

Note / Memo

**Haskoning Australia PTY Ltd.
Water & Maritime**

To: Mr Andrew Mason
From: Andrew Morris
Date: 12 October 2023
Copy: Click to enter "CopyTo"
Our reference: PA3159-RHD-WR-XX-ME-CI-0001
Classification: Project related
Checked by: Click or tap here to enter text.

Subject: Uranquinty Levee Upgrade - Progress Report

Dear Andrew,

Please find below a progress report related to Uranquinty Levee Upgrade. Throughout this memorandum reference is made to chainages along levee alignments. The adopted chainages are approximate and are presented on a Figure included as **Attachment A**.

1 Site Investigations

A number of Site investigations were completed between May and July. These included the following:

- Site walkover conducted by engineers from RHDHV and JK Geotechnics. This included walking the length of the levee, recording observations of the existing condition of the levee and infrastructure present, and identifying possible site constraints. The walkover was undertaken in May 2023. As part of the inspection, a representative from the Uranquinty Progress Association met with RHDHV and discussed the existing flooding issues. Impromptu discussions were also held with a number of other local community members and landowners who were encountered in the course of the inspection.
- Geotechnical investigations were carried out by JK Geotechnics in May 2023. This included drilling boreholes along each of the levee structures. Testing of the soil samples and geotechnical analysis of the existing levee is ongoing.
- Topographic survey of the existing levee structure was carried out in late June and early July. The topographic survey also defined property boundaries in the area of works. A Level B service investigation was also undertaken.

2 Service Investigation Review

A Dial Before You Dig Inquiry was undertaken and a Level B services investigation carried out as part of initial services investigation for the Uranquinty Levee Upgrade Project. This identified the following services present within the existing levee. This is in addition to the services present within the levee. The approximate alignment of services is captured on the survey that was carried out by CMS Surveyors in July 2023.

Table 1 – Summary of Services Identified

Levee Section	
Churches Plain	Medium Pressure Gas Main – Chainage 300 (along Church Plan Road)
	Possible Water main – CH 400 (assumed private)
	HV underground cable – Ch1100
Connorton Street	2 x water main - ~ Chainage 800
	1 x gas main – chainage 850
	1 x water main – chainage 400
Deane Street Connection	1 x watermain – Chainage 380
	1 x sewer – Chainage 240
	1 x water main – Chainage 180
Town Levee South	1 x water main – chainage 440
Town Levee North	1 x water main – Chainage 780

Potential impacts of any levee improvements will be considered as the design is developed. There are also a number of stormwater drains through the levee that have been surveyed and will be considered as part of the works.

A number of preliminary observations regarding the services includes:

- As part of the project, it will be important to ensure that any existing service crossing that traverses the levee does not act as a weak point, resulting in piping through the levee.
- Temporary or permanent diversions may be required where compaction works to upgrade sections of the levee cannot be undertaken without exceeding the allowable working load for the service in question.
- Separate but related to the services, the design is likely to interact with ARTC owned train line and the TfNSW owned Olympic Highway.

Standard details for preventing piping failure through any services penetration will be documented as part of the proposed works. A strategy for managing utility and stakeholders is being prepared as part of the preliminary design.

3 Existing Levee Freeboard Assessment

Topographic survey along the levee alignment has been carried out. The survey has been used to refine the levee freeboard assessment. This has confirmed and refined in some instances the levee freeboard overtopping scenario.

A summary of the levee freeboard assessment, based on the updated survey carried out along the five levee structures. Figures are included in **Attachment B**, showing the 100 year flood level, the surveyed terrain level and the available freeboard to the 100 year ARI flood level. :

- Churches Plains Levee
- Connorton Street Levee
- Deane Street Connection Levee
- Town Street Levee (South)

- Town Street Levee (North)

The following observations recorded in **Table 1** are made regarding the available freeboard along each levee section and the depth of overtopping predicted to occur during the 100 year ARI flood event.

Table 1 Summary of Levee Freeboard

Levee	Available Freeboard and Upgrade Works
Churches Plains (refer Figure B1)	The entire levee has a freeboard typically less than 0.2 metres. Overtopping by less than 100 mm is predicted to occur in several locations. The levee should be raised however, consideration of the freeboard to be provided will be contingent on a number of factors, including the consequences of overtopping during rarer flood events.
Connorton Street (refer Figure B2)	Overtopping is predicted to occur across a length of approximately 400 metres, to depths of up to 1 metre. Provision of adequate freeboard, including for the remaining section not overtopped in the 100 year ARI event is being considered
Deane Street (refer Figure B3)	Overtopping of Deane Street Levee occurs along a 150 metre section, to depths of around 0.4 metres. Given the remainder of the levee was constructed originally as an emergency measure, the remaining section is likely to require strengthening and reinforcement, together with provision of a suitable freeboard.
Town Street Levee (south) (refer Figure B4)	Generally there is adequate freeboard along the levee. There are localised sections which may need to be raised to provide adequate freeboard. Any other strengthening works will be contingent on the outcome of the geotechnical investigation.
Town Street Levee (north) (refer Figure B5)	Generally there is adequate freeboard along the levee. There are localised sections which may need to be raised to provide adequate freeboard. Any other strengthening works will be contingent on the outcome of the geotechnical investigation.

4 Preliminary Design Options

The following options for raising the levee have been identified:

- Raise and extend existing earth embankment structure on wet side of levee;
- Raise and extend existing earth embankment structure on dry side of levee; and,
- Concrete parapet wall

In general, from an engineering perspective, where earth is being used to raise the levee, the preference would be to place extend the structure on the wet side of the levee. In the case of Uranquinty, this would be subject to consultation with private landowners whose landholding may be impacted by this. Raising on the dry side is more likely to required re-construction of the levee and will generally prove more difficult as this will begin to encroach on certain infrastructure including roads, although in the case of Churches Plains Levee this will not be particularly significant.

Further assessment is currently ongoing to establish the preferred geometry for any levee raising, as well as potential requirements in respect of easements.

A parapet wall will generally only be employed in locations where there is limited space. This could be required in localised sections of the Connorton Street and Deane Street Levees. It may also be of benefit where localised raising are required for the north and south Town Street Levees.

5 Tasks Currently Under Completion

At present, the project is focussing on finalising the preliminary design options for the levee upgrades. This includes the following tasks to close out:

- Input into the side slopes as well as the crest width.
- Estimating footprints required for the levee and how these relate to existing easements and encroachment into landholdings.
- Investigating options to improve local nuisance flooding within the township of Uranquinty.
- Finalising the stakeholder consultation strategy.

Attachment A – Levee Layout and Chainages

Uranquinty

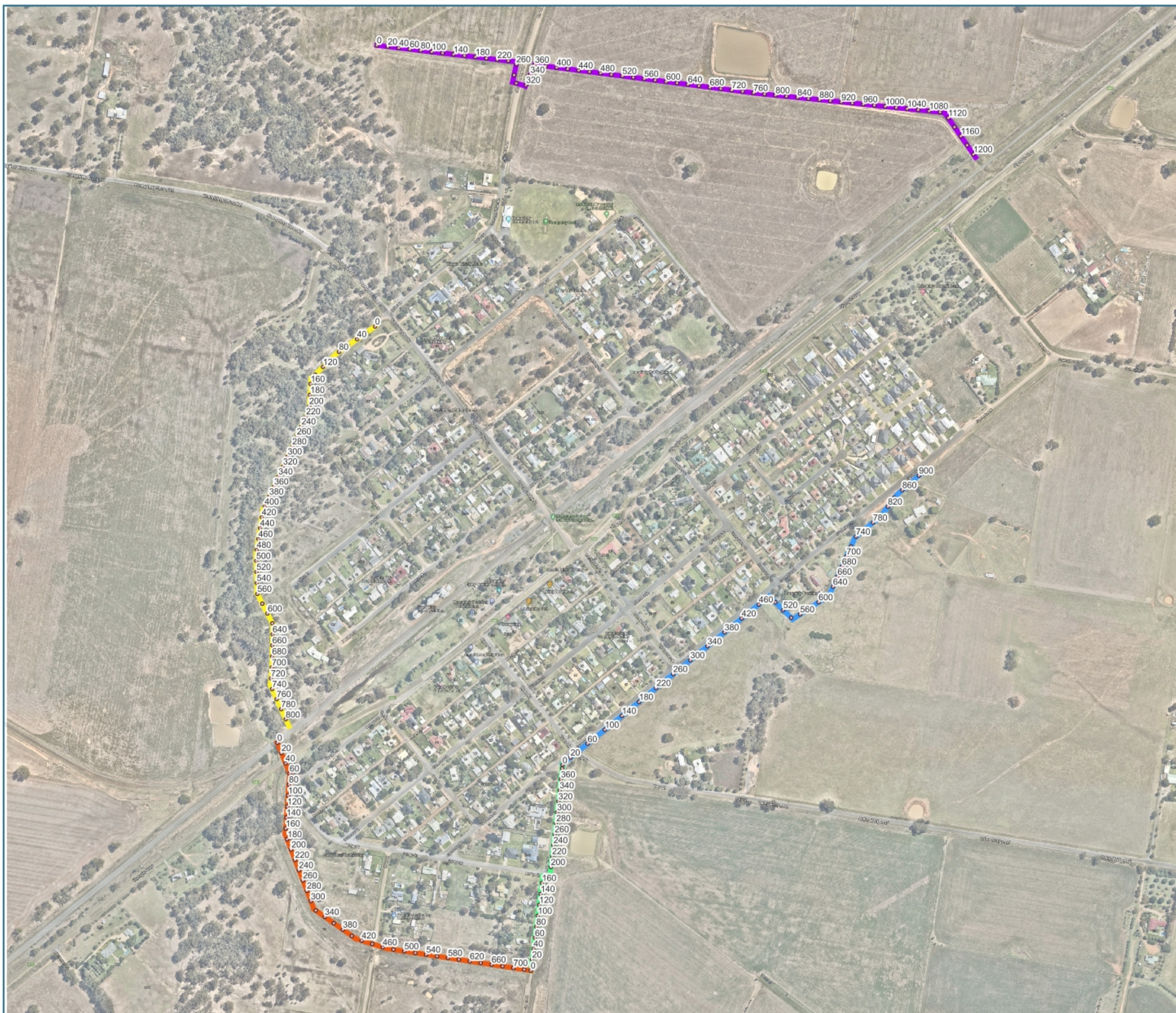
Approximate Levee Locations

PA3159 / 2023-05-03
GDA2020 / MGA zone 55
Scale at A3 1:6,400



0 100 200 300 m

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Attachment B – Levee Freeboard Analysis – Existing Conditions for the 1% AEP flood event

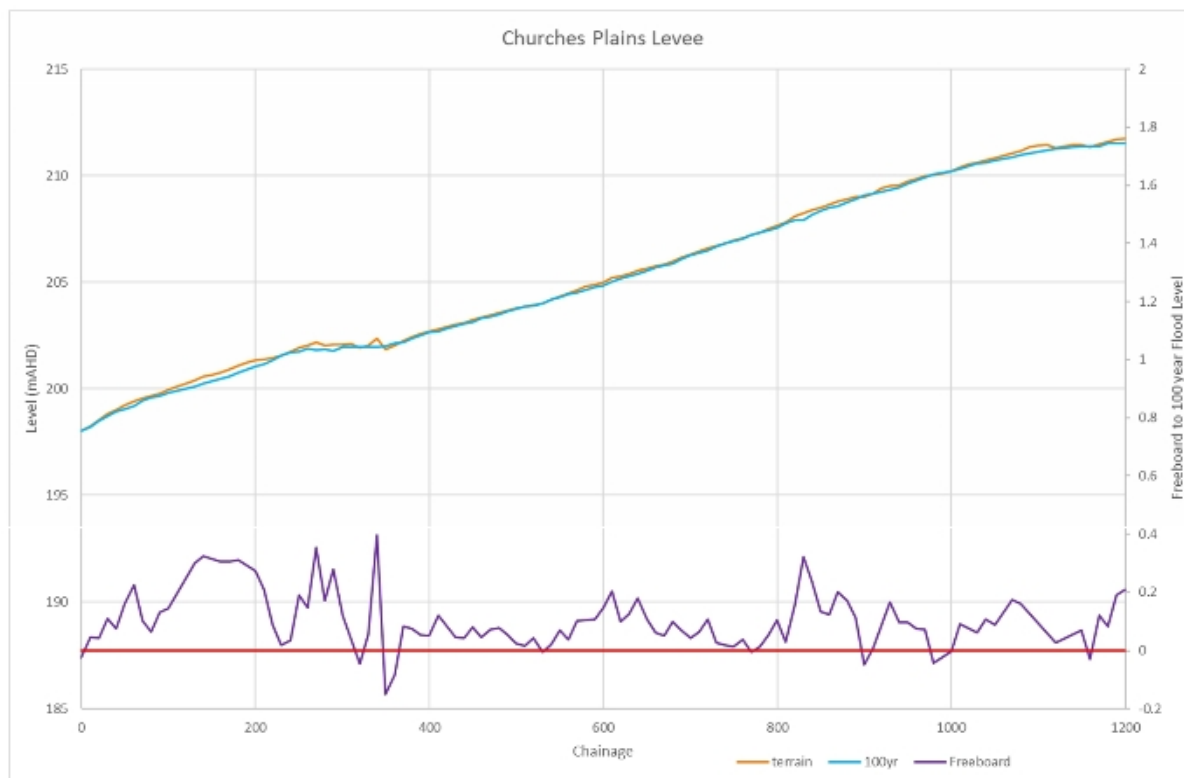


Figure B1 – Churches Plains



Figure B2 – Connorton Street

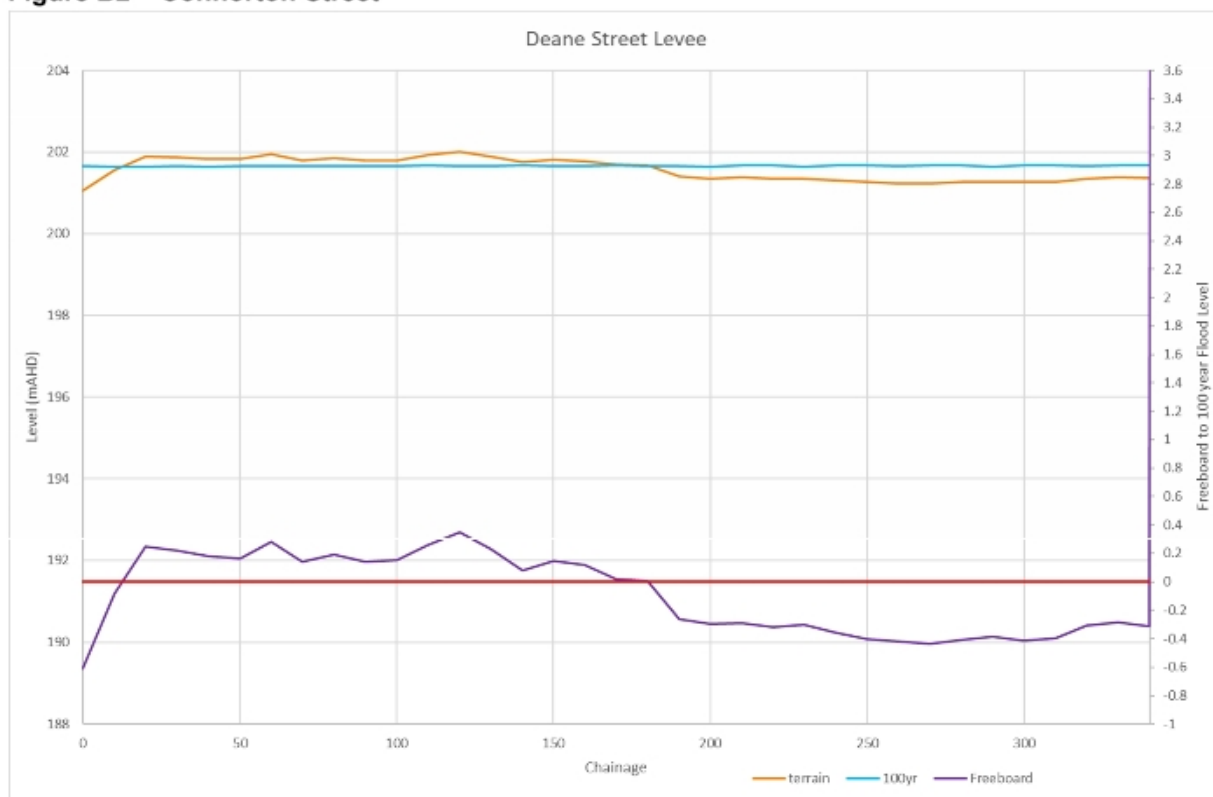


Figure B3 – Deane Street Levee Connection

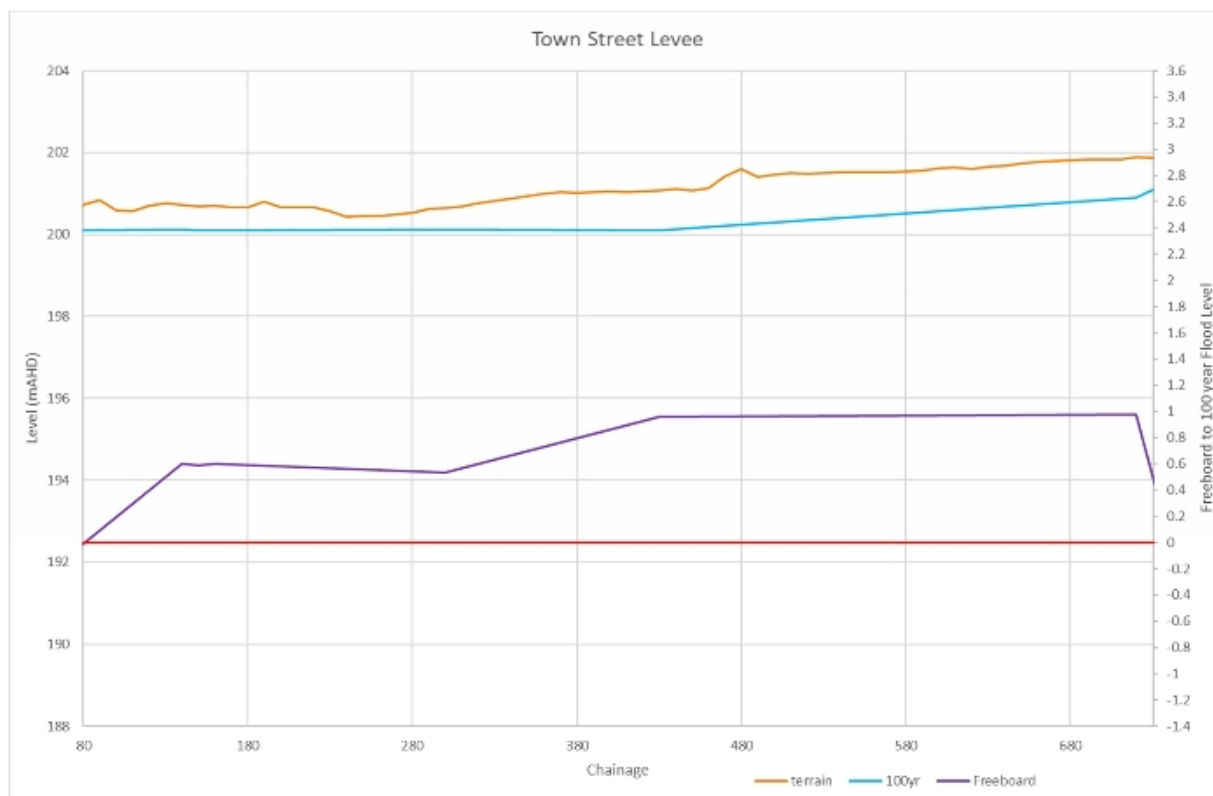


Figure B4 – Town Street Levee South

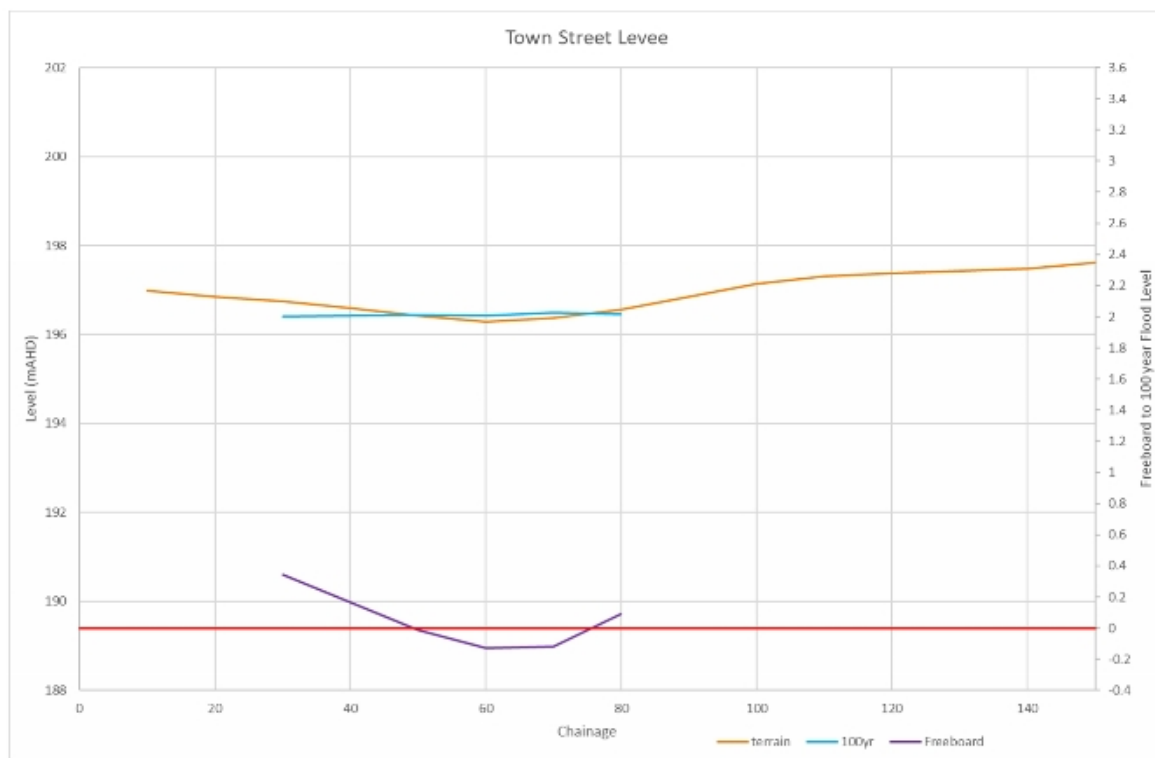


Figure B5 – Town Street Levee North