



memorandum



TO	Raj Patil	FROM	Jessica Aldridge
	Hawkes Bay Regional Council	DATE	15 June 2026
RE	Awatoto Pump Station Upgrade Modelling – Worst Case Scenarios		

1.0 Introduction

Hawkes Bay Regional Council (HBRC) has engaged Pattle Delamore Partners Limited (PDP) to undertake hydraulic stormwater modelling for the Awatoto and Brookfield catchments in Napier.

HBRC is undertaking assessments of the Awatoto (Mission) and Brookfield stormwater pump stations. As part of this work, HBRC has undertaken modelling of the Awatoto and Brookfield catchments to understand the existing capacity of the pump stations and the potential effects of any improvements. PDP have previously undertaken an assessment of the pump station and future drainage improvements.

Following an internal HBRC review of the previous flood modelling and recent scope adjustments to the pump station projects—specifically that Brookfields Pump Station will not be upgraded to incorporate new resilience—PDP has received a request from HBRC to model additional scenarios to assist in the determination of minimum installation levels (FFL) for the pump motors and electrical equipment at the Awatoto (Mission) Pump Station.

This memo outlines the additional model scenarios run, results and effects of the Awatoto (Mission) pump station upgrade on flood levels within the Awatoto catchment. Four scenarios were initially requested by HBRC. However, post delivery of results for scenarios 1 and 4 the remaining two scenarios (Scenarios 2 & 3) were no longer required within this work scope and have not been run. Scenario 1 represents the worst-case scenario for the catchment with no pump stations operating in both the Brookfield and Awatoto catchments. Scenario 4 investigates the impact that the Brookfield pump station not operating has on the Awatoto (Mission) pump station.

2.0 Model Settings

The model as described in the letter *Awatoto and Brookfield catchment stormwater modelling* (PDP, 2024) has been used for this assessment with the following model settings:

2.1 Existing Pump Stations

The existing Brookfield and Awatoto (Mission) pump stations were excluded from the model to investigate the impact on the peak water level upstream of the Awatoto (Mission) pump station for both scenario 1 and 4.

2.2 Drain Improvements

The model scenarios were run without the drain improvements described in the 2024 letter as part of the initial modelling investigations.

2.3 Awatoto (Mission) Pump Station Design Capacity

The modelling focuses on the peak flood levels during the 1% AEP RCP8.5 2081 – 2100 event. Therefore, the pumps have been modelled assuming a maximum discharge through the Tūtaekurī Stopbank. The upgraded pump capacity outlined below was provided by HBRC.

The pump station is comprised of three pumps:

- ✧ 2 x Bosman Vision 90MC pumps – estimated max discharge 3 m³/s each.
- ✧ 1x Bosman Vision 45MC lead pump – estimated max discharge 0.5 m³/s.
- ✧ Total discharge capacity of 6.5 m³/s.

2.4 Rainfall

A 1% AEP RCP8.5 2081-2100 design storm developed using a 24-hour nested hyetograph was utilised for this iteration of model scenarios. The design rainfall depth was obtained from the Earth Sciences NZ High Intensity Rainfall Design System (HIRDS). Figure 1 shows the modelled hyetograph.

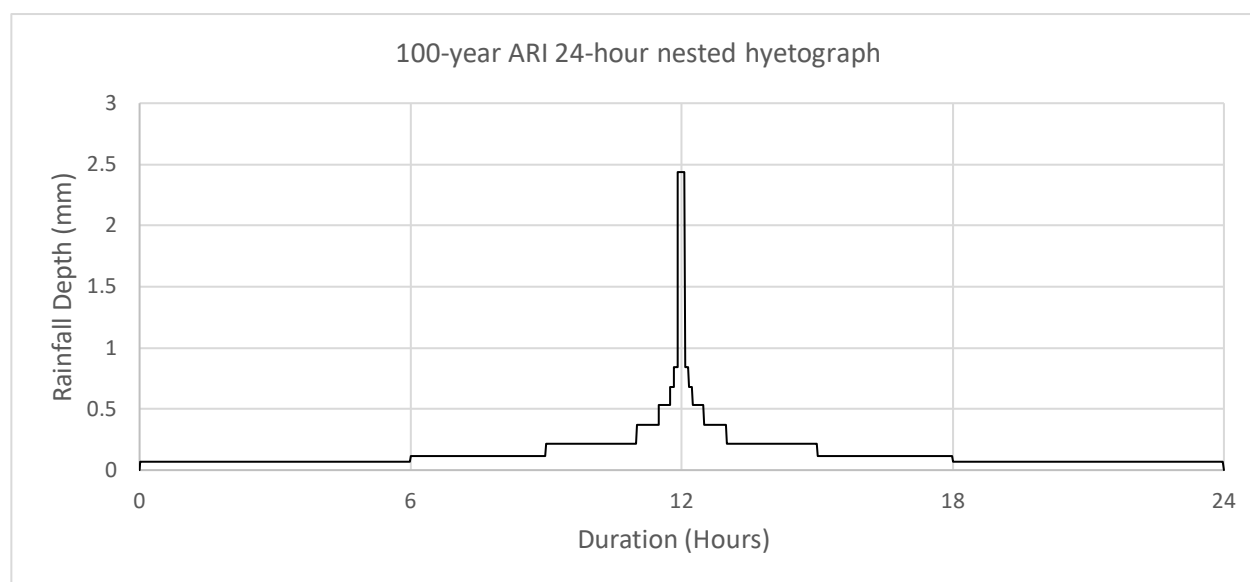


Figure 1: design rainfall hyetograph

3.0 Modelled Scenarios

The scenarios run in the model are described in Table 1 below.

Run ID	Rainfall	Awatoto (Mission) Pump Station	Brookfields Pump Station	Drain Improvements
Scenario 1	1% AEP – RCP 8.5 2081-2100 Nested Rainfall	Not Operating	Not Operating	Not Included
Scenario 4	1% AEP – RCP 8.5 2081-2100 Nested Rainfall	Operating at Upgraded Capacity	Not Operating	Not Included

4.0 Results

4.1 Water Levels at Awatoto (Mission) Pump Station

The peak flood level at the Awatoto (Mission) pump station for each of the scenarios is summarised in table 2 below. Figures 2 to 3 show the modelled flood levels.

Table 2: Peak Flood Level at Awatoto (Mission) Pump Station

Run ID	Peak Flood Level (m RL NZVD2016)
Scenario 1	1.33
Scenario 4	1.05

The previously reported peak flood level at the Awatoto (Mission) pump station was 0.77 m RL NZVD2016 based on both existing pump stations operating. This 560 mm increase in peak flood level compared to previous modelling is not expected to have a significant impact on the pump station design and will be managed through design optimisation.

4.2 Drain flows upstream of Awatoto (Mission) Pump Station

Flows within the drains upstream of the Awatoto (Mission) pump station were extracted from the model at the locations shown in Figure 2. These flows are summarised in table 3.

Table 3: Peak Flows Upstream of Awatoto (Mission) Pump Station

Run ID	Drain	Flow (m ³ /s)
Scenario 1	Awatoto_US_MIS	0.98
	Mission_US_MIS	1.03
Scenario 4	Awatoto_US_MIS	2.86
	Mission_US_MIS	4.59



Figure 2. Flow Extraction Points for the Awatoto (Mission) Pump Station

4.3 Upstream effects of the Awatoto (Mission) Pump Station Upgrade

Figure 3 below shows the differences in water level within the Awatoto catchment between the existing pump station capacity and the proposed upgraded pump station. An additional run with the Brookfields pump station excluded from the model and the existing Awatoto (Mission) pump station capacity was completed and forms the basis of comparison for the effects assessment. The upgraded pump station achieves a reduction in flood levels upstream of approximately 150 mm for the 1% AEP level of service event. While the flood depths have been reduced within the catchment the extent of flooding has not changed significantly.

The model uses 2020 LiDAR for this assessment, see the letter *Awatoto and Brookfield catchment stormwater modelling* (PDP, 2024) for further details. Some post Cyclone Gabrielle remedial works such as potential NCC wastewater treatment plant works may not be reflected in the model results.

The Awatoto Pump Station discharges at the very base of the Tūtaekurī catchment, within approximately 1 km of the combined river mouth. At this location, flood levels during a significant event are governed by the coastal/tidal backwater boundary condition, not by marginal incremental inflows from the HBRC Mission pump station location. The stage-discharge relationship on the lower Tūtaekurī reach in flood conditions is consequently very flat.

Figure 3 indicates the change in flood level downstream of the pump station as an isolated event related to the Awatoto sub-catchment (it does not take into account flood levels within the Tūtaekurī River). The difference map is based on a downstream normal depth boundary condition with a slope of 0.01 m/m.

Under a flood scenario, the assessment of the pump station's maximum output of 6.5 m³/s, when compared to NZ flood statistics for the Tūtaekurī River, indicates that the pump station flow represents approximately 0.5% of the 100YR Tūtaekurī catchment flow at this location. The incremental increase in water surface elevation attributable to the pump station during the 100 YR event is thereby immeasurably small. The influence on downstream flood levels is, on that basis, is negligible during a 100 YR event.

This conclusion is based on a qualitative engineering assessment. While the influence of the pump station under smaller and more frequent flood events have not been assessed as part of this study, the pump station flows into the river and increases arising from that pumpstation discharge would be expected to remain within the river channel.



Figure 3. Flood Differences Between Existing and Upgraded Awatoto (Mission) Pump Station for 1% AEP RCP8.5 2081-2100 Event

5.0 Conclusions

Additional scenarios have been run for the Awatoto and Brookfields model to investigate the worst case peak water levels at the Awatoto (Mission) pump station. This resulted in the following conclusions:

- ∴ The peak water level at the Awatoto (Mission) pump station is expected to be 1.33 m RL for a 1% AEP RCP8.5 2081-2100 event.
- ∴ The previously reported peak flood level at the Awatoto (Mission) pump station was 0.77 m RL NZVD2016 based on both existing pump stations operating. This 560 mm increase in peak flood level compared to previous results is not expected to have a significant impact on the pump station design and will be managed through design optimisation.
- ∴ The flow split in the drains upstream of the Awatoto (Mission) pump station within the model for the peak water level event is 0.98 m³/s in the north drain and 2.86 m³/s in the west drain.
- ∴ The upgraded pump station achieves a reduction in flood levels upstream of approximately 150 mm in comparison to sole operation of the existing Awatoto (Mission) pump station for the 1% AEP RCP8.5 2081 – 2100 event.

6.0 References

PDP. (2024). *AWATOTO AND BROOKFIELD CATCHMENT STORMWATER MODELLING*.

7.0 Limitations

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