Memo – Healthy Waters

To:	Vineway Ltd
From:	Tim de Wit – McKenzie & Co
Cc:	James Kitchen – McKenzie & Co
Date:	2/07/2025

BACKGROUND

Mckenzie & Co have undertaken a comprehensive stormwater design for the proposed Delmore Fast-track development at 88, 130, 132 Upper Ōrewa Road and 53A, 53B and 55 Russell Road, Ōrewa. This memo is in response to queries from Auckland Council Healthy Waters to clarify design assumptions and detail relating to the Stormwater system.

RESPONSES

SW1

It is essential that the applicant undertakes detailed stability and erosion assessment of the gully and stream network for the 100-year design life including:

- *Evaluation of the Current Network State*
- *Identification of Development Impacts and Mitigation strategies*
- *Assessment of Natural Hazards and Public Safety Risks.*

This should not only reflect the change in Land use, but also the concentration of flows in response to the outlets from the communal devices, 10% AEP pipe network and the 1% AEP flowpaths.

SW1 Response

Please refer to the attached Geomorphic Response Memo, which provides a site-specific assessment addressing the matters raised. A summary is provided as follows.

Current Network Evaluation

A review of long-term aerial imagery (dating back to the 1980s) and site inspections were undertaken, to evaluate channel form and behaviour. Both investigations showed no evidence of stream incision, bank instability, meandering, or lateral migration was noted within the streams. Field observations confirm that the stream network has remained geospatially stable under current hydrological conditions.

Development Impact and Mitigation Strategy

The proposed stormwater system has been carefully designed to preserve natural flow patterns, with stormwater flows directed to vegetated, mechanically stabilised earth bunds via T-bar spreaders, which mimic diffuse stormwater sheet flow. This avoids creating concentrated discharges that could lead to stream bank / riparian gully erosion. In this regard, the development impact is considered low.

Our key Mitigation Strategies have been designed to be intentionally conservative, incorporating:

- Stabilisation and Vegetation establishment on batters to enhance resistance to any long term channelisation scour from the T-bar spreaders and promote natural sheet flow runoff;
- Spreader structures and TR2013/018 compliant energy dissipating devices at all stormwater discharge points, including all private T bars and at centralised raingarden outlets; and
- Preservation of low-order stream headwaters to maintain stream baseflow and minimise large pipe/single discharge point type design.

Natural Hazard and Public Safety Risk

The Geotechnical Assessment Report confirms that the slopes adjacent to the stream riparian zone are suitable for development under the proposed stormwater regime, with recommendations below to minimise hazard potential.

- The use of Geotechnical Engineered earthworks,
- Combination of mechanical and vegetated stabilisation, and
- limited earth fill and adequate setbacks in sensitive areas

Furthermore, no development is proposed in areas identified as having active landslips or creep, and all structures are set back in accordance with geotechnical advice. We consider the risk of gully destabilisation or public safety hazard to be low under the proposed conditions.

Response to Ara Hills Comparison

We acknowledge that Ara Hills has experienced some isolated erosion issues; however, we have visited the site, taken photos and assessed the performance of the streams and discharges from the stormwater system. Please refer to the Geomorphic Response Memo for documentation of the Ara Hills assessment. The Delmore design reflects lessons learned from that site and incorporates more robust gully protection and discharge design which will perform better for the topography.

Based on the above, McKenzie & Co are confident that the proposed stormwater and gully management approach provides a stable, resilient outcome over the 100-year design life, and a separate, standalone erosion risk assessment is not necessary.

SW2

Increase the Riparian Margin to a more appropriate width following detailed geomorphic investigations. In the absence of this detailed assessment, the Riparian Margin should be not less than 20m.

SW2 Response

We note Council's recommendation; however, it remains unclear why the currently proposed riparian setbacks are considered inadequate. The reference to a 20m margin appears somewhat arbitrary in the absence of site-specific evidence to suggest this stream and its tributaries and/or the surrounding topography is subject to bank instability for a distance of 20m.

Our position is detailed in the accompanying Geomorphic Response Memo, which outlines the rationale for our proposed setbacks and why McKenzie & Co do not believe that a geomorphic assessment is necessary. The widths have been developed in consideration of the site's geotechnical constraints, slope stability, stormwater hydrological design, and we remain confident that the proposed development widths adjacent to the stream are appropriate and defensible.

SW3

Carry out detailed erosion assessment around the outlets from the proposed raingardens and public stormwater networks (including overland flowpaths) for all events up to 100-year ARI and provide appropriate erosion protection.

SW3 Response

All stormwater outlet structures—including those from T-bars, raingardens, piped networks, and overland flow paths—will be designed with erosion protection measures appropriate for the relevant storm events, up to the 100-year ARI event. This will be based on site-specific conditions and in accordance with Auckland Council's Hydraulic Energy Management: Inlet and Outlet Design for Treatment Devices – Technical Report 2013/018.

Outlet locations have been identified on the submitted stormwater plans, and erosion risks will be mitigated through:

- Appropriately sized energy dissipation features (e.g. rock rip-rap, stilling basins, or spreaders);
- Vegetated surfaces and reinforced outfalls where required; and
- Confirmation of low exit velocities and shear stress calculations at each discharge point.

While detailed erosion control design will be finalised at the Engineering Plan Approval (EPA) stage, we confirm that this will include:

- Erosion risk screening for each outlet;

- Confirmation of location-specific protection needs based on contributing catchment size and velocity, and
- Additional early co-ordination with Healthy Waters to agree on acceptable detailed design solutions.

SW4

Confirm how even surface distribution of flows will be achieved in the larger raingardens proposed in the Fast Track area.

SW4 Response

At detailed design we will confirm the appropriate method(s) and will be finalised during the Engineering Plan Approval (EPA), in consultation with Healthy Waters. Several strategies are currently under consideration, including:

- Installation of level spreaders to ensure uniform sheet flow entry;
- Use of multiple inlet structures into the raingardens, designed with energy dissipation and erosion protection to safeguard the media;

Provision of a perforated pipe along the length of the raingarden with bubble-up sumps or scruffy domes, each protected by rip-rap, to evenly distribute flow across the surface.

These measures will be selected and sized in accordance with Auckland Council's GD01 guidance and based on catchment-specific hydraulic inputs.

Note there is only one large raingarden which already has two inlets, and the remainder are much smaller and as such this should only apply to a few devices.

SW5

Confirm how treatment of all impervious surfaces is to be achieved or provide evidence of a BPO that is to be applied to the Fast Track application.

SW5 response

All impervious surfaces within the development—both public and private—will receive appropriate water quality treatment and hydrology mitigation through a combination of communal and at-source devices.

Public Roads and JOALs

Public roads and JOALs are treated via communal raingardens, each designed and sized in accordance with GD01 requirements. Specific allocations include:

- JOAL 1 → RG04
- JOAL 16 → RG14
- Road 1 → RG02 and RG12

Treatment catchments and associated impervious surface areas have been confirmed via design drawings 3725-1-4310 and 3725-2-4310, and calculations demonstrating the assumed runoff coefficients and sizing methodology.

Private Lots

Private lots are managed at source through the installation of:

- First flush diversion devices and retention/detention tanks;
- Driveway treatment devices (e.g., GD01-compliant stormfilters or small on-lot raingardens);
- Consent notices on each title requiring installation and long-term maintenance of these devices.

This dual approach ensures that all impervious surfaces—public and private—achieve full compliance with treatment and hydrology mitigation requirements. The proposed solution reflects the Best Practicable Option (BPO) for the site, balancing performance, feasibility, and ongoing operability.

SW6

Confirm design catchments for each raingarden and how treatment and hydrology mitigation are provided.

SW6 Response

The communal raingardens have been designed to manage stormwater runoff from defined road and JOAL catchments, with treatment and hydrology mitigation outcomes tailored to the contributing area.

Each raingarden is connected to a splitter manhole, which diverts flows up to the water quality volume (WQV)—generally equivalent to the 95th percentile storm—into the bioretention device. Flows beyond this threshold bypass the raingarden to avoid overloading.

The catchment areas for each raingarden are illustrated in plans 3725-1-4340 and 3725-2-4310, confirming the delineation between public and private impervious areas.

Dynamic hydraulic modelling will be undertaken during the Engineering Plan Approval (EPA) phase to confirm that the splitter manholes and raingarden devices meet both treatment and conveyance performance expectations.

Although some runoff from private lots may enter the public stormwater system, these flows are already mitigated at source through on-lot retention/detention systems. As such, their contribution to the peak design flow entering the communal devices is minimal, and conservative sizing has been applied to account for this.

Notably, JOALs 01 and 03 cannot connect to raingardens due to topographic constraints and will instead be managed via on-site treatment and hydrology mitigation, consistent with GD01.

This comprehensive, distributed approach ensures that all contributing catchments are accounted for, and that both treatment and hydrological outcomes are achieved in accordance with regional standards.

SW7

Confirm how runoff from private lots from flow spreader units interact with the proposed communal devices.

SW7 Response

The proposed flow spreader units from private lots are not intended to discharge to the communal raingardens. Where private lot runoff may flow downslope near communal raingardens or access tracks, we propose the following:

- A swale or shallow channel will be constructed alongside the access track to intercept and redirect any overland flow, preventing uncontrolled inflow into the raingarden;
- Where necessary, subsurface piping may be introduced to convey runoff away from the raingarden, ensuring it is discharged to the streams in a controlled manner, and in accordance with GD01 energy dissipation guidelines;
- In all cases, these flow paths will be separated from the operational zone of the communal raingardens, with erosion protection and safe flow conveyance addressed through detailed design.

These solutions are intended to minimise hydraulic loading on the communal devices while protecting baseflow for adjacent streams and wetlands. Final design will be developed in coordination with Healthy Waters at the EPA phase, with appropriate erosion control and hydrology management measures confirmed as part of the detailed stormwater design.

SW8

Confirm that raingarden design will provide the necessary treatment function and be hydraulically sized to adequately manage the inflows throughout a design storm.

SW8 Response

The stormwater network has been structured to ensure that the communal raingardens provide effective treatment performance and are hydraulically sized to manage inflows over the full design storm duration.

- Public roads and JOALs discharge directly to communal raingardens, each of which has been sized to treat the first flush (water quality volume) in accordance with GD01 design standards. These devices have been modelled to receive undiluted runoff from high contaminant load surfaces, ensuring maximum treatment efficiency during the critical early portion of storm events.

- Private lot runoff is treated and mitigated at source using:
    - First flush diverters,
    - Retention/detention tanks sized to manage the 95th percentile storm volume,
    - On-lot GD01-compliant treatment devices such as stormfilters or small-scale raingardens.

The hydrological sequencing has been determined to demonstrate that the timing and magnitude of tank discharges from private lots are delayed, such that they do not interfere with or dilute the first flush entering the communal raingardens.

Specifically;

- Even with a conservative scenario where private lot catchments are twice the area of road catchments, a 10-minute overlap would result in <1% dilution of the road first flush.
- This overlap is further reduced in reality due to the initial 5mm retention in private tanks, ensuring near-zero early discharge during the critical pollutant-laden initial storm period.
- This confirms that the communal raingardens are functionally and hydraulically separated from private lot contributions during the first flush window, and are treating high-risk runoff independently and effectively.

We consider this approach to meet or exceed GD01 performance requirements for both treatment and hydrological control. A dynamic hydraulic analysis will be finalised at the EPA stage to confirm the sizing and performance of all devices through full storm events.

SW9

Where are the GPTs located upstream of the communal raingardens. It is assumed that these GPTs are to be provided as none of the raingardens have forebays (as stated in the Stormwater Report). How will these interact with the hydraulics of the splitter box. The outgoing pipe will need to be sized for the detention flows.

SW9 Response

The Stormwater plans show the locations of the proposed Gross Pollutant Traps (GPTs), which are positioned downstream of the splitter manholes and upstream of the communal raingardens. These GPTs are included to capture gross debris and sediment prior to inflow into the bioretention media, and serve the same pretreatment function, as required under GD01.

The hydraulic interaction between the splitter box and GPT will be considered in more detail and EPA phase design process:

- The GPT introduces a hydraulic head loss which is beneficial to the system, as it reduces flow velocity entering the raingarden, helping to minimise scour, media disturbance, and erosion at the surface;

- This arrangement ensures both the first flush diversion to the treatment device and pre-treatment of coarse material without compromising flow capacity; and
- The outlet pipe downstream of the splitter will be appropriately sized to convey both the detention volume and high-flow bypass scenarios, consistent with GD01 hydraulic modelling principles.

Final confirmation of sizing, head loss allowances, and detention performance will be undertaken as part of the Engineering Plan Approval (EPA) phase, including dynamic hydraulic modelling of the full system.

SW10

The SMP recommends that raingardens are used due to their ability to provide retention (infiltration) management. This is contrary to the recommendations of the Geotechnical report included in the submission information.

SW10 Response

While the Geotechnical Report initially advised caution regarding infiltration in certain areas due to localised soil instability (e.g., presence of Northland Allochthon), this advice is not intended to preclude all use of retention (infiltration) within the site.

Following further consultation, the project geotechnical engineer, James Beaumont of Riley Consultants, has confirmed that infiltration suitability will be assessed on a case-by-case basis at the detailed design stage. Where retention via infiltration is proposed:

- A site-specific geotechnical review will be undertaken of each raingarden location;
- Appropriate factors of safety will be applied based on soil profile, slope stability, and groundwater conditions;
- Infiltration zones will be restricted to locations where adequate setback, soil strength, and slope conditions can be verified; and
- Where retention is unsuitable, raingardens will still provide water quality treatment and detention, with infiltration bypassed or underdrained in accordance with GD01, or including this volume with the detention volume.

This approach allows the stormwater design to align with the SMP's intent to maximise retention where safe and feasible, while also respecting the geotechnical limitations and ensuring slope stability is not compromised. The Engineering Plan Approval (EPA) phase will include confirmation of infiltration feasibility and supporting geotechnical input for each device.

SW11

Correct the use of 'inert' to low contaminant generating' building materials.

SW11 Response

Noted. The stormwater management approach for individual lots has been updated in the relevant reports to clarify the treatment sequence in accordance with GD01.

Each lot will include the following features:

- A leaf diverter and first flush device installed upstream of any on-lot storage;
- A retention/detention tank to manage both water quality and hydrological mitigation; and
- A driveway treatment device, such as a 1m^2 on-lot raingarden or another GD01-approved alternative, to manage contaminants from hardstand areas.

This sequence ensures the first flush is captured and treated prior to detention, and that all lot-derived impervious surfaces receive appropriate treatment and mitigation in accordance with best practice. A consent notice will be registered on each title requiring installation, operation, and maintenance of these systems.

SW12

Confirm whether reuse tanks for internal, non-potable reuse are to be provided for each lot.

SW12 Response

Every lot will be required to provide at-source retention, detention, and water quality treatment, consistent with GD01 and the stormwater management strategy for the development.

To clarify, the rainwater tank infrastructure itself is mandatory on every lot. This includes provision for retention (first 5mm) and detention (difference between the pre and post-development 95th percentile storm) as part of on-lot stormwater management.

The earlier reference to "optional" applies only to whether the retained water is reused internally (e.g. for toilet flushing or irrigation). This internal reuse is encouraged but not required. The retention volume and outlet structure will be provided regardless of plumbing configuration.

Updated wording in the stormwater reports confirms this position to ensure consistency across the application documentation.

SW13

Confirm whether infiltration is to be used or not.

SW13 response

Infiltration is not assumed as a default approach across the development due to geotechnical sensitivities (e.g. Northland Allochthon soils and steep slopes). However, it is proposed on a case-by-case basis where site-specific geotechnical assessments confirm it is appropriate and safe to do so.

This approach has been confirmed through further discussion with the Riley Consultants geotechnical engineer. Infiltration will only be enabled in locations that:

- Are set back from steep or unstable slopes;
- Have confirmed soil profiles and some infiltration capacity;
- Meet minimum factors of safety for slope stability and ground saturation.

Where infiltration is not suitable, stormwater devices (e.g. raingardens) will be constructed with underdrains and impermeable bases to maintain treatment and hydrology performance without promoting infiltration. The retention volume will be added to the detention volume.

This approach allows the design to remain adaptive, safe, and compliant with GD01, while protecting site stability.

SW14

Include relevant drawings and calculations of stormwater infrastructure in the SMP.

SW14 Response

Refer to the updated 'SMP' with all references bound. We note - we are not looking for adoption of an SMP at this stage, it is provided in this format as a framework for future adoption at time of future re-zoning by council.

SW15

Confirm the design parameters and device sizing.

SW15 Response

Design parameters and sizing for stormwater treatment devices have been calculated from typical roading cross sections and site impervious data from the architect and urban designer.

- Road catchments: 60% impervious (including carriageways and footpaths), with the remaining 40% grass berms;
- JOAL catchments: 90% impervious, reflecting their predominantly hardstand nature.

All assumptions and calculations are provided in the submitted stormwater management plans and design spreadsheets. Final sizing will be confirmed at the EPA stage with detailed hydraulic modelling factors referred to are based off the actual road catchments calculated at 60% impervious (grass berm area 40%) and the JOAL catchments (mostly impervious) at 90%. Note this is very conservative for the JOALs as the larger JOALs have grass berms. Exact sizing will be refined at EPA phase.

SW16

Public stormwater assets located within private lot areas and JOALS should be relocated within public space to allow long term maintenance.

SW16 response

Where possible the lines have been located in the road reserve or public reserves. However due to layout and topography this is not always possible and practicable. A more refined adjustment of selected lines can be realigned in collaboration with Healthy Waters at EPA stage if required.

SW17

Identify any new impervious areas not receiving treatment and justify why.

SW17 Response

As per response to SW5 above.

All new impervious areas across the development are accounted for in the stormwater management design and receive appropriate water quality treatment and hydrology mitigation in accordance with GD01.

Public roads and JOALs are treated via communal raingardens, each sized to manage the Water Quality Volume (WQV) and mitigate the 95th percentile storm event:

- JOAL 1 → RG04
- JOAL 16 → RG14
- Road 1 → RG02 and RG12

Private lots are managed at source, with each lot required to:

- Treat runoff via first flush diversion,
- Provide on-lot retention/detention tanks, and
- Incorporate a GD01-compliant driveway treatment device (e.g. stormfilter or raingarden).

No new impervious areas are proposed that bypass treatment. The catchment plans (Drawings 3725-1-4310 and 3725-2-4310) and the stormwater calculations attached confirm that all impervious surfaces are directed to appropriate treatment devices and sized using confirmed runoff coefficients.

This ensures full compliance with treatment and hydrology mitigation requirements for both public and private components of the development.

SW18

Splitter boxes are presented upstream of each communal device. There should be a detailed hydraulic analysis undertaken of the entire public network to confirm that it operates as intended.

SW18 response

Noted. We confirm that this will be provided at EPA stage. This will be done with dynamic analysis and show hydraulic grade on all long sections. Splitter box hydraulic losses will only affect storms above 95%ile and up to 10y. Detailed design pipe sizing will account for the losses through these devices.

SW19

Provide more detail on the discharge locations of overland flowpaths to the gullies, together with flows, velocities and any erosion protection required to the gully and receiving watercourse.

SW19 Response

Refer to the Overland Flow Path Memo, which contains OLFP routes, flow data and calculations for rip rap outlets.

SW20

The modelling used to support the Application should be supplied to Healthy Waters for review and confirmation that the results are appropriate and acceptable.

SW20 Response

This has been provided, and responses received back from the HW modelling team. A Memo responding to these queries is attached.

SW21

Provide evidence that the proposed maintenance access associated with each raingarden device can be built and meets the necessary requirements for safe vehicle access and activities.

SW21 Response

Raingarden plans have tracking curves applied to them to show how a truck may manoeuvre down and around the raingardens. A cross section showing how an excavator could also undertake maintenance work is included also. This can be worked through in more detail during EPA phase.

SW22

Provide appropriate areas for lay down / sediment drying areas with the device accessways.

SW22 Response

Sufficient space for laydown areas have been considered, and should be evident on the drawings. This detail can be worked through with the Healthy Waters team at EPA phase.

SW23

Reconsider the widespread application of private flow spreader bars discharging flows direct to gullies.

SW23 Response

The spreaders are proposed to feed water into the streams, so that the entire catchment is not drained to the bottom. Most of the slopes they are discharging onto, are reinforced earth walls, and as such destabilisation should not be an issue. These will be private devices, and will be the responsibility of the owners to maintain.

SW24

Clarify if the intention of maintaining stream base flow is realised by the proposed stormwater design.

SW24 Response

Yes, the proposed stormwater design intentionally supports the maintenance of stream baseflow conditions, particularly in areas discharging to downstream wetlands and natural channels. This is

achieved through a combination of design strategies aimed at preserving catchment hydrology and promoting slow, distributed flow discharge:

- **On-Lot Retention and Detention Tanks**: Each private lot includes a combined retention/detention tank. These tanks capture the first flush (5 mm retention) and slowly release detention volumes over a 24-hour period, mimicking natural hydrological response and contributing to sustained baseflow discharge.
- **T-bar Spreader Systems:** These devices disperse tank overflow and stormwater overland via vegetated slopes and bunds, replicating diffuse sheet flow. This reduces flow concentration and encourages shallow infiltration and subsurface flow pathways, which support localised baseflow recharge.
- **Hydrological Balance Confirmation:** Catchment modelling has been used to compare pre- and post-development flows upstream of the wetland areas. This analysis confirms that flow volumes and timing remain within natural ranges, ensuring the downstream baseflow regime is protected.

Together, these design measures ensure that stream baseflow is supported through both preservation of contributing catchment areas and the implementation of slow-release, distributed stormwater controls.