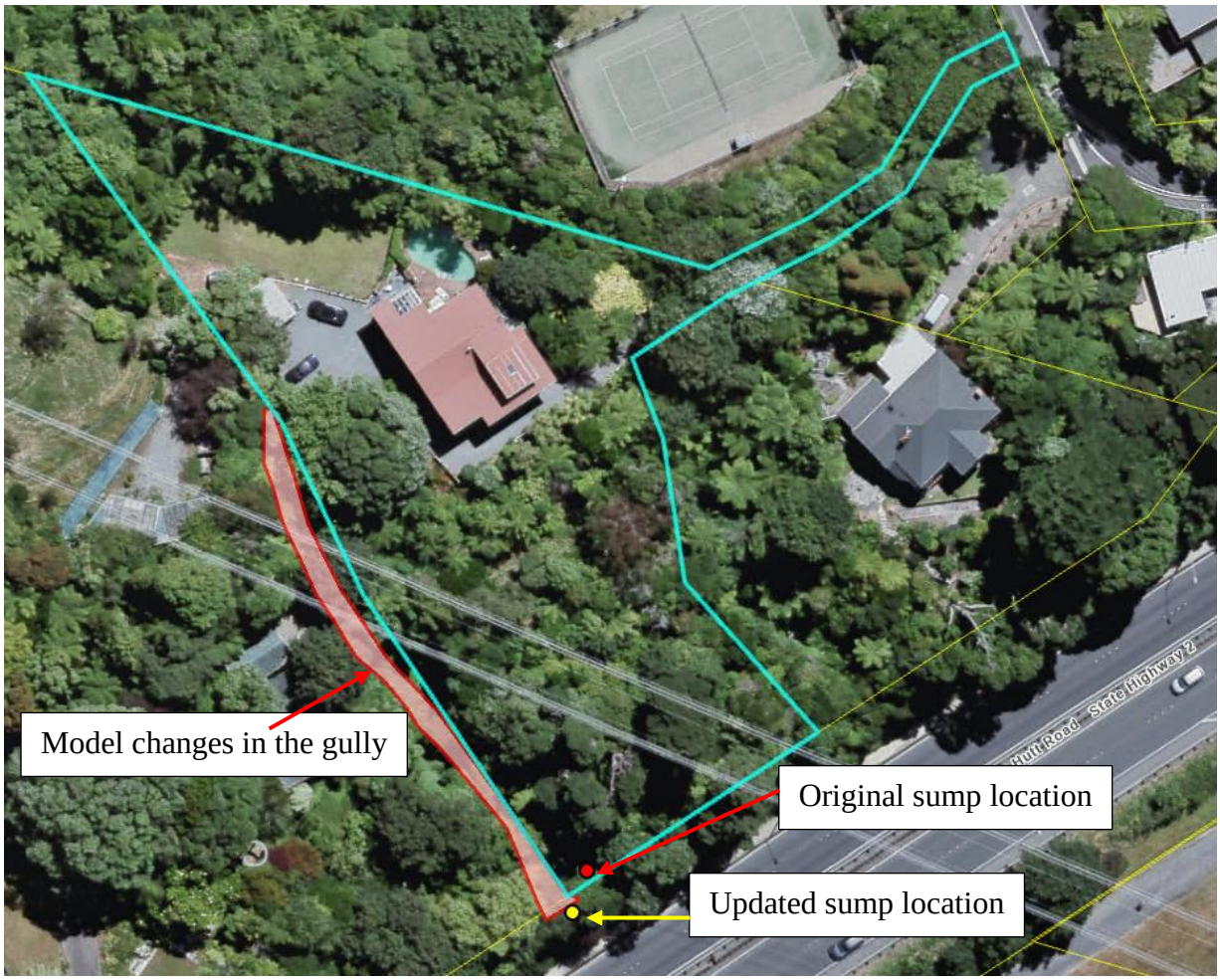


**Figure 2:** Model updates

The result of these model updates is shown below in the flood depth map Figure 3. The new results indicate 23 Pomare Rd is only marginally impacted by nuisance flooding (less than 0.05m) along the western boundary of the property.

As part of the additional analysis undertaken by Wellington Water, the flood hazard maps that will be applied by Hutt City Council in the upcoming notified Proposed District Plan have been updated to reflect this updated modelling. Figure 4 below shows the extent of the updated flood hazard mapping in the vicinity of 23 Pomare Rd. The updated mapping shows there is no longer a modelled flood hazard on the property.

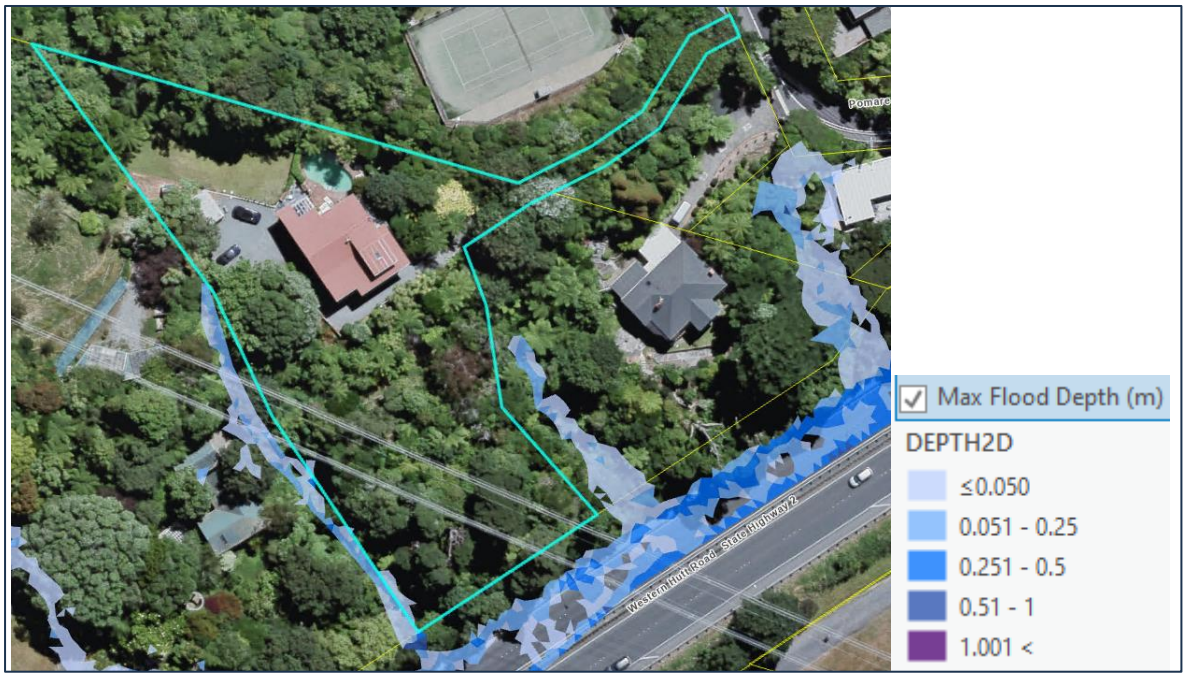


**Figure 3:** Updated modelled flooding at 23 Pomare Rd during the 1% AEP event plus climate change

**Figure 4:** Updated flood hazard extents in the vicinity of 23 Pomare Rd

## Statement

Wellington Water has updated the Petone stormwater hydraulic model to better reflect the topography and site features at 23 Pomare Road, Tirohanga. This modification was completed following a discussion with the property owner and two visits to the property to confirm the site features discussed.

The updated model results show that the property is only impacted by nuisance flooding (less than 0.05m) along the western boundary of the property. This change will be reflected in the upcoming Hutt City Council notified Proposed District Plan superseding the current Draft District Plan maps, in which the proposed flood hazard maps will show no flood hazard on 23 Pomare Rd, Tirohanga. Wellington Water confirms they are satisfied with the outcome and consider there to be no modelled flood hazard on the property.

For further information or additional details regarding the modelling please email the Modelling Team at Modelling.Team@wellingtonwater.co.nz.