

Technical Memo

Proposed Plan Change 14 to the Waipa District Plan

Stormwater Response to Matters Raised by the Henmar Trust in its Statement of Evidence and Legal Submission

Fonterra Limited

To:	Mark Chrisp, Mitchell Daysh Sam Lochery, Fonterra Limited	HG Project No.:	A2313738.00
From:	Saeed Ghavidelfar, HG Philip Comer, HG	Reviewer:	Philip Comer, HG
Date:	20 March 2024	Approver:	Philip Comer, HG

1.0 Introduction

Immediately prior to the Council Hearing in relation to Plan Change 14 (PC14) to the Waipa District Plan, the following documents were received on behalf of Henmar Trust:

1. Statement of Evidence M L Bourke
2. Legal and Opening Submissions of Counsel for the Henmar Trust

The Hearing has been adjourned to enable consideration of, and response to, the above documents. Fonterra Limited (Fonterra) has requested that Harrison Grierson (HG) review the documents in relation to the stormwater matters raised and provide advice to inform/assist Waipa District Council response.

HG review of the Henmar Trust documents has identified the following three (3) stormwater-related matters for response:

Matter 1 - Flood Effects on the Henmar Trust Land

Matter 2 - Clarification of Sub-catchment Discharge Point

Matter 3 - Fish Passage

We address these matters below.

2.0 Matter 1 – Flood Effects on the Henmar Trust Land

2.1 Flood Effects from the PC14 Area

Henmar Trust has raised concerns that the flood effects on its landholding as a result of future industrial development of the PC14 area will not be mitigated. Henmar Trust states (at paragraph 90 of the Statement of Evidence by M L Bourke) that:

“It is imperative that any development upstream of the Henmar Trust property controls their stormwater runoff within their boundaries so that it does not exceed pre-development levels, to avoid further adverse flooding effects on the Henmar Trust property”.

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At paragraph 91 of the Statement of Evidence by M L Bourke, Henmar Trust states that:

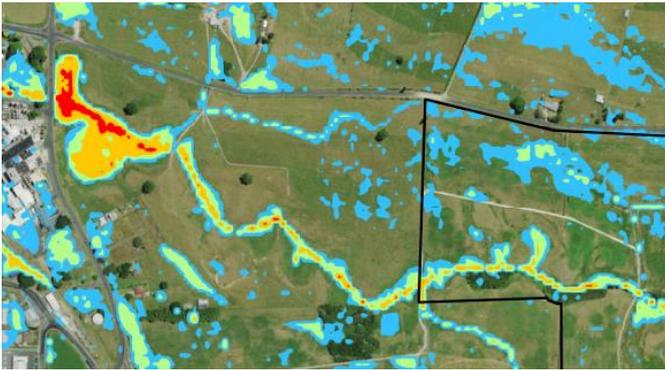
“The Stormwater Management Plan prepared by Harrison Grierson dated 12 April 2024 (Stormwater Plan) illustrates an increase in downstream flooding on the Henmar Trust property from development on the Mangaone Precinct alone”.

To set the context for our response on this matter, **Tables 1 and 2** below provide a comparison of the pre and post-development flood depths in relation to the Henmar Trust Land.

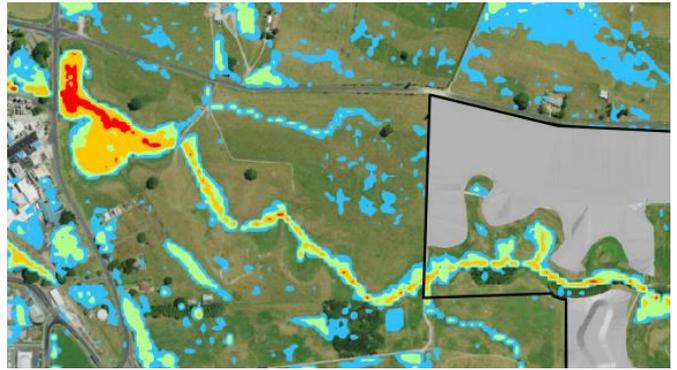
Table 1 – Comparison of Pre and Post-development Flood Depth on the Henmar Trust Land
 Image Sources – Appendix 1 to the Stormwater Management Plan (SMP) report

1% AEP Storm Event

Pre-development Flood Depth

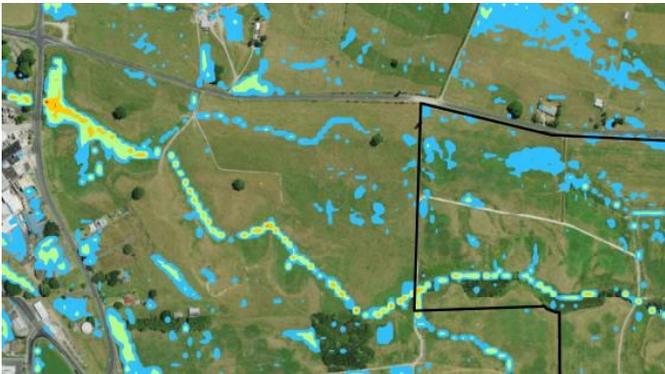


Post-development Flood Depth

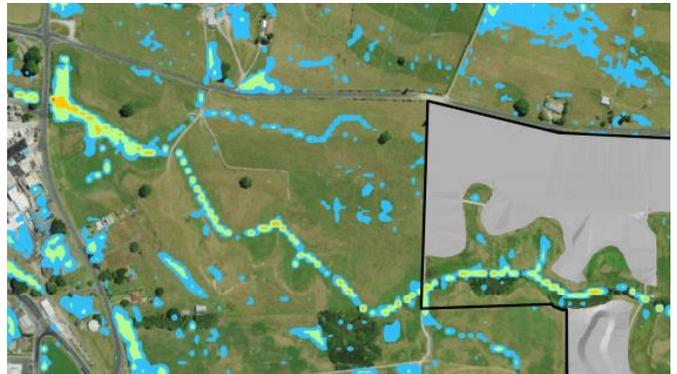


10% AEP Storm Event

Pre-development Flood Depth



Post-development Flood Depth



50% AEP Storm Event

Pre-development Flood Depth

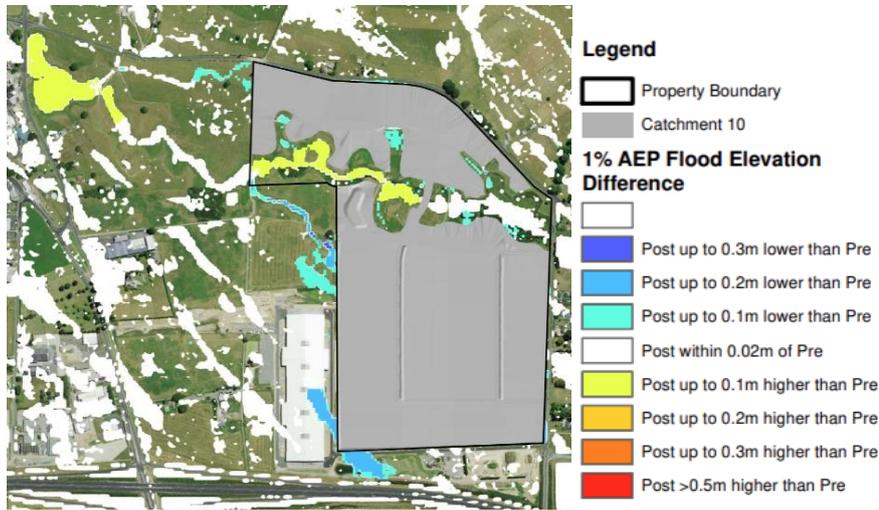


Post-development Flood Depth

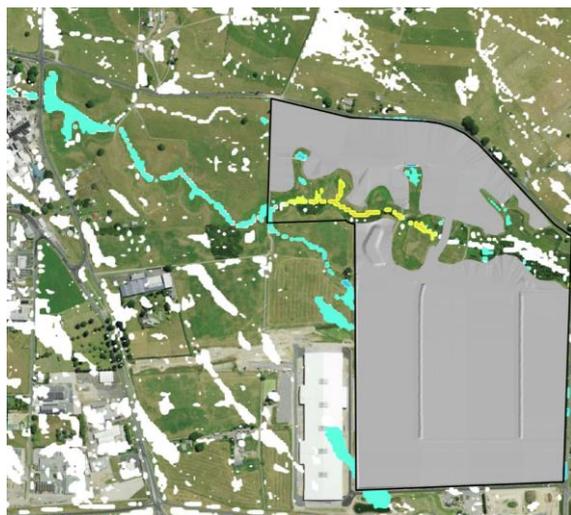


Table 2– Comparison of Pre and Post-development Flood Levels on the Henmar Trust Land
 Image Sources – Appendix 1 to the Stormwater Management Plan (SMP) report

1% AEP Storm Event: Post-development Flood Level minus Pre-development Flood Level



10% AEP Storm Event: Post-development Flood level minus Pre-development Flood Level



50% AEP Storm Event: Post-development Flood Level minus Pre-development Flood Level



In relation to the images contained in **Table 1 and 2** above, we note the following:

- In the 1% AEP storm event, there is a very slight increase in flood level in the northwest corner of the Henmar Trust landholding, immediately upstream of the Victoria Road culvert. The area affected by the increased flood level is very small (represented by an almost indiscernible increase in the area of red shading in Table 1 above) and is wholly contained within the extent of the pre and post-development flood plain area. We note that the extent of the flood plain does not increase in the post-development scenario.
- As confirmed in Table 9 of the Stormwater Management Plan (SMP) report prepared by HG, the increase in flood level upstream of the Victoria Road culvert is a maximum of 20mm in the 1% AEP storm. It is important to note that the flood level difference maps, presented in Table 2 above and Figures 13-15 of the SMP report, categorise the flood levels such that any increase between 20mm and 100mm is presented in a single category. However, the actual level rise upstream of the Victoria Road culvert is within the 20-25mm range, as discussed on page 21 of the SMP report. Moreover, the extent of the flood remained unchanged between the pre-development and post-development scenarios, given the extensive existing storage area upstream of the Victoria Road culvert.
- In the 10% and 50% AEP storm events, there is no increase in flood level or extent in the post-development scenario when compared to the pre-development scenario and, in some locations modelled, there will be a reduction in flood level.

We note paragraph 29 of the legal submission on behalf of Henmar Trust, which states that:

“Pages 17-24 of the Harrison Grierson Stormwater Management Plan document dated 12 April 2024 need to be considered carefully. (Pages available in hard copy) The report on the hydraulic modelling predictions relies on the impact just upstream of the Victoria Road culvert being at a low level of increased flooding i.e low level of increased height of flood waters, but figures 13, 14 and 15 show substantial increase in the areas flooded in comparison with the pre-development flooding effects. Figure 13 shows a substantial area of the Henmar Trust property receiving post-development flooding up to 0.1 metres (100mm) higher than pre-development. A small but still significant area of increased flooding up to 0.1 metres higher is shown in figure 14 for the 10% AEP storm event. Even the flood level difference shown for the 50% AEP storm event in figure 15 is a material increase in flooding up to 0.1 metres.”

To clarify in this regard, Figure 13 does indeed show a very slight increase in flood level within the Henmar Trust Land in the 1% AEP storm event (as discussed above, the actual increase in the flood level is between 20mm and 25mm). However, Figure 13 needs to be considered alongside the flood depth maps at Appendix 1 of the SMP report (refer also **Table 1** above); together, Figure 13 and the Appendix 1 maps confirm that, despite an actual increase of between 20mm and 25mm in flood level immediately upstream of the Victoria Road culvert, there will be no increase in the spatial extent of flooding with all flows accommodated within the existing flood plain on the Henmar Trust land. Figures 14 and 15 in contrast do not show any increase in flood level or extent in the post-development scenario; rather, they show a reduction in flood depth in the 10% and 50% AEP storm event on the Henmar Trust land.

Having regard to the above, there will be no increase in downstream flood effects on the Henmar Trust land as a result of industrial development of the PC14 area. The flood extent in the post-development scenario will be wholly contained within the flood plain of the Mangaone Stream. Therefore the very slight increase in flood level in the small area identified will not result in an increase in downstream flood effects on the Henmar Trust land based on the modelling undertaken.

We also note that the Preliminary Wetland Design Calculations attached at Appendix 2 of the SMP report have been used to inform the area of land required to accommodate stormwater attenuation devices for the PC14 area. The Structure Plan map for the PC14 area, and the physical extent of the Mangaone Stream Reserve, has been prepared having regard to the area of land required for stormwater attenuation purposes to ensure that attenuation devices can be accommodated with the reserve area to mitigate downstream flood effects. The detailed design, size and location of stormwater attenuation devices will be determined at resource consent stage.

2.2 Flood Effects from the Kiwifruit Block

Stormwater management in relation to the Kiwifruit Block (which has already been developed for industrial activities) has not been considered or assessed by HG in the modelling undertaken for the PC14 area because stormwater flows and discharges from the Kiwifruit Block are conveyed to the Mangaone Stream through the Bardowie Industrial Precinct Structure Plan area and discharge to the Mangaone Stream downstream of the PC14 area. Stormwater flows and discharges do not, and will not, be conveyed through the PC14 area.

We note paragraph 28 of the legal submission on behalf of the Henmar Trust as follows:

“The Henmar Trust has been led to understand that the stormwater basin in the Kiwifruit Block will overtop during the 1% AEP storm event. It is necessary to find out whether that overtopping has been taken into account in modelling of the effects of the 1% AEP event on the Mangaone Stream, particularly the Henmar Trust property.”

We also note paragraph 34 of the legal submission on behalf of the Henmar Trust as follows:

“The Kiwifruit Block appears to have been excluded from the hydraulic modelling for PC14 on the basis that the discharge from the stormwater basin gets to directed to a different subcatchment that does not affect the Mangaone Stream upstream of Victoria Road. That is an assumption that needs to be verified, as information about the discharge to surface water from the basin has been difficult to obtain.”

In response to paragraph 28, the stormwater basin in the Kiwifruit Block is part of the stormwater management of the Bardowie Industrial Precinct Structure Plan area to the west. Stormwater flow and discharge from the Bardowie Industrial Precinct Structure Plan area would have been robustly considered and assessed as part of Plan Change 11 process to rezone that land for industrial purposes. Stormwater management, including the discharge of stormwater from the Bardowie Industrial Precinct Structure Plan area and downstream flood effects, would also have been robustly considered and assessed at resource consent stage prior to development of the Bardowie Industrial Precinct land.

Having regard to the above, the Kiwifruit Block has been excluded from the hydraulic modelling for the PC14 area (which responds to paragraph 34), assuming that any flood impacts resulting from development of the Kiwifruit Block were considered and mitigated as part of the Plan Change 11 process.

3.0 Matter 2 – Clarification of Sub-catchment Discharge Point

Henmar Trust has noted (at paragraph 94 of the Statement of Evidence by M L Bourke) that the SMP report prepared by HG states that:

“The southwest corner of the PC14 Structure Plan is within another subcatchment that drains into the Mangaone Stream approximately 500 metres downstream from Victoria Road.”

Henmar Trust has queried where the discharge point for this sub-catchment is.

In response HG notes the following:

- The sub-catchment within the PC14 area that is noted as draining into the Mangaone Stream approximately 500m downstream from Victoria Road, is shown in Figure 1 of the SMP report (as replicated in **Figure 1** below).
- **Figure 1** identifies the southwest corner of land concerned within the black circle and the blue arrow denotes the general direction that stormwater would have drained from the sub-catchment pre-development of the Bardowie Industrial Precinct Structure Plan area and the PC14 area.

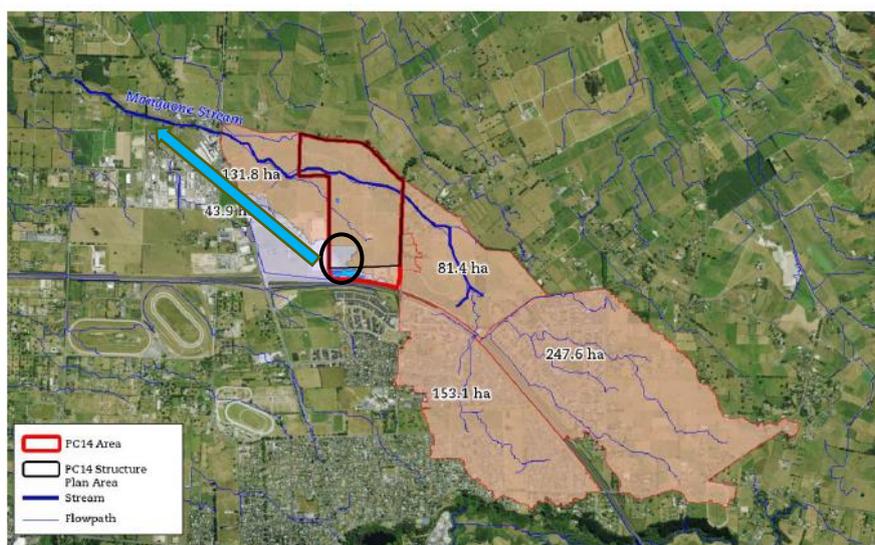


FIGURE 1: CATCHMENT AREA OF THE MANGAONE STREAM (THE MANGAONE PRECINCT (PC14 AREA) IS OUTLINED IN RED AND THE PC14 STRUCTURE PLAN AREA IS OUTLINED IN BLACK)

Figure 1: Figure 1 of the HG SMP Report

- The developed hydraulic model utilises a 2D rain-on-grid approach to simulate flooding beyond the PC14 area, including the area to the southwest of PC14. In the 2D rain-on-grid model, rainfall is directly applied to the flexible mesh elements (ground surface), allowing runoff to follow the topography and generate overland flow paths. This represents the most natural method for modelling runoff, as the flood loading points (discharge locations) are not manipulated. Thus, any runoff from the relevant catchment flows downstream according to the existing topography.
- The stormwater modelling undertaken for the PC14 area anticipates that levels within the PC14 structural plan area will be modified at the time of industrial development so that stormwater will drain north and east through the network of swales (and the piped network) within the PC14 area towards the stormwater management devices that will be located within the Mangaone Stream Reserve area. Stormwater flows will be attenuated in these devices to manage stormwater discharge to the Mangaone Stream from the PC14 area and ensure that there will be no increase in downstream flood effects on the Henmar Trust land.

4.0 Matter 3 – Fish Passage

At paragraphs 101 and 102 of the Statement of Evidence by M L Bourke, Henmar Trust states that:

“Another issue of concern is the provision for fish passage. Allowing for fish passage often requires greater flow of water” (paragraph 101).

“Question: Has fish passage this been accounted for in the Technical Reports? If not, how has the technical report accurately assessed the potential downstream flooding effects on the Henmar Trust property as fish passage is a legislative requirement and cannot be ignored?” (paragraph 102).

In response, we note that all of the stormwater management devices for the PC14 area will be offline. The Mangaone Stream will continue to convey flows from east to west through the PC14 area and flow volumes along the stream will fluctuate depending on groundwater levels and the frequency, duration and intensity of rainfall events (as is the case now).

Whilst fish passage is not directly addressed in the SMP report prepared for the PC14 area, it is a matter for consideration and assessment at resource consent stage once the detailed design of the stormwater management system for the PC14 area is available. It is premature to consider fish passage at plan change stage as no detailed design has yet been undertaken.