MEMORANDUM

DATE: 16 January 2026

SUBJECT: Sunfield Development – High-Level Natural Hazard Risk Assessment (NPS-NH Alignment)

1. Introduction

This memorandum summarizes the flood hazard risk level for the Sunfield development in accordance with Part 3 of the National Policy Statement for Natural Hazards (NPS-NH). It confirms that the proposed engineering design aligns with the NPS-NH by prioritizing the avoidance of high-risk hazards and managing residual risks.

All risk levels below have been calibrated against the specific Likelihood vs. Consequence Risk Matrix (refer to Appendix A) within Appendix 1 of the NPS-NH.

A review of the Auckland Council GeoMaps 'Natural Hazards – Landslides' layer has also been undertaken as part of this assessment.

Flood Hazard Risk Assessment

2. Methodology: The Precautionary Approach

Given the scale of the development, this risk assessment breaks the Sunfield development down into respective 'zones' which factor in the respective land-use and the flood management strategy.

Consistent with the NPS-NH requirement to rely on the "best available information," this assessment utilises a Precautionary Approach:

- Climate Change Horizon: All flood hazards are assessed against a 1% AEP (1-in-100 year) event plus a conservative allowance for climate change per the Auckland Council Stormwater Code of Practice.
- Freeboard Buffers: Vertical freeboard (typically 500mm) is applied to all habitable floor levels above the modelled flood level.

3. Risk Categorization & Management Strategy

Zone A: Residential Precincts

- Strategy: Avoidance.
- Assessment: Detailed earthworks design ensures that all residential platforms are elevated above the 1% AEP flood plain plus freeboard.

- NPS-NH Risk Matrix Classification:
    - Likelihood: Rare (ARI 500+ years).
        - *Justification:* While the flood plain is 100-year (1% AEP), the freeboard buffer means the *overtopping* event for floor levels is significantly larger, estimated at >500 year ARI.
    - Consequence: Moderate.
        - *Justification:* Safe egress is maintained (life safety risk = Negligible). Consequence is limited to potential building damage and economic recovery of the dwelling in an extreme event.
    - Resulting Risk Level: **LOW (Green).**
- Compliance: The design effectively eliminates "High" and "Medium" risks for private dwellings.

Zone B: Commercial, Industrial & Education Precincts

- Strategy: Avoidance & Operational Resilience.
- Assessment: Commercial floors are set above flood levels. The School includes enhanced dry-egress protections.
- NPS-NH Risk Matrix Classification:
    - Likelihood: Rare (ARI 500+).
        - *Justification:* While the flood plain is 100-year (1% AEP), the freeboard buffer means the *overtopping* event for floor levels is significantly larger, estimated at >500 year ARI.
    - Consequence: Moderate.
        - *Justification:* "Catastrophic" or "Major" consequences (loss of life/injury) are mitigated to "Negligible" by ensuring dry evacuation routes. The remaining consequence is economic/operational and the potential damage to buildings.
    - Resulting Risk Level: **LOW (Green).**
- Compliance: The design effectively eliminates "High" and "Medium" risks for Commercial, Industrial & Education Precincts.

Zone C: Road Network, Swales & Overland Flow Paths

- Strategy: Mitigation, Conveyance & Serviceability

- Assessment: The swale and road network is designed to actively convey the 1% AEP flow. The road network shall be engineered to function as a secondary conveyance corridor in full compliance with the Auckland Transport Technical Design Manual (TDM).
- NPS-NH Risk Matrix Classification:
    - Likelihood: Possible (ARI 50-100 years).
        - *Justification:* The road network is designed to engage as a flow path only when pipe capacity is exceeded (typically >10 year ARI), with significant depth occurring in the 50-100 year range.
    - Consequence: Negligible.
        - *Justification:* Road geometry shall be designed to maintain a passable lane for emergency vehicles. There is no structural damage to infrastructure, and life safety risks are mitigated by strict adherence to depth-velocity limits per the *Auckland Transport Technical Design Manual*.
    - Resulting Risk Level: **LOW (Green).**
- Compliance: The alignment with the AT TDM demonstrates that the presence of water is a managed operational state, not an uncontrolled hazard.

Zone D: Stormwater Reserves & Dual-Use Areas

- Strategy: Storage & Attenuation.
- Assessment: Parks and ponds provide temporary flood storage.
- NPS-NH Risk Matrix Classification:
    - Likelihood: Almost Certain (ARI up to 100 years).
        - *Justification:* These areas are designed to flood frequently as part of their function.
    - Consequence: Negligible.
        - *Justification:* The areas shall be designed in accordance with Auckland Council Stormwater Code of practice safety requirements. The area is grassed/planted. Flooding causes no significant damage and no safety threat.
    - Resulting Risk Level**: LOW (Green).**
- Compliance: Per the matrix, even frequent hazards are "Low Risk" if the consequence is Negligible.

Zone E: Downstream Properties in the Eastern Catchment (Papakura Stream Catchment)

- Strategy: Flood attenuation will be achieved through attenuation ponds to ensure post-development flows either match or are reduced below pre-development parameters.
- Assessment: Pre- to Post-Development flooding effects on Downstream Properties in the Eastern Catchment.
- NPS-NH Risk Matrix Classification:
    - Likelihood: Possible (ARI 50-100 years).
        - *Justification:* The proposed attenuation ponds are designed to attenuate stormwater flows associated with the 1% AEP (100-year) rainfall event.
    - Consequence: Negligible.
        - *Justification:* Attenuation ponds will be installed, which are designed to attenuate peak stormwater flows to levels equivalent to, or lower than, pre-development conditions for storm events up to and including the 1% AEP (100-year) rainfall event. This approach ensures that hydraulic neutrality is maintained across the site, such that post-development discharge characteristics do not worsen downstream effects.
    - Resulting Risk Level**: LOW (Green).**
- Compliance: Per the matrix, even frequent hazards are "Low Risk" if the consequence is Negligible.

Zone F: Downstream Properties in the Western Catchment (Pahurehure Catchment)

- Strategy: Flood attenuation will be achieved through a purpose-designed attenuation pond, which has been specifically sized and configured to ensure that post-development discharge rates either match or fall below pre-development parameters, to remain within the operational capacity and performance limits of the existing downstream flood infrastructure.
- Assessment: Pre- to Post-Development flooding effects on Downstream Properties in the Western Catchment.
- NPS-NH Risk Matrix Classification:
    - Likelihood: Likelihood: Possible (ARI 50-100 years).
        - *Justification:* The proposed attenuation pond is designed to attenuate stormwater flows associated with the 1% AEP (100-year) rainfall event.

- Consequence: Negligible.
    - *Justification:* A single attenuation pond will be installed, designed to attenuate peak stormwater flows to levels equivalent to, or lower than, pre-development conditions for storm events up to and including the 1% AEP (100-year) rainfall event. In this instance, the pond has been specifically sized and configured to ensure that post-development discharge rates remain within the current operational capacity and performance limits of the existing downstream flood infrastructure. This approach maintains hydraulic neutrality across the site and ensures that post-development discharges do not exceed downstream system capacity, or otherwise exacerbate downstream effects.

      The McLennan Wetland downstream will be upgraded to ensure adequate capacity and performance prior to receiving any additional runoff from areas outside its currently designated catchment.
  - Resulting Risk Level**: LOW (Green).**
- Compliance: Per the matrix, even frequent hazards are "Low Risk" if the consequence is Negligible.

Conclusion:

The engineering strategy for Sunfield effectively prioritizes safety. By manipulating the "Likelihood" (via freeboard) and "Consequence" (via egress design), the project ensures that no 'High' or 'Very High' risks remain on the specific project risk matrix.

Auckland Council GeoMaps Landslides

According to the Auckland Council GeoMaps 'Natural Hazards – Landslides' layer, the landslide susceptibility class mapped for the majority of the site under Council's Level A analysis for shallow landslide susceptibility is 'Very Low'. A few scattered areas across the site are classified as 'Low' and 'Moderate', and in the south-eastern corner these 'Low' and 'Moderate' zones occur in a more condensed pattern, along with a single 'High' and 'Very High' susceptibility area. For large-scale landslide susceptibility, the majority of the site is mapped as 'Very Low', with the southern third of the site classified as 'Low'.

- NPS-NH Risk Matrix Classification:
    - Likelihood: Unlikely.
        - *Justification:* Any areas identified with elevated mapped susceptibility can be more accurately assessed through detailed geotechnical investigations as part of the design phase. These investigations allow targeted validation of ground conditions and confirmation of whether the Level A screening constraints are actually present. During construction, earthworks activities provide further opportunity to remediate any localised geological or stability risks that may be encountered. This includes shaping, compaction, subsoil drainage, or any other stabilisation measures recommended by the geotechnical engineer. Following completion of works, the geotechnical engineer will provide a Geotechnical Completion Report confirming that the constructed earthworks and any remedial measures meet the required stability and performance standards. Collectively, these investigation, construction, and verification processes significantly reduce the residual risk, supporting an overall landslide likelihood rating of Unlikely.
    - Consequence: Negligible.
        - *Justification:* the area of elevated shallow-landslide susceptibility in the south-eastern corner of the site is located within an open space zone and is free of any existing buildings, structures, or critical infrastructure. As there are no assets or occupants within this portion of the site, any potential slope movement would not result in damage to built development, loss of service, or risks to life safety. The absence of exposure in this area therefore substantially reduces the potential impacts associated with a landslide, supporting the assessment of a low overall risk level despite the locally higher susceptibility classification.
    - Resulting Risk Level: **LOW (Green).**

- Compliance: Per the matrix, even frequent hazards are "Low Risk" if the consequence is Negligible.

Kind Regards,

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Appendix

Figure 1: Risk matrix

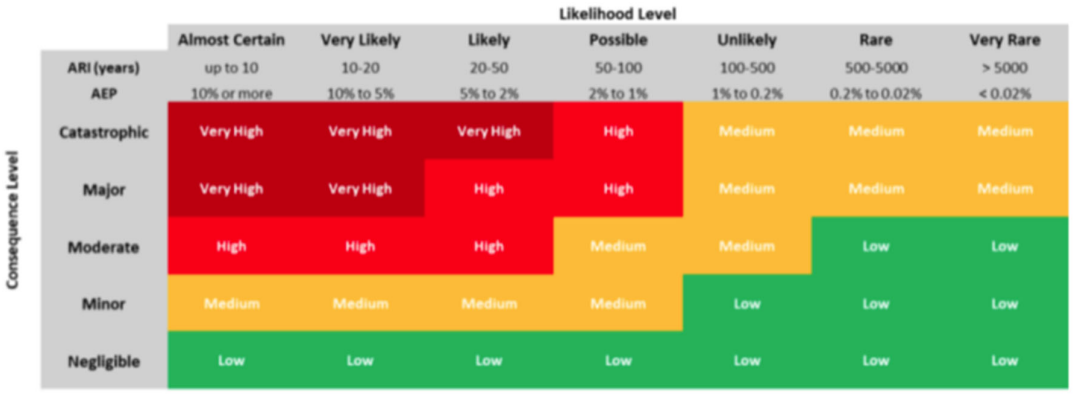

Table 1: Likelihood table

Likelihood level	Annual exceedance probability (AEP)	Average recurrence interval (ARI) or 'return period'
Almost certain	10% or more	Up to and including 10 years
Very likely	10% to 5%	Over 10 and up to and including 20 years
Likely	5% to 2%	Over 20 and up to and including 50 years
Possible	2% to 1%	Over 50 and up to and including 100 years
Unlikely	1% to 0.2%	Over 100 and up to and including 500 years
Rare	0.2% to 0.02%	Over 500 and up to and including 5,000 years
Very rare	less than 0.02%	More than 5,000 years

Table 2: Consequence table

Consequence level	Damage to property	Potential for injury or fatalities
Catastrophic	Severe damage to land and building(s), potential for collapse or total destruction of structures. Building(s) need to be demolished, rebuilt or relocated.	High threat to life safety, with probable fatalities and/or critical injuries.
Major	Major damage to land and building(s), including structural damage. Loss of use and substantial repair required.	Unsafe for people, with potential for many injuries, or critical injuries and/or fatalities.
Moderate	Some damage to land and non-structural damage to building(s). Limited loss of use, repairs required.	Unsafe for people, with potential for injuries, although expected to be minor.
Minor	Minor damage to land and building(s). No loss of use, minimal repairs required.	Isolated minor injuries possible.
Negligible	No loss of use, no building repairs required.	No injuries.