Note: Healthy Waters have reviewed the Stormwater Management Plan (SMP) submitted as part of the 70A and 70B Lisle Farm Drive PPC in relation to stormwater effects against the plan change requirements and in relation to the Auckland Council Healthy Waters' Regionwide Network Discharge Consent (NDC). The Plan Change proponent has indicated that it wishes its stormwater discharges to be covered by the NDC and intends to vest stormwater assets with Auckland Council. The table below outlines the further information requested by Healthy Waters pursuant to Clause 23 of the First Schedule to the RMA.

Request No.	Category of information request	Request for information	Reason for request	**HW's review comments (14 Aug 2024) on the Applicant's RFI Responses dated 17 July 2024**
SW 1	Receiving environment	How has the proposed stormwater management approach considered the type (streams, wetlands, lakes, underlying aquifers) and condition (possible erosion risk, capacity and required infrastructure upgrades, SEAs) of the downstream receiving environments?	Assessment and understanding of the condition of the receiving environment is required to inform the most suitable methods of stormwater management for the proposed development. Any proposed stormwater management should consider the location where runoff is discharged from the site all the way to the ultimate receiving environment from the wider catchment. Please refer to section 1.6 of the Stormwater Management Plan Template – Explanatory Notes (Stormwater Management Plan Template (aucklanddesignmanual.co.nz)) for further details on what is expected in the SMP.	Resolved.
SW 2		Please provide an assessment of: • Pre- and post-development flows entering the watercourse. • Potential changes to erosion risk at the discharge points from the development enabled by the plan change. • Locations of outlets and proposed mitigation measures.	The SMP identifies steep site features with large scale land movement of the gully flanks and stream banks. Increases in peak stormwater discharges associated with development can result in increased erosion and scour of stream channels during storm events. Any actual and potential effects in relation to stormwater discharge should be assessed and identified.	Please refer to comments below in relation to flood modelling and stormwater attenuation.

SW 3		Please show in the SMP the location of any natural hydrological features within the plan change area, including natural wetlands, and demonstrate how the development and proposed stormwater management will ensure the vitality of these wetlands. It is noted that earthworks are being proposed in close proximity to some of the wetlands. Erosion effects and how they are intended to be avoided and/or mitigated should be addressed in the SMP.	As shown on Figure 2 of the Ecological Assessment, there are five wetlands within the plan change area. It is stated in the assessment that: *Alternations to topography at the gully heads has the potential to result in changes to the hydrological inputs that feed the natural wetlands within the gullies. This is proposed to be addressed by achieving hydrological neutrality through the installation of an underground drainage network. If this drainage network functions as expected effects on the wetland hydrology should be negligible.* Any actual and potential effects on the wetland in relation to stormwater management should be identified and assessed. Please also refer to section 1.7 of the Stormwater Management Plan Template – Explanatory Notes for further details on what is expected in the SMP.	Resolved.
SW 4	Mana Whenua engagement	Please provide details of Mana Whenua engagement undertaken to date and/or how and when it is intended to be undertaken.	Mana Whenua engagement is required to inform the proposed stormwater management approach. The Precinct Description (proposed as part of the Lisle Farm Drive Precinct provisions) acknowledges the cultural significance of this area to local iwi and states that the cultural values including hydrological and ecological features within the precinct need to be recognised and appropriately managed, including through consultation with Ngāti Te Ata and Ngāti Tamaoho. However, at the time	Resolved.

			of preparing the SMP, no Mana Whenua engagement has been undertaken. It is important that Mana Whenua engagement take place as per the objectives and outcomes outlined in Schedule 2 of the NDC to ensure that the proposed stormwater management recognise and integrate with the cultural values Mana Whenua have for the area. It should also be noted that Mana Whenua engagement must be undertaken as per Schedule 4 of the NDC for greenfield sites.	
SW 5	Stormwater management approach – overall	Please confirm the stormwater management approach proposed for different areas and activities and update the SMP accordingly. Please confirm and/or clarify the following: • The table in the executive summary does not propose any water quality measure for residential lot – roof areas, whereas elsewhere the use of inert building materials is sought. • Pre-treatment devices are specified for residential hardstand areas in the figure in Section 5.2.1 and the table in the executive summary, but not in the first figure in Section 5.2.9. • The figure in Section 5.2.1 and the table in the executive summary does not include centralised bioretention devices, rain garden or rain smart tank as a measure to achieve hydrological mitigation for residential hardstands, though this is proposed in the first figure in Section 5.2.9. • Consider adding attenuation requirements to the table in the executive summary and the figure in Section 5.2.1 so it is clear that this is a requirement in some catchments. • Section 2.3.4 of the Stormwater Assessment mentions the use of **five** communal	There are inconsistencies presented throughout the SMP which leads to uncertainty of what stormwater management approach is being proposed.	Resolved.

		stormwater devices, which contradicts Section 5.2.8 of the SMP, stating the design of **three** communal stormwater devices. Please confirm the number of communal devices being implemented within the SMP. • The stormwater management approach for catchments A, E, F and G as described in Section 5.2.9 suggests use of permeable paving for residential hardscapes. This should be incorporated into the second figure in Section 5.2.9.		
SW 6	Water quality	Please confirm and clarify if all impervious areas are proposed to be treated to meet GD01 requirements as per the requirement of the NDC's water quality performance criteria: • Section 5.2.1 of the SMP specifies deep sump cesspits as pre-treatment devices for Public Roads and Hardstand Area. The deep sump cesspit does not achieve GD01 treatment. We recognise that this pre-treatment option in series with bioretention devices would achieve GD01 treatment, but discharge via a tank would not provide any additional treatment. • Similarly, the SMP specifies Gross Pollutant Traps for pretreatment only for the residential surfaces in catchments A, E, F, G. Catchment E, F, and G then discharge directly into natural wetlands. • Section 5.2.2 promotes the use of bio-retention swales and rain gardens for roads, though these are not included in any figures.	This information is required to enable a full assessment of water quality effects.	Resolved.
SW 7		Please provide an assessment and justification of why the proposed treatment methods for private residential roofs, private residential hardstand, and public roads and hardstand area are considered the Best Practicable Option (BPO) and how they meet the requirements of the NDC and the relevant		Resolved.

		policies under Chapter E1.3 of the Auckland Unitary Plan.		
SW 8		Please provide information on how stormwater runoff from any communal waste storage areas in apartments and/or multi-unit developments is proposed to be managed and treated.		Resolved.
SW 9	Hydrological mitigation	The SMP specifies that "no soakage is proposed" due to the "geotechnical constraints and steep site features". Please comment on the underlying soil materials, infiltration potential (including whether any site-specific percolation testing has been completed) and any other known "geotechnical constraints" which preclude infiltration.	This information is required to enable a full assessment of stormwater runoff effects.	Resolved
SW 10		Please confirm whether and where retention can be provided.	The second figure in Section 5.2.9 of the SMP suggests that re-use and soakage is not feasible for the residential hardstand. Similar to the proposal to achieve hydrological mitigation for the ROW, could the stormwater management approach specify to "offset compensate" these surfaces to achieve retention.	Resolved.
SW 11	Flood Modelling	Please confirm and explain the values presented in Table 7 of the Stormwater Assessment. We note that for "To South East" the 10% AEP unmitigated peak flows increase, whereas the 1% AEP unmitigated peak flows decrease. "To South West" appear to have inconsistent decreases.	This information is required to enable a full assessment of flood risk associated with the development enable by the proposed plan change.	Resolved.
SW 12		Please confirm the 1% AEP flow path for runoff from the residential lots in Post Stormwater Catchment A.		Resolved.
SW 13		Please provide a sensitivity assessment of device sizing allowing for 3.8 degree climate change increase to ensure that the device(s) can be incorporated into the proposed future urban layout.		**Outstanding.** A sensitivity assessment of device sizing with allowance for 3.8 degree climate change is now provided. However, the rationale behind how the Maximum Probable

				Development (MPD) was calculated is confusing and has the potential to underestimate the area of impervious surface that requires mitigation (refer to section 2.3.2 of the Modelling Report). The entire plan change area is proposed to be rezoned to Residential – Mixed House Urban. On this basis, a sensitivity assessment of device sizing should consider a MPD of 60% of the entire plan change area. This is to ensure that the worst case scenario is identified and assessed.
SW 14	Stormwater attenuation	Where attenuation is proposed, please confirm which design storms this SMP is seeking attenuation for. The attenuation requirements for communal and "offset compensate" devices need to be clear.	Section 5.2.8 of the SMP "modelled communal devices were designed to accommodate the attenuation target under 50%, 10% and 1% AEP rainfall events" however the figures in Section 5.2.9 only specify attenuation to 76% of unattenuated 10 year and 100 year ARI flow rate. It is unclear whether the SMP is seeking attenuation of the 50% AEP storm event, whether 76% attenuation is appropriate for the 1% AEP and whether this requirement needs to be adjusted for communal and "offset compensate" devices.	**Outstanding.** The attenuation requirements for communal and "offset compensate" devices are still unclear. This information is required to enable assessment of whether appropriate and feasible flood mitigation is to be proposed so that downstream flooding risks are not increased. Please explain: • How the 76% figure has been decided on; • Whether 76% attenuation is appropriate for the 1% AEP events and whether this

				requirement needs to be adjusted for communal and "offset compensate" devices (refer to sections 5.2.8 and 5.2.9 of the SMP).
SW 15		Please confirm the type of device that is proposed for communal attenuation.	The SMP describes it as a "centralised bioretention devices, rain garden or rain smart tank", however bioretention devices typically aren't designed to achieve attenuation requirements (refer to table 11 and Section C3 of GD01). Elsewhere it is described as an "underground stormwater storage with designed ancillary system".	**Outstanding.** Three Cirtex Rainsmart Modular tanks are proposed to achieve communal attenuation and to be vested with Healthy Waters. Healthy Waters is unlikely to accept a communal tank solution unless it is demonstrated as the Best Practicable Option (BPO). As a greenfield site it seems unlikely that better solutions are not feasible. Tanks for stormwater attenuation can have limitations e.g. maintenance and appropriate orifice design can be challenging. Opportunity to provide an integrated approach to stormwater management with communal devices providing multiple functions e.g. end of catchment wetlands should be considered. Please also demonstrate how stormwater flows will be conveyed to the tanks? Will all upstream connections to the tanks be sized to accommodate

				the 1% AEP storm events? Supporting information are required to demonstrate feasibility. The feasibility and suitability of the proposed stormwater devices should be demonstrated. And hence to confirm if adverse effects associated with stormwater discharge will practically be able to be mitigated.
SW 16	SMP Implementation	Please provide information on how the proposed stormwater management methods outlined in the SMP are intended to be implemented. Please confirm and clarify at what stage of the development the proposed communal device and other public network/devices are intended to be constructed. If staging of development is proposed, please provide information on how the SMP will be implemented corresponding to each stage of development.	This information is required to enable assessment of whether any adverse effects will practically be able to be mitigated.	Resolved.
SW 18	SMP Approval	Please provide an amended SMP which includes the further information and assessment as requested above. Feedback on other sections of the SMP: • Section 5.2.2 specifies promoting the use of permeable paving to achieve the water quality control target. However, it should be noted that permeable paving only provides limited treatment for active systems. Please amend this detail within the SMP. • Labelling of tables and figures would assist with future reviews.	The SMP acts in the plan change process as an assessment of stormwater effects and forms part of the NDC authorisation process. An approved SMP is required for the authorisation of stormwater diversion/discharge under the NDC.	Resolved.

		• Please use consistent referencing to design storms i.e. 1% AEP or 1 in 100 year ARI throughout the SMP and stormwater assessment. • In addition to setting out the preferred stormwater management for a development, the SMP should also identify further investigative works that are required in the later stages of design. This should include: - erosion study once the stormwater pipe network is conceptually designed to enable an assessment of whether SMAF 1 is appropriate, or whether a higher standard is required. - Site-specific infiltration testing. - Assessment to confirm that the vitality of the wetlands can be maintained and enhanced.		