| **Clause 23 Further Information Request Response Table – WBP PPC** | | | | |
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| **#** | **Category of information** | **Specific Request** | **Reasons for request** | **Applicant Response** |
| **Planning, Todd Elder** | | | | |
| 1. | Planning AEE/S32 analysis | Please include a specific part in the 'Private Plan Change Request – Whenuapai Business Park' (Planning Report) that refers to Section 22 of Schedule 1 of the RMA under section 8.4. Specifically, can you please provide:<br><br>a. The reasons for the plan change request; and<br>b. The Purpose of the plan change.<br><br>You may wish to provide a section on the Purpose under the Section 32(1)(a) assessment, as the currently listed private plan change objectives could be amended through submissions. You may also want to note that other operative AUP provisions are being relied upon, of which the objectives of these provisions have already met the Purpose of the RMA. | | Please refer to the attached updated planning report. (**Attachment A**). Section 8.4 has been updated to directly refer to Section 22 of Schedule 1 of the RMA.<br><br>Reference to Section 32(1)(a) is provided in Section 9.2.<br><br>Reference to the PPC relying on other operative AUP provisions is provided in Section 9.1. |
| 2. | | Can you please provide a summary of matters raised by iwi in the section 32 (4A) assessment? For example, it | | Please refer to the attached updated planning report (**Attachment A**). Refence to Section 32(4)(a) is provided in Section 9.1 and refers to |

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| | | seems section 11.4 of the Planning Report is relevant to summarise or reference in the Section 32 assessment. | | the relevant sections of the planning report and the consultation appendix. An update has been made to include a direct reference to Section 11.4. |
| 3. | | Can you please confirm that Appendix V has been authorised by Iwi to be used on this PPC request? | | The applicant sought confirmation from Te Kawerau ā Maki on whether the previous CIA can be repurposed for the PPC. No response has been received from Te Kawerau ā Maki representatives at the time of writing this response. The applicant has attempted to engage on four separate occasions and not received a response. As outlined within the PPC request, Te Kawerau Iwi Tiaki Trust prepared a Cultural Impact Assessment for a fast track project on a large proportion of the PPC site in September 2021. To ensure that those inputs were not lost, potential cultural impacts identified within the fast-track CIA have been incorporated in the draft PPC application and precinct provisions, as far as practicable. |
| 4. | | Were any Iwi Management Plans considered in the preparation of this PPC request? | | Please refer to the attached updated planning report (**Attachment A**). Section 11.4.1 includes reference to Te Kawerau ā Maki Resource Management Statement (1995). |
| 5. | | Regarding the land not owned by NEIL Construction Limited, has the Applicant received any further responses from landowners whose land is affected by this PPC request? | | No further responses have been received. |

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| 6. | | Section 7.2 Future Development Strategy of the Planning Report provides an overview of the Whenuapai Business Park against the FDS. Do you consider that the infrastructure projects listed in the document, with specific reference to Appendix are relevant? Can you please identify which projects on page 38, of Appendix 6 of the FDS applicable to the PPC request? | | Section 10.8 of the planning report (**Attachment A**) addresses the infrastructure projects applicable for the PPC land under the FDS.<br>Section 4.8 of the Integrated Transport Assessment (**Attachment B**) outlines that some development can take advantage of existing capacity and the infrastructure upgrades proposed as part of the PPC avoid the need for the FDS infrastructure prerequisites to be in place prior to the PPC. |
| 7. | Precinct Provisions | Regarding the proposed precinct, can you please adjust the precinct title to 'I6XX.1'. The final precinct number will be allocated if the plan change is made operative. I will provide the AUP template for your precinct to be inserted into. | | Please refer to the attached updated Precinct Provisions (**Attachment C**). |
| 8. | | Can you please provide and reference precinct plan numbers for Policies (1), (4), (14) and other areas marked as 'XX' throughout the precinct. | | Please refer to the attached updated Precinct Provisions (**Attachment C**). |
| 9. | GIS/BIM Files | Can you please provide the GIS shapefiles or dwg/dgn files in NZGD 2000 (datum) NZTM for Precinct Plans. The proposed precinct maps are required to be a part of the AUP precinct, and the council GIS team will put them into a format suitable for the | | Providing the GIS shapefiles is not considered necessary whilst the Clause 23 matters are being resolved and the PPC may still be subject to change. The GIS shapefiles can be shared once the PPC has been finalised. |

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| | | AUP. Ideally this will be completed before notification. Council is happy to assist with this process and will arrange a GIS specialist to discuss if required. | | |
| **Ecology, Jason Smith** | | | | |
| | Precinct provisions | The Precinct Plan includes two objectives that relates to ecological values:<br><br>(4) The health and well-being of streams and wetlands within the Precinct is enhanced.<br>(5) Riparian, open space buffer, and boundary planting contributes to increasing the canopy cover within the Precinct.<br><br>And one policy:<br><br>(6) Provide for the health and wellbeing of streams and wetlands within the Precinct through riparian planting and restoration of degraded habitats while providing habitats for less mobile or flightless species.<br><br>To better align with the NPS:IB (policies 8, 13 and 14), as well as, AUP RPS: objective B7.2.1(2) it is considered that there should be policy provisions that reference the enhancement of terrestrial ecological values. | It is recommended that the following amendments be made to reference all indigenous biodiversity values:<br><br>(4) Ecological values including the health and well-being of streams and wetlands within the Precinct ~~is~~ are enhanced.<br><br>(5) Riparian, open space buffer, and boundary planting contributes to increasing the canopy cover and indigenous biodiversity within the Precinct.<br><br>(6) Provide for the health and well-being of indigenous biodiversity, streams and wetlands within the Precinct through riparian planting and restoration of degraded habitats ~~while providing habitats for less mobile or flightless species~~ | Please refer to the updated Precinct Provisions (**Attachment C**). |

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| | | Please updated the Special information requirement (2) to align with Appendix 16 of the Auckland Unitary Plan | Whilst three years may be an appropriate end point, the current guidance from Appendix 16 of the AUP references 3-5 years, with 5 years where site conditions are likely to be harsh (which would include recently earthworks sites). It is recommended that the following amendments be made:<br><br>(b) Provide a detailed restoration plan, including planting and maintenance ~~for no less than three years~~ plan, for the stream, wetland, and their buffer/riparian margins. The plan shall be in accordance with best practice methodologies of TP148 and/or Auckland Unitary Plan Appendix 16, or other subsequent Council restoration guide. | The three years proposed is standard practice and is in accordance with Appendix 16. Whilst the PPC land may currently have 'harsher' conditions, the majority of these works will be completed by the time planting occurs on the future sites and the conditions will be more consistent with the standard 3 years required for plant growth maintenance and monitoring. Therefore, the three years as proposed is considered sufficient and in accordance with Appendix 16. |
| | Wetland assessments | Can the applicant please provide the wetland data points used in the wetland delineation and classification assessments. | As the wetlands are shown in the precinct map along with a requirement for their riparian margins to be planted in the future it is important that their classification and delineation is supported.<br><br>This is particularly relevant for wetland referred to in section 3.3.5 of the EcIA, the location of the former | Please refer to the response prepared by Viridis in **Attachment D**. |

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| | | | feed pad, where the pasture exclusion methodology has been applied. | |
| | Stream erosion | Please assess the resiliency of the stream bed and banks to withstand any changes in the hydrological regime that may result from the change in land use. | The Stormwater Management Plan states that the development of the plan change area will not result in significant increases in stream erosion.<br><br>Whilst the SMP proposes stormwater management controls, the detailed assessment of which will be undertaken by others under separate cover, this statement does not appear to be supported by any assessment of the resilience of the stream bed/banks to the changes in the hydrological regime which would be apparent even with best practice stormwater management.<br><br>Please discuss if the SMP provisions will be sufficient to address effects on the stream environment caused by the change in land use. The overarching request is to compare the hydraulic shear stress exerted by the driving force of water to the critical shear stress of the material of the stream channel.<br><br>It is envisioned that this would require a quantified assessment that accounts | Please refer to the Stream Condition Assessment prepared by Viridis (**Attachment E**).<br><br>The report found that the existing condition of the waterways within the PCA was good and that there was largely no evidence of erosion, scour or other bank damage. This includes a "before and after" comparison of the main stream using dated photos to assess any damage caused over time and in particular by the early 2023 significant rain events.<br><br>A meeting took place between the applicant, their consultants, and the Council team responsible for the Stream Erosion Risk Tool. It was determined that the suggested tools were not yet verified, not yet calibrated for the Auckland Region, not yet publicly available, and not yet fit for purpose. Furthermore, Appendix A of the Plan Change 69 SMP appears to have resulted from a similar request. Within it, Tonkin and Taylor extensively modified Council's erosion risk screening tool to tackle perceived shortcomings and to enhance its accuracy. Nevertheless, the findings of the report still raises doubt about the erosion risk screening tool's reliability in identifying erosion-prone areas. |

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| | | | for the stability of the stream banks such as the application of the Auckland Council Stream Erosion Risk Tool and/or the Bank Stability and Toe Erosion Model (B-STEM) to indicate a change in erosion potential by quantifying the duration of exceedance of critical shear stress.<br>The use of such a would identify areas with erosion risk, and where these change as a result of the development, and where extra measures may be required.<br><br>This responds to Auckland Unitary Plan RPS objectives B7.4.1(4 and 5), as well as policies B7.4.2(1, 6, 8 and 9) | TR2013/035 Auckland Unitary Plan stormwater management provisions: Technical basis of contaminant and volume management requirements determines the appropriateness of SMAF1 equivalent volume management to mitigate stream bank erosion. There is no reason to believe it should not be relevant to the PCA. TR2013/035 section 2.5.1.1 discusses stormwater management in greenfields areas and states: "Importantly, stormwater management policy sets an expectation that stormwater runoff in greenfields areas draining to streams will be managed to achieve hydrological mitigation equivalent to that required in a SMAF1; applying both on-site and communal solutions appropriate for the area and development anticipated."<br><br>The Auckland Unitary Plan stormwater management provisions recommends that Greenfields areas draining to streams achieve hydrology mitigation equivalent to a SMAF1. This is a change from the historic approach of using Extended Detention which was seen as having a negative effect on the base flow of streams during dryer periods. In addition, the stormwater management guidance and design documentation prepared by Auckland Council for stormwater management devices is based on using either SMAF1 of SMAF2.<br><br>SMAF1 equivalent mitigation combined with riparian planting and outlet protection is |

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| | | | | considered as the best practicable option to protect the stream banks from erosion. |
| **Healthy Waters, Carmel O'Sullivan, Gemma Chuah, Lee Te, Susan Andrews & Brooke Waterson** | | | | |
| HW1 | Water Quality | Figure 1 (as below) of the SMP relies solely on inert building materials to provide water quality management. However, inert roofing/building materials still present an issue providing a pathway for airborne contaminants deposited on roof/building surfaces to discharge to the environment.<br><br>The Regionwide NDC requires:<br><br>○ Treatment of all impervious areas by a water quality device designed in accordance with GD01/TP10;<br><br>OR<br><br>○ An alternative level of mitigation on determined through a SMP that:<br><br>▪ Applies an Integrated Stormwater Management Approach;<br>▪ Meets the NDC objectives and | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment; and the ways in which any adverse effects may be mitigated. | Please refer to the Healthy Water Response Document (Section 1.1) prepared by Cato Bolam (**Attachment F**).<br><br>A peer review of the stormwater management approach has also been undertaken by MPS Limited and is provided in **Attachment G**. |

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| | | outcomes in Schedule 2; and<br>▪ Can demonstrate it is the BPO.<br><br>Please provide information as to how the effects of deposition of airborne contaminants on roof surfaces will be appropriately mitigated given the current omission of any proposed mitigation of roof runoff, and discussions as to why is this considered to be the BPO. | | |
| HW2 | | Aside from providing a pathway for airborne contaminants deposited on roof/building surfaces, roof surfaces heated by the sun elevate the temperature of rainfall runoff passing across these surfaces which is then discharged to receiving water environments.<br><br>Please discuss how temperature will be mitigated given potential roof areas enabled by the proposed change in land use encompassing approximately 15 hectares. | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment; and the ways in which any adverse effects may be mitigated. | Please refer to the Healthy Water Response Document (Section 1.2) prepared by Cato Bolam (**Attachment F**). |
| HW3 | | Please clarify the relationship between the Supporting Growth upgrade of Brigham Creek Road and the Plan | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment; and the | Please refer to the Healthy Water Response Document (Section 1.3) prepared by Cato Bolam (**Attachment F**). |

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| | | Change Area with respect to water quality management. | ways in which any adverse effects may be mitigated. | |
| HW4 | | Please provide addition information as to whether 'green' outfalls have been considered at stream outfalls?<br><br>Green outfalls whilst providing amenity – reduce the impact of discharges on the receiving stream – and comprise a length of manmade naturalised vegetated channel between the outfall and the stream that dissipates energy and provides additional contaminant removal polishing.<br><br>These typically comprise a riprap section, about 10m long, used to reduce the velocity of the discharge, and a planted channel section, approximately 10-20m long, to provide further treatment before the discharge enters the stream. | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment; the ways in which any adverse effects may be mitigated, and the benefits and costs, the efficiency and effectiveness, and any possible alternatives to the request. | Please refer to the Healthy Water Response Document (Section 1.4) prepared by Cato Bolam (**Attachment F**). |
| HW5 | Hydrology Mitigation | During the Unitary Plan process future urban areas were excluded from the SMAF management layer, on the basis that during structure plan and plan change processes the most appropriate method of hydrology mitigation would be applied/determined. | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment; the ways in which any adverse effects may be mitigated, and the benefits and costs, the efficiency and effectiveness, and any possible alternatives to the request. | Please refer to the Healthy Water Response Document (Section 2.1) prepared by Cato Bolam (**Attachment F**). |

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| | | Section 6.2.1 of the SMP proposes SMAF 1 – i.e., retention of the first 5mm of runoff from impervious surfaces, and detention (temporary storage), and a drain down period of 24 hours for the difference between the pre-development and post-development runoff volumes from the 95th percentile 24-hour rainfall event minus the achieved retention volume.<br><br>Please discuss if the use of SMAF is the BPO and will be sufficient to mitigate effects on the stream environment such as erosion, instream habitat changes, etc., accounting for the existing state of the stream, its vulnerability to erosion and future changes in flow associated with the change in land use, and address the following:<br><br>- What is the current condition of stream?<br><br>- Can the infiltration requirements of SMAF 1 be met? Given the limited opportunity for stormwater reuse within commercial and industrial buildings, and that the infiltration rate to soils is limited, it is unlikely that the | | |

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| | | retention component of hydrology mitigation will be able to be provided for the majority of the plan change area.<br><br>- Please provide a geomorphic assessment of the stream(s) to verify whether the proposed SMAF 1 (without retention) is sufficient, alongside an assessment of the current condition of existing stream – to demonstrate infiltration requirements can be achieved and effects of the change in land use and increased flows can be appropriately mitigated. See as also addressed in the Ecology RFI/cl23 Request.<br><br>- How will the stream be affected and will any works to the stream be required to support the plan change? | | |
| HW6 | Flooding | Please detail the impact/effect of the proposed change of land use on land and structures (such as culverts) outside the PPC area in terms of flood flows, flood extents, velocities, depths, duration, for the 2, 10 and 100 year | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment. | Please refer to the Healthy Water Response Document (Section 3.1) prepared by Cato Bolam (**Attachment F**). |

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| | | rainfall events (excluding climate change). | | |
| HW7 | | It is understood that the proposed Plan Change Area covers land not owned by the applicant e.g., 159 Brigham Creek Road.<br><br>What is the impact/effect of the proposed development on land (not owned by the applicant) and structures (such as culverts) within the PCA in terms of flood flows, flood extents, velocities, depths, and duration, for the 2, 10 and 100 year rainfall events (excluding climate change)?<br>What is the impact/effect of the proposed development on land (not owned by the applicant) and structures (such as culverts) within the PCA in terms of flood flows, flood extents, velocities, depths, and duration, for the 2, 10 and 100 year rainfall events (with climate change)? | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment. | Please refer to the Healthy Water Response Document (Section 3.2) prepared by Cato Bolam (**Attachment F**). |
| HW8 | | The effects with and without climate change need to be assessed.<br><br>The Healthy Waters regionwide model indicates that the existing habitable floor at 162 Brigham Creek Road will be inundated under a 100-year ARI MPD | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment. | Please refer to the Healthy Water Response Document (Section 3.3) prepared by Cato Bolam (**Attachment F**). |

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| | | scenario (with both 2.1- and 3.8-degree climate change).<br><br>The same model indicates that the house will not be inundated under the ED scenario (existing development imperviousness, no climate change allowance).<br><br>Section 3.3 of the requestor's flood report states that the house will be "encroached by the flood plain in the existing situation."<br><br>Please can you identify and provide the model inputs in the existing situation. | | |
| HW9 | | The text in Section 3.3 of the SMP appears to indicate that a climate change allowance of 3.8 degrees has been used in the existing development scenario.<br><br>Please confirm if this is correct? | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment. | Please refer to the Healthy Water Response Document (Section 3.4) prepared by Cato Bolam (**Attachment F**). |
| HW10 | | With reference to the Flood and Flood Hazard Risk Assessment Report provided, (Neil Construction Ltd, 141, 145, 151, 153, 155-157 & 159 Brigham Creek Road - 69, 71, 73, 94, 96A & 96 Trig Road, Whenuapai, Auckland Private Plan Change – Flood and Flood Hazard Risk Assessment Report, Cato Bolam, 15/12/2023): | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment; the ways in which any adverse effects may be mitigated, and the benefits and costs, the efficiency and effectiveness, and any possible alternatives to the request. | Please refer to the Healthy Water Response Document (Section 3.5) prepared by Cato Bolam (**Attachment F**). |

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| | | - Please clarify what you mean by mesh size of 2.5-5m – page 2. Is that a mesh area? Or the size of the side of each mesh? (Within flood areas Healthy Waters generally use up to 8m² area (triangular mesh) and 2 x 2 for a rectangular mesh).<br><br>- What tailwater level was used in the model?<br><br>- Please confirm impervious percentages used in each scenario for all modelled extents.<br><br>- Please specify what Manning's n values were used for each land use.<br><br>- Please provide details on how the 4-metre culvert is represented in the model.<br><br>- The HW model information indicates that full development of the upstream catchment (including the PPC area) – plus climate change – will result in habitable floor flooding of 162 Brigham Creek Road. | | |

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| | | Please explain how increasing the risk of habitable floor flooding at 162 Brigham Creek Road and increasing the flood depth along Brigham Creek is consistent with RPS Objective B10.2.1(3). | | |
| HW11 | | The upgrade of Brigham Creek Road is assumed in the model, however: what is the likely timing of this upgrade; what is proposed should development of the PCA proceed ahead of the upgrade; and what is proposed should the upgrade not proceed?<br><br>How do the proposed precinct provisions ensure that flooding effects will be appropriately managed and mitigated should the development of the PCA proceed ahead of the upgrade of Brigham Creek Road, and/or if the upgrade of Brigham Creek Road does not proceed? | To enable the local authority to Better understand — the nature of the request in respect of the effect it will have on the environment; and the ways in which any adverse effects may be mitigated. | Please refer to the Healthy Water Response Document (Section 3.6) prepared by Cato Bolam (**Attachment F**). |
| HW12 | | It appears that a number of scenarios have been considered as part of the flood assessment. These scenarios consider different imperviousness, pre- and post-development, different climate change factors, blockage scenarios etc. However, it is unclear in | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment; and the ways in which any adverse effects may be mitigated. | Please refer to the Healthy Water Response Document (Section 3.7) prepared by Cato Bolam (**Attachment F**). |

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| | | the report which scenario assumes what and which scenarios are being compared or explained when discussing results.<br><br>Please show flood levels in Figure 6, 8, 9 and 10 of the Flood and Flood Hazard Risk Assessment Report for easier comparison. | | |
| HW13 | | Section 3.1 of the Flood Assessment states that existing culverts under the motorway in the upstream catchment are assumed to be 50% blocked.<br><br>Please provide an assessment of the existing culverts under the motorway with no blockage. | To enable the local authority to better understand — the nature of the request in respect of the effect it will have on the environment; and the ways in which any adverse effects may be mitigated. | Please refer to the Healthy Water Response Document (Section 3.8) prepared by Cato Bolam (**Attachment F**). |
| | Other Matters (Non-CL23 Requests) | Of relevance to water quality measures proposed for the PCA - the sites encompassed by this proposed PPC ultimately discharge to the Upper Waitemata Harbour (via the Sinton Stream (Trig Road sites), and the Waiarohia Stream (Brigham Creek sites)), which is a low energy and highly sensitive receiving environment with a number of Significant Ecological Areas (SEAs).<br><br>These include: | | Please refer to the Healthy Water Response Document (Section 4) prepared by Cato Bolam (**Attachment F**). |

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| | | SEA_M2_57b, Marine – Sinton Stream Coastal Marine Area (CMA) receiving environment; and<br><br>SEA_T_4733, Terrestrial – associated with the Waiarohia Stream. | | |
| | | The executive summary of the Stormwater Management Plan (SMP) references the 'Whenuapai 3 Precinct Stormwater Management Plan'. The executive summary states that "This SMP has been prepared to support the private plan change and the plan change is consistent with the SMP".<br><br>Please be advised that the Whenuapai 3 Precinct Stormwater Management Plan was never formally adopted into the Regionwide Network Discharge Consent (NDC).<br><br>Any development/change of land use proposed in an area with no adopted SMP needs to prepare a site specific SMP which meets the requirements of Schedule 4 and Schedule 2 of the NDC and which demonstrates mitigation proposed is the Best Practicable Option (BPO) for the site.<br>The 'Whenuapai 3 Precinct Stormwater Management Plan' may contain useful background material and catchment context information. | | |

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| | | Figure 1 'Proposed Stormwater Management Treatment Chain', on page 4 of the SMP (as per HW1 above); and repeated on page 22 as Figure 11 (below), includes a box labelled 'Other Impervious Areas'.<br><br>Figures 1 & 11 indicate these areas will be treated for water quality by Gross Pollutant Traps (GPTs) and subsequently by rain garden/bioretention devices.<br><br>As these are likely to be primarily on private sites the applicant may wish to consider allowing for a wider range of options that can be selected from that will achieve the outcomes sought – rather than restricting private sites to these option/s only. | | |
| **Auckland Transport, Katherine Dorofaeff and Mike Nixon (Commute, consultant on behalf of AT)** | | | | |
| 1. | Stormwater Management Plan | Para 2 on page 27 of the Stormwater Management Plan (under section 6.2.6 Overland Flow Path and Floodplain Management) anticipates that the 4m box culvert will replaced with a bridge before the effects of 2.1 degree (or 3.8 degree) climate change occur. The implication is that this would be done by AT as part of the future upgrade of Brigham Creek Road. These future | To determine the flooding effects of the proposal and any ways in which any adverse effects may be mitigated | Please refer to the Auckland Transport Response Document (Section 1) prepared by Cato Bolam (**Attachment H**). |

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| | | works are unfunded. It is not clear whether this replacement of the culvert with a bridge is required to mitigate the flooding effects of the development enabled by the proposed plan change. Please provide additional information to clarify whether the culvert / bridge works are required for this plan change. | | |
| 2. | Planning Assessment | 7.2 Future Development Strategy – last paragraph states:<br><br>'Under the FDS, the PPC land is located within the Whenuapai Business area and is identified as being lived-zoned from 2025 (refer Figure 22 below). The PPC land was originally proposed as being development ready from 2035+ under the draft FDS although, after public feedback, this was amended to 2025+ as no significant challenges were identified that would otherwise make the development of the FUZ Whenuapai Business land inappropriate.'<br><br>Amend to correctly reflect the wording of the FDS – which identifies the timing of the live zoning as 'not before 2025+'.<br><br>Also amend Section 7.2 to reflect that infrastructure prerequisites are | To better understand the effects and the costs and benefits of the proposal through an accurate assessment against the relevant contents of the FDS. | The wording of Section 7.2 has been updated and the infrastructure prerequisites are outlined and discussed in Section 10.8 (please refer to the updated planning report in **Attachment A**). |

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| | | identified, but qualified by the statement 'some business can take advantage of existing capacity, these are the projects required to support full build out'. | | |
| 3. | | 10.8 Future Development Strategy Second para refers to the land being identified as live zoned from 2025+. Amend to correctly reflect the wording of the FDS – which identifies the timing of the live zoning as 'not before 2025+'.<br><br>Section 10.8 notes the infrastructure prerequisites in the FDS and the statement that 'some business can take advantage of existing capacity …'. Section 10.8 lists the transport infrastructure which is proposed by the applicant. However Section 10.8 does not explicitly address whether the infrastructure prerequisites are needed to support the development.<br><br>Please provide additional information to clarify whether the transport infrastructure prerequisites identified for the Whenuapai area in the FDS are required to support the full build-out of the Whenuapai Business Park area, and whether the proposed development will generate adverse effects on the safe and efficient operation of the | To better understand the effects and the costs and benefits of the proposal through a fuller assessment against the relevant contents of the FDS. | The wording of Section 10.8 has been updated (please refer to the updated planning report in **Attachment A**).<br><br>Section 10.8 of the planning report and section 4.8 of the Integrated Transport Assessment (**Attachment B**) outline that some development can take advantage of existing capacity and the infrastructure upgrades proposed as part of the PPC avoid the need for the FDS infrastructure prerequisites being in place prior to the PPC. |

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| | | transport network without the identified transport prerequisites. | | |
| 4. | | 10.10 AUP-RPS Amend to also consider the following objectives and policies:<br><br>• Objectives B2.2.1(1)I and (d), (5)(a)<br>• Policy B3.2.2(5)<br>• Policies B3.3.2(1) to (4), (5)(a)-(c) and (f).<br><br>(Note that transport objective referred to as B3.3.2 on page 68, should be corrected to read B3.3.1.) | To better understand the effects and the costs and benefits of the proposal through an assessment against additional transport related objectives and policies of the Regional Policy Statement. | Please refer to Section 10.10 of the updated planning report (**Attachment A**). |
| 5. | ITA – Section 3.4 Trip distribution | In order to provide a better estimate of the origin and destination of traffic movements, we recommend undertaking origin-destination analysis (using the 2028 SATURN model) of a node near the plan change area / site and updating the proposed trip distribution. As a consequence of the likely change in input volumes, the SIDRA models results are also likely to change. For review purposes, can the applicant please provide figures showing base traffic volumes, additional traffic movements and proposed traffic movements? | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the updated Integrated Transport Assessment (**Attachment B**) and the Strategic Assessment and Modelling Overview Memo (**Attachment I**). |

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| 6. | ITA – Section 4 Effects of the proposal and mitigations | Regarding the treatment of Brigham Creek Road, it is unclear how the proposed upgrades and intersections will tie-in to the existing road network (vehicle carriageways and walking and cycling paths) and fit within the land available to be modified. We note road upgrade plans have been provided for Brigham Creek Road and Trig Road however we recommend the plans show how the proposed design integrates not only with the existing road layout but also the NoR 'future layout' design (this is required at three locations: the Brigham Creek Road eastern and western extents, and at the Trig Road southern extent). Can the applicant please provide concept plans showing the tie-in of their design to the future NoR design? | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the Future Tie In Drawings in **Attachment J** which show how the proposed design integrates with the future NoR design. |
| 7. | ITA – Section 4.3 Pedestrian, cycling and passenger transport | Section 4.3 of the TEAM ITA notes that "Additionally, a new separated footpath and cycleway is to be installed on the southern side of Brigham Creek Road". We understand this is not the case to the east of the Brigham Creek Road/ Road 1 intersection due to constraints at this location. While a cycleway may not be able to be provided, can the applicant clarify whether it is possible to provide a footpath on the southern side of | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the Auckland Transport Response Document (Section 2) (**Attachment H**) and the Road Upgrade Drawings (**Attachment K**).<br><br>It is possible to provide a footpath on the southern side of Brigham Creek Road to the east of the Brigham Creek Road/Road 1 intersection, however, the considerable constraints (such as the steep banks and the proximity of the nearby stream) past this point would make it challenging to extend the |

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| | | Brigham Creek Road east of the Brigham Creek Road/ Road 1 intersection? | | footpath further to the intersection of Kauri and Brigham Creek Road. With no connections to other footpaths to the east of the PPC frontage along the southern side of Brigham Creek Road, not providing a footpath along the southern side of Brigham Creek Road to the east of the proposed intersection remains the safest option. |
| 8. | ITA – Section 5 Traffic generation effects | Section 4.5 of the ITA describes the intersections that have been assessed in traffic models and the methodology for assessing effects. The ITA states that "base traffic flows utilise the Auckland Forecasting Centre's 2028 travel demand forecasts, or recent traffic counts that have been forecast adjusted using a 5% annual growth rate". To understand the above, can the applicant please provide:<br><br>• What wider road network improvements are included in the 2028 AFC model (Hobsonville Road upgrade, SH16 four-laning north of Brigham Creek Road etc)?;<br><br>• Clarification of whether the 2028 AFC demands include the Spedding Road Plan Change. Note: the Spedding Road Plan Change should form part of the | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | A Strategic Assessment and Modelling Overview Memo (**Attachment I**) has also been prepared by Don McKenzie Consulting and provides an in-depth analysis of the rationale used for the PPC modelling.<br><br>Please refer to the Whenuapai Business Park Saturn Model Extracts Memo prepared by Abley (**Attachment L**) for what is included in the AFC model.<br><br>Employments assumptions are provided in Table 3.1-3.3 of the Whenuapai Business Park Saturn Model Extracts Memo (**Attachment L**) and are discussed in the Strategic Assessment and Modelling Overview Memo (**Attachment I**). |

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| | | base network for analysis and we note SATURN models were prepared for that application; and<br><br>• Details of what employment numbers are included in the zones containing the plan change. Note: AFC models are typically based on land use scenarios e.g. I11.6 which include household, population and employment forecasts. | | |
| 9. | ITA – Brigham Creek Road / Road 1 Signals | While we have concerns with the trip distribution, and the base volumes used for analysis, we note the modelling to date does not identify any significant operational concerns at this intersection. We note the eastern Brigham Creek Road approach in the evening peak hour is operating at LOS E with a queue of approximately 200 m. Can the applicant please provide:<br><br>• assessment of where queues are likely to extend to on the intersection approaches (on a plan) and confirmation this does not extend to other intersections. We are particularly concerned about the eastern Brigham Creek | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the updated Integrated Transport Assessment (**Attachment B**). Section 4.5.1. |

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| | | Road approach and the Road 1 approach, and<br><br>• SIDRA phasing summaries so we can understand whether the proposed phasing arrangements are standard SCATS sequences.<br><br>We can provide further comment once the requested updates to trip distribution etc have been undertaken. | | |
| 10. | ITA – Trig Road / Road 1 Roundabout | Can the applicant please confirm that required sight visibility lines do not extend over land that is not under their control. Note: this is needed to confirm that safe sight lines can be achieved without approval or agreement needed from other parties. | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the updated Integrated Transport Assessment (**Attachment B**) Section 4.5.1-4.5.4 and the Safe Intersection Sight Distance Drawings (**Attachment M**). |
| 11. | ITA – Brigham Creek Road / Trig Road Roundabout | Can the applicant please confirm the following:<br><br>• that required sight visibility lines do not extend over land that is not under their control. Note: this is needed to confirm that safe sight lines can be achieved without approval or agreement needed from other parties. | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the updated Integrated Transport Assessment (**Attachment B**) Section 4.5.1-4.5.4 and the Safe Intersection Sight Distance Drawings (**Attachment M**).<br><br>Please refer to the Future Tie In Drawings in **Attachment J** which show how the proposed design integrates with the future NoR design.<br><br>Spedding Road Plan Change volumes are included in the modelling assessment (please refer to the updated Integrated Transport Assessment in **Attachment B**). |

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| | | • that sufficient land will be set aside within the applicant's landholdings to enable a dual-lane roundabout to be achieved in the future (as indicated in the Te Tupu Ngātahi NoR). This may require development setback requirements in the precinct provisions.<br><br>• whether Spedding Road Plan Change volumes are included in the modelling assessment? | | |
| 12. | ITA – Brigham Creek Road / SH18 Interchange | Can the applicant please confirm assessment of where queues are likely to extend to on the intersection approaches (on a plan) and provide confirmation this does not extend to other intersections. We are particularly concerned about the western Brigham Creek Road approach.<br><br>Can the applicant also please confirm whether Spedding Road Plan Change volumes are included in the modelling assessment? | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the updated Integrated Transport Assessment (**Attachment B**) Section 4.5.1-4.5.4. |
| 13. | ITA – Trig Road / SH18 Interchange | No changes are proposed to the existing priority controlled offramp at the Trig Road / SH18 off-ramp intersection. The intersection is utilised | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Spedding Road Plan Change volumes are included in the modelling assessment (refer to the updated Integrated Transport Assessment in **Attachment B**). |

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| | | by vehicles travelling to/from the Spedding Road Plan Change Area. As per earlier queries, can the applicant please confirm whether Spedding Road Plan Change volumes are included in the modelling assessment. | | |
| 14. | ITA – Other intersections | The Brigham Creek Road / Kauri Road intersection has not been assessed. Given it is a priority controlled intersection with significant turning movements to and from Kauri Road, we recommend that the Brigham Creek Road / Kauri Road intersection is modelled for existing and future scenarios to understand the effects of the plan change. Can the applicant also please confirm if there are any changes proposed to the existing Kauri Road walking and cycling crossing? | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the updated Integrated Transport Assessment (**Attachment B**) Section 4.5.4.<br><br>The existing Kauri Road walking and cycling crossing is to remain as per its current state (refer to the Road Upgrade Drawings in **Attachment K**). |
| | Precinct Provisions | | | |
| | I618.2 Objectives | Amend Objective 2 as follows: '<br><br>(2) Transport infrastructure that is required to service <u>subdivision and</u> development within the Precinct:<br><br>a) Provides for freight<br><br>b) Provides ~~for~~ safe and efficient walking and cycling connections | | All amendments accepted. Please refer to the updated Precinct Provisions (**Attachment C**). |

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| | | c) Provides for bus access and bus stops to support future improvements in public transport<br><br>d) Mitigates traffic impacts on the surrounding road network<br><br>e) Provides connectivity to facilitate future subdivision and development of adjacent sites; and<br><br>f) Is staged and co-ordinated with subdivision and development' | | |
| | | Amend Objective 3 as follows:<br><br>'(3) ~~Appropriate r~~Roading connections, new or upgraded intersections, and the upgrading of Brigham Creek and Trig Road are provided to support subdivision and development within the Precinct.'<br><br>Include an objective addressing outcomes related to the strategic transport network i.e. the Brigham Creek Road (BCR) and Trig Road upgrades. Suggested objective:<br><br>'(x) A safe, efficient and integrated transport network provides for strategic connections and upgrades to | | All amendments accepted excluding the suggested objective as this matter is covered by objective 2 and 3. Please refer to the updated Precinct Provisions (**Attachment C**). |

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| | | service wider development in the Northwest.' | | |
| | I618.3 Policies | Amend Policy 2 as follows:<br><br>'(2) Ensure that where a stage identified on the Precinct Plan (Infrastructure Upgrading) is subdivided or developed, the associated upgrading or establishment of ~~roads, intersections,~~ transport and three waters infrastructure ~~shall be~~ is undertaken and completed at the same time.' | | All amendments accepted. Please refer to the updated Precinct Provisions (**Attachment C**). |
| | | Amend Policy 4 as follows:<br><br>'(4) Require the development of a transport ~~roading~~ network that implements the elements and connections identified in Precinct Plans XX – XX and the Road Function and Design Elements table.' | | Please refer to the updated Precinct Provisions (**Attachment C**). The Road Function and Design Elements Table is now included as an Appendix to the Precinct Provisions. |
| | | Include a policy about applying vehicle access restrictions to support the effective, efficient and safe operation of the existing and future arterial road network for all modes. | | Whilst Trig Road will most likely be an arterial road in the future, it is not currently and the introduction of a vehicle access restriction will impose additional consenting requirements that are not necessary or required until the road is an arterial. Existing and separate vehicle access is provided to 94, 96 and 96A Trig Road and these sites are held in different ownership. The existing access is safe and |

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| | | | | efficient. Future access will be subject to the provisions of E27 Transport. Site access can be designed to accommodate the relevant speed limit of Trig Road and the likely users. A workable compromise could include an identified access point on each site with a with a VAR that covers the remainder of the site frontage being added to the Precinct Plan. |
| | I618.4 Activity table | Support (A2) and (A3) which applies a NC status for use and development that does not comply with I618.6(1) and (2). However, note that the current wording of standard I618.6(2) identifies it as relating to subdivision, not development. | | A3 has been deleted. I618.6(2) has been added to A5 which refers to subdivision. |
| | | Amend (A5) (under subdivision) so that NC status applies to subdivision that does not comply with I618.6(2). | | (A5) refers to activities that do not comply with the aircraft testing noise boundaries. A3 has been amended so that NC status applies to subdivision that does not comply with I1.6(2). |
| | | Some precincts include an RD status for subdivision and development that does not comply with the Road Function and Design Elements table. However this can only be supported if there is more information / description included in the staging rules about the type of infrastructure required – as non-compliance with staging rules is NC. There is not currently enough description in the staging rules to | | The Precinct provisions have been updated to include a Road Function and Design Elements table. Amendments to Policy 4 and Standard I1.6.2 require transport infrastructure to be upgraded in accordance with the table. |

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| | | describe the transport infrastructure required independent of the Road Function and Design Elements table. | | |
| | | For clarity, include an entry with RD status for subdivision and new buildings prior to subdivision (these would be for proposals that comply with the standards) | | A blank in the activity status column for subdivision means that the activity status in E38 applies. An entry with RD status causes confusion and is not required.<br><br>New buildings (prior to subdivision) will be a permitted activity provided they comply with the standards.<br><br>Subdivision around existing buildings will be subject to E38. |
| | I618.5 Notification | Support application of normal tests for notification. | | Noted. |
| | I618.6 Standards | Amend paragraph 3 as follows:<br><br>'All activities listed in Activity Table I618.4.1 must comply with Standards I618.6.(1) – I618.6.(11).' | | Agreed and amended. |
| | | Include purpose statements for I618.6(1) and (2). These standards could be combined and called 'Transport infrastructure upgrades'. | | Heading and purpose statement added. |

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| | | I618.6(1) should be reworded as follows, to use similar wording as (2)(b):<br><br>'(1) Prior to the occupation of any buildings within a particular stage, the transport infrastructure shown on Precinct Plan (Infrastructure Upgrading) must have been constructed for that stage' | | Suggested wording accepted and amended. |
| | | Meaning of (2)(a) unclear – 'must be designed to ensure the protection of future road corridors, intersections and connections shown on Precinct Plan 1'. Not clear what this means and why it applies to subdivision and not development. The infrastructure shown on the precinct plans is to be provided, so the reference to protection is confusing. | | The purpose of this provision is to ensure that subdivision is designed in accordance with the precinct plan and future road corridors and intersections are protected. We note this provision is consistent with the wording in the Spedding Block Precinct (I616.6.4(a)). |
| | | Ensure consistency between standards applying to subdivision, and standards applying to development – for instance (2)I should apply to development as well as subdivision.<br><br>Include a Road Function and Design Elements table – it is referenced in I618.6I but not provided. Provision of this table is critical. | | The separation of standards applying to subdivision and development is appropriate and consistent with the provisions contained with the Spedding Block Precinct (I616.6.4(a)).<br><br>Please refer to the attached Updated Precinct Provisions (**Attachment C**) which now includes the Road Function and Design Elements table. |

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| | | Include vehicle access restrictions for the future arterial road (Trig Road). Also some modification required to vehicle access restrictions applying to the existing arterial (BCR). Modifications largely relate to assessment matters (mentioned further below). | | See response regarding vehicle access restriction on Trig Road above. |
| | | Amend (7) as follows:<br><br>'(a) At the time of subdivision for development, land within 10m of the streams and wetlands identified on Precinct Plan 1 <u>as 10m Riparian Margin / Ecological Enhancement</u> must be planted with native vegetation from the top of the back of the stream or the wetland's edge'<br><br>This is to make it clear that planting is not required where the new road connecting to BCR crosses the stream. Alternatively, could specify that the standard does not apply to that part of a riparian yard where a road crosses a stream or wetland. | | Amended. Please refer to the attached updated Precinct Provisions (**Attachment C**). |
| | I618.7.1 Matters of discretion | Matters in I618.7.1(1)(a) and (c) read more as assessment criteria than matters of discretion. | | The wording is appropriate and reads as assessment criteria. We note the wording is |

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| | | | | also consistent with the assessment criteria within the Spedding Block Precinct. |
| | | Amend I618.7.1(1)(a) to refer to subdivision, as well as development. | | Amended. |
| | | I618.7.1(1)(b) needs to be clarified. What is the future ability being referred to in the context of this precinct? All of the infrastructure shown on Precinct Plan 1 is required to service the subdivision and / or development. Is this matter intended to refer to the future upgrades to BCR and Trig Road which are not included in this proposal but which are required to service wider growth? | | The purpose of 1618.7.1(1)(b) is to ensure Council had the ability to reserve its discretion in regard to whether a future RD proposal effects the ability to construct the road corridors and connections on the Precinct plan. We note that similar assessment criteria is listed in the Spedding Block Precinct.<br><br>1618.7.1(1)(b) has been renamed to I1.7.1(1)(b) and amended to refer to the precinct plan. |
| | I618.7.2 Assessment criteria | Amend I618.7.2(1) as follows:<br><br>(1) For subdivision <u>and new buildings prior to subdivision</u><br><br>(a) The extent to which any subdivision or development layout is consistent with and provides ~~for~~ the upgraded roads, ~~and~~ new indicative roads <u>and connections</u> shown on Precinct Plan 1;<br><br>(b) Whether the proposed subdivision <u>or development</u> includes the delivery of the transport infrastructure identified on Precinct Plan | | The 1618.7.2(1) assessment criteria are specifically for subdivision. The criteria do not apply to buildings prior to subdivision. Some of the suggested amendments to (1)(a) – (i) have been included where appropriate. |

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| | | (Infrastructure Staging) and in accordance with the Road Function and Design Elements table;<br><br>I Whether the proposed road corridors and connections will service the Precinct in a safe and efficient manner;<br><br>(d) Whether the proposed subdivision enables development that would require ~~road~~ transport infrastructure upgrades to be provided;<br><br>I Whether the proposed subdivision or development will adversely affect the safe and efficient operation of the current and future transport network;<br><br>(f) Whether a safe and efficient road design is provided for all modes;<br><br>(g) The extent to which any subdivision or development layout provides for the functional requirements of the existing or proposed transport network, roads and relevant transport modes;<br><br>(h) Whether the proposal includes methods to ensure ~~that~~ the construction of the road corridors and connections, within its stage shown in Precinct Plan (Infrastructure Staging) ~~are provided for~~; and | | |

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| | | (i) Whether the following required works are located, designed, and undertaken in a staged manner, in accordance with the Precinct Plan (Infrastructure Staging), that facilitates and avoids unnecessary rework in future upgrades to Brigham Creek Road and Trig Road to provide strategic network connections to service wider growth:<br><br>(a)Proposed new – roundabout on Trig Road <u>(intersection with new collector road)</u>, and Trig Road upgrade<br>(b) Upgraded Brigham Creek Road/ Trig Road intersection – roundabout, and Brigham Creek Road upgrade<br>I New Brigham Creek Road <u>/ new collector road</u> left in, left out intersection and Brigham Creek Road upgrade<br>(d) New Brigham Creek Road <u>/ new collector road</u> signalised intersection and Brigham Creek Road upgrade<br><br><u>(j) The design and efficiency of stormwater infrastructure and devices (including communal devices) including the likely effectiveness, lifecycle costs, ease of access and operation and integration with the built and natural environment.'</u> | | |

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| | | The suggested (j) above Is similar”to I618.7.2(2)(b) which applies to stormwater management not complying with the stormwater management standard. | | |
| | Missing assessment provisions | Add matters of discretion and assessment criteria relating to non-compliance with vehicle access restrictions on Trig Road and BCR. The existing assessment matters in E27 (E27.8.1(12) and E27.8.2(11)) apply to BCR but require modification as they do not sufficiently take into account active modes (in particular existing and future cycle facilities), and AT would also support specific reference to considering the effect on future upgrades to BCR and Trig Road. | | New vehicle access restrictions have not been imposed on Trig Road. Existing assessment matters in E27 (E27.8.1(12) and E27.8.2(11)) apply to Brigham Creek Road and provide scope to take into account active modes. |
| | | If non-compliance with the Road Function and Design Elements table is provided for as RD, then matters of discretion and assessment criteria will be needed for this also. | | Matters of discretion (I1.7.1(a) – (c) and Assessment criteria I1.7.2(1)(a) – (i) provide sufficient scope to ensure a safe and efficient road design is provided. |
| | Special information requirements | Support the requirement for a Transport Design Report. The key road intersections referred to need to be clearly identified as such on the Precinct Plan – so that is it is clear which intersections require a Transport Design Report. AT has concerns about | | The proposed new and upgraded road intersections are clearly identified in the Precinct Plan. Wording amended for clarification. The two internal collector roads are not considered key intersections which require a traffic design report as a special information requirement. |

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| | | BCR / Kauri Road intersection. Intersection of the two internal collector roads also needs to be identified as a key intersection. | | Comments on the Kauri Road Intersection is provided within Appendix B: Updated ITA. Overall, the ITA confirms that the upgraded Brigham Creek Road / Kauri Road intersection can accommodate traffic generated by a fully developed WBPPC. The performance of the intersection improves when the proposed Brigham Creek Road signalised intersection to access the WBPPC is completed because extra lanes on Brigham Creek Road extend to Kauri Road's short turn lanes to become continuous turning lanes (continuous left turn-in lane and continuous right turn-out lane). |
| | | Include a requirement for any proposed upgrades to BCR and Trig Road to be supported by a Transport Assessment that includes Road Safety Audits and / or Safe System Analysis. | | This is a resource consent matter. |
| | Precinct Plans | The form of the individual intersections is acceptable to AT i.e. signalised, roundabout, left in / left out.<br><br>Not clear why the proposed pedestrian / cycleway link is shown on the Precinct Plans. There will be other facilities on BCR and Trig Road as well. Leave this to be covered by Road Function and Design Elements table. | | The proposed pedestrian/cycleway link has been removed please refer to the updated Precinct Plan in **Attachment N**). |

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| | | Amend Precinct Plan(s) to identify BCR as arterial, and Trig Road as future arterial, and other internal roads as collectors. This will be relevant to the application of Vehicle Access Restrictions and the Road Function and Design Elements table. | | Please refer to the attached updated Precinct Plan (**Attachment N**). |
| | | How is orange shaded area (west side of Trig Road) proposed to be accessed? AT will seek Vehicle Access Restrictions on this frontage. Consider identifying a road to service this area. | | Vehicle access restrictions are not proposed. See previous comments on this matter. |
| | | Trig / BCR intersection upgrade may be required before development of orange area (west side of Trig Road) occurs. Staging needs to be justified in the ITA. | | Please refer to the updated Infrastructure Staging Plan (**Attachment O**) and Section 4.7 of the updated Integrated Transport Assessment (**Attachment B**). |
| | | BCR / Kauri intersection needs to be further considered – may need upgrades, and identification as a key intersection. | | Please refer to Section 4.5.4 of the updated Integrated Transport Assessment (**Attachment B**). |
| | Comments on ITA | | | |
| | 2.4.3 Walking, Cycling & Micro-Mobility | Section 2.4.3 states: 'The WBPPC brings forward these works on Brigham Creek Road and Trig Road with the provision of separated footpaths and cycleways on both sides of Trig Road, and on the southern side of Brigham Creek Road (west of a proposed WBPPC signalised intersection)'. | | Please refer to Section 4.3 updated Integrated Transport Assessment (**Attachment B**). |

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| | | However the subsequent section 4.3 does not note that the proposal does not provide active modes on the southern side of Brigham Creek Road east of the signalised intersection. Update the ITA to reflect this. | | |
| | 4 Effects of the proposal and mitigations | **Staging**<br>This section identifies the new and upgraded transport infrastructure proposed to support the subdivision and development. However it does not consider the staging proposed in the precinct provisions. The ITA should consider the proposed infrastructure staging and comment on its appropriateness | | Please refer to Section 4.7 of the updated Integrated Transport Assessment (**Attachment B**). |
| | | **BCR / Kauri Road intersection**<br>ITA should assess the effects of the proposal on the BCR / Kauri Road intersection to determine whether any upgrades / modifications are required to this intersection. See previous comments in AT's memo to NCL dated 13 December 2023. | | Please refer to Section 4.5.4 of the updated Integrated Transport Assessment (**Attachment B**). |
| | | **Road Safety Audits**<br>AT's memo to NCL dated 13 December identifies the need for Road Safety | | Noted. Engineering plans will be progressed at the resource consent stage. |

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| | | Audits later in the consenting process to assess changes to BCR and Trig Road. | | |

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| | 4.3 Pedestrian, cycling & passenger transport | Section 4.3 states: 'a new separated footpath and cycleway is to be installed on the southern side of Brigham Creek Road'.<br><br>AT supports provision of active modes facilities by the applicant along the full BCR frontage. However NCL has previously advised that active mode facilities would not be provided on the southern side of the BCR frontage, east of the new BCR / collector intersection. Please clarify and provide updated plans if there has been any change.<br><br>NCL have referred to the Joint Expert Witness Statement (Transport) (JWS) which was agreed as part of the declined fast track application for a smaller area of land (22.9ha rather than the current 47.6ha). AT transport expert witnesses were party to the JWS. One of the matters discussed was AT's request for conditions to include the provision of a footpath and cycleway on the south side of the BCR fronting the site (and east of the BCR / collector road intersection). The experts agreed that walking and cycling facilities are not practical on the proposed Lot 300 frontage. The JWS statement does not record the reasons for this agreed position. AT does | | It is possible to provide a footpath on the southern side of Brigham Creek Road to the east of the Brigham Creek Road/Road 1 intersection, however, the considerable constraints (such as the steep banks and the proximity of the nearby stream) past this point would make it challenging to extend the footpath further to the intersection of Kauri and Brigham Creek Road. With no connections to other footpaths to the east of the PPC frontage along the southern side of Brigham Creek Road, not providing a footpath along the southern side of Brigham Creek Road to the east of the proposed intersection remains the safest option. |

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| | | support simply relying on the previous JWS as be the automatic starting point for this new proposal – rather this approach needs to be justified in the ITA.<br><br>The ITA should provide further detail:<br><br>• explaining why it is considered impracticable / unnecessary to provide the active modes on this portion of the BCR.<br>• advising whether options such as a boardwalk have been considered.<br>• identifying what effect the lack of such a link is likely to have. | | |

| **Auckland Council Parks, Louise Thomas, and John McKellar** | | | | |
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| OS1 | Development Control | Please confirm whether the applicant is proposing to include precinct provisions to incorporate the Height in Relation to Boundary rules under H17.6.2 for the future open space zone interfaces. | In order to manage shading and dominance effects of future development within the proposed plan change site on the future public open space, we propose that both the yards and height in relation to boundary development controls relating to interfaces with open space zones are incorporated into the precinct rules for the proposed plan change area. | Rule H17.6.2 is provided for by the proposed Whenuapai Business Park Precinct Provisions (**Attachment C**) for boundaries which adjoin future open space. |
| OS2 | | Please confirm whether the applicant is proposing to include precinct provisions to incorporate the Height in Relation to Boundary rules under H17.6.5 for the future open space zone interfaces. | In order to manage effects on the future public open space, we request that the applicant confirms whether they propose or are amenable to conditions imposing the same requirements on the zoned land as if the park is already. | We do not consider it necessary to provide for Rule H17.6.5 in relation to the future open space the PPC land adjoins.<br><br>The requirement for minimum 1.8m high screening of rubbish/storage areas will create sporadic portions of fencing or other types of screening along the boundaries. In addition, the Whenuapai Business Park Precinct yard standard requires yards which adjoin future open space to be planted within a mixture of native trees, shrubs, or groundcover plants along the full extent of the yard.<br><br>The required planting along the boundaries with future open space is considered to provide sufficient screening of any future storage or rubbish areas within close proximity to the boundary and will appropriately manage the interface between the differing land uses. |

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| OS3 | Connectivity | Will the roads provided for connectivity between the two open space zones be vested to AT and therefore become public access, or alternatively, if they are to remain in private ownership, can there be conditions imposed on the consent that would allow for public access. | The proposed plan change sits between two future public spaces which have been acquired by Auckland Council and are proposed to be re zoned and developed as reserves. The development site provides opportunity to provide public access between the two reserves and we therefore want to ensure public access is possible in perpetuity. | We can confirm that all of the proposed roads will be vested to Auckland Transport to ensure public access.<br><br>The proposed pedestrian/cycle link on the eastern side of the PPC land is also proposed to be vested to Auckland Transport on the basis that the applicant is appropriately compensated for the land required. This will be agreed upon at a later stage via the appropriate processes. |
| **Urban Design (on behalf of Auckland Council), Rebecca Skidmore** | | | | |
| 2.1 | Urban Design Matters | The UDA notes in a number of places (e.g. Para. 6.2(g)) that the urban design assessment has been informed by a number of concepts prepared for the requestor. One example is included in Figure 7. It would be helpful to provide the other examples to better understand the assumptions made and basis for the assessment provided | | Please refer to the response prepared by Ian Munro (**Attachment P**). |
| 2.2 | | Please provide further analysis in relation to upgrading planned for Trig Road and Brigham Creek Road and the way future development within the proposed Business: Light Industry zone ("LIZ") will likely interface with these street corridors. Given the limited access available to these streets, please comment on whether any precinct- | | Please refer to the response prepared by Ian Munro (**Attachment P**). |

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| | | specific provisions are necessary to achieve a suitable interface. I note that at Para. 6.5(g) comments are made about the role of landscaping in the precinct and the potential issues for the airbase in accommodating trees. The opinion is provided that an appropriate and well-landscaped solution could be achieved and addressed at the time of land subdivision. Please advise which subdivision provisions are being relied on to achieve a suitable outcome. I also note that the assessment goes on to note that some Precinct plan level guidance could be provided. Please elaborate. | | |
| 2.3 | | I note that the proposed Precinct Plan is specific in the location and dimension of key streets through the Precinct. Please advise whether this level of specificity creates any urban design issues in limiting design flexibility for future resource consent applications. | | Please refer to the response prepared by Ian Munro (**Attachment P**). |
| 2.4 | | The proposed Precinct Plan includes the identification of areas of 'open space buffers' and the provisions require a 5m rear yard in these locations. Please advise whether further policy guidance and provisions | | Please refer to the response prepared by Ian Munro (**Attachment P**). |

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| | | (either standards or assessment matter for subdivision) are necessary (including planting requirements) to achieve the amenity outcomes sought for the interface with adjacent future parks. | | |
| 3.1 | Landscape Matters | The planning report by Campbell Brown identifies a number of resource consents that have been granted within the Plan Change area1 and provide for extensive earthworks. The LVA includes references to earthworks that have occurred to date. Please advise whether the consented and unimplemented consents and the change in character enabled by these has been taken into account in carrying out the assessment of landscape character and visual effects. | | Please refer to the updated Landscape Visual Assessment (**Attachment Q**).<br><br>Paragraph 5.15 & 5.16 now outline the extent of earthworks undertaken and the assessment has been updated to include the impact of these works on the character of the PPC land. The LVA states that the earthworks have shifted the character of the PPC land to a highly modified, semi-rural environment and has dramatically altered the landscape. The large areas of open earthworks are considered to greatly influence the character, quality and visual amenity of the site and wider area. |
| 3.2 | | Para. 8.9 identifies the potential viewing audience for the assessment of visual effects. While the subsequent assessment notes the future use of adjacent sites purchased by Auckland Council for parks, this paragraph does not identify park-users as one of the viewing audiences. Please confirm the assessment in relation to this viewing audience and provide additional | | Please refer to the updated Landscape Visual Assessment (**Attachment Q**).<br><br>It is confirmed that future park users do form part of the viewing audience and an assessment of the impact of the PPC on this viewing audience is provided in paragraphs 8.48-8.50.<br><br>Through the provision of the 'Open Space Buffers' and future landscaping opportunities |

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| | | comment in relation to the query set out in Para. 2.4 above. | | within the future parks, the visual effects of future development enabled by the PPC when viewed from the parks is considered to be acceptable within the existing and planned future urban environment.<br><br>The proposed 'Open Space Buffers' along the boundaries of the PPC land which adjoin future open space are considered sufficient and mirror the standard(s) of the LIZ that apply when adjoining land has an open space zoning. Further landscaping provisions are not considered necessary as the Precinct Standard achieves the same outcome as the LIZ standard that applies to adjoining land which is zoned open space. |
| 3.3 | | Para. 8.21 notes that there is a 9m height restriction over part of the proposed Precinct created by the Defence Force flight path. Please provide a plan showing the extent of this height restriction or provide a cross reference to where this information can be found the PC package of material. | | Please refer to the Designation 4311 Contours - Airspace Approach & Departure Heights Above Existing Ground Level Map in **Attachment R**. |
| 3.4 | | In relation to the assessment of visual effects from the surrounding road network (starting at Para. 8.26), please consider the query at Paragraph 2.2 in the section above and provide comment on the potential visual | | The proposed Precinct Standards and LIZ rules are sufficient for managing visual effects from future development enabled by the PPC on to the street corridors. The required planting of yard setbacks with a mixture of native trees, |

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| | | effects arising from development backing onto these street corridors. | | shrubs or ground cover plants will provide sufficient screening.<br><br>Any future subdivision of the PPC land will require resource consent(s) and the existing subdivision provisions provide Council with sufficient discretion to enquire as to how the road-frontage will be addressed. |
| 3.5 | | Para. 8.32 includes a reference to Pukekohe Hill. Please confirm whether this is a typo. | | Please refer to the updated Landscape Visual Assessment (**Attachment Q**). This was a typo and has been removed. |
| 3.6 | | Appendix B includes three visual simulations. However, there is no reference made to these in the body of the report. Please advise how the viewpoints for preparation of these simulations was determined and what assumptions were made in the modelling used in the simulations. Please provide an assessment of what is demonstrated by these visual simulations. | | Please refer to the updated Landscape Visual Assessment (**Attachment Q**). A Photomontage Methodology is now provided in Appendix C and an assessment of what is demonstrated by the photomontages is provided in paragraphs 8.30-8.41.<br><br>The assessment of the photomontages concluded that any effects on visual amenity resulting from the PPC would be low and consistent with the built form anticipated for the area. |
| **Flow Transportation (on behalf of Auckland Council), Harry Shepard and Angie Crafter** | | | | |
| 1. | Crash history | Please undertake a crash history assessment of the roads leading up to the state highway interchanges, where development traffic is anticipated to access the wider network. | Section 4.6 of the ITA includes a crash history assessment for the sections of Brigham Creek Road and Trig Road fronting the site. The ITA does not include a crash assessment of the wider network. The ITA predicts a | Please refer to Section 4.6 of the updated Integrated Transport Assessment (**Attachment B**). |

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| | | | relatively large increase of trips accessing the external network via the state highway interchanges. The ITA should assess the safety effects of these additional trips. | |
| 2. | Modelling years of assessment | Please undertake additional/sensitivity tests of the effects on the road network using a 2038 modelling scenario. | The ITA has undertaken a modelling assessment for 2028. This represents a relatively short term timeframe for all development within the site to be completed. Furthermore, traffic volumes in Whenuapai would be relatively lower in 2028 compared to 2038, with not as much development in the wider area being completed.<br><br>This means that the modelling for 2028 may not show capacity issues at some intersections, or for midblock sections.<br>Modelling 2038 allows for a medium to long term scenario to test if the proposed intersection upgrades are appropriate beyond the short term. | A Strategic Assessment and Modelling Overview Memo (**Attachment H**) has been prepared by Don McKenzie Consulting and provides an in-depth analysis of the rationale for the PPC modelling used. |
| 3. | Traffic demands | Please provide a table of all of the traffic volume datasets and assumptions used in the traffic modelling assessment for each road and intersection assessed.<br><br>Please confirm if there is any allowance for any other approved plan changes or | Section 4.5 of the ITA states:<br>"in a 2028 future year scenario that is based on a combination of the Auckland Forecasting Centre's 2028 travel demand forecasts and recent traffic counts with 5% arithmetic growth rate added to 2028" | A Strategic Assessment and Modelling Overview Memo (**Attachment I**) has been prepared by Don McKenzie Consulting and provides an in-depth analysis of the rationale for the PPC modelling used. |

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| | | developments such as PC69 Spedding Road. | It is not clear how the two datasets of the 2028 travel demand forecasts and recent traffic counts have been combined to calculate the volumes used in the assessment.<br><br>Furthermore, it is not clear if these datasets include additional traffic from other approved plan changes or developments such as PC69 Spedding Road. | |
| 4. | Wider network upgrades | Please outline what wider network upgrades such as the SH16/18 Connections project, are inherently included in the modelling assumptions. | The ITA provides a map showing the Te Tupu Ngatāhi Supporting Growth Northwest Indicative Strategic Transport Network. This includes wider network projects such as the SH16/18 Connections project, which has the potential to change traffic volumes on SH16, SH18, Brigham Creek Road, and Trig Road. Another project includes the Spedding Road extension with a bridge over SH16.<br><br>Clarification is requested, whether this or any other projects are assumed to be in place by the Auckland Forecasting Centre and the travel demand forecasts that have been provided for use in the ITA.<br><br>We acknowledge that the SH16/SH18 Connections project is currently | The modelling assumptions are based on the 2028 Saturn Model and do not include the SH16/18 connections project. Please refer to the updated Integrated Transport Assessment in **Attachment B**. |

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| | | | unfunded under the current Auckland Regional Land Transport Plan 2021-2031. | |
| 5. | Mode share assessment | Please include a mode share assessment of trips that will be generated by the development, including ride-share, as well as walking and cycling and public transport trips.<br><br>Please assess where these trips may travel from and to.<br><br>Please assess trip generation of the expected activities for the peak period of the activities outside commute times. Please consider effects on the transport network if this occurs at the same time as school departure time. | The ITA does not include a mode share assessment for all transport modes and only assesses effects of vehicle trip generation of the development during peak network hours (i.e. commute times).<br><br>Including a mode share assessment provides an estimate of the number of walking, cycling and public transport trips. This may influence what measures are required to accommodate those trips on the road network. It may also influence the vehicle trip generation rates used in the ITA.<br><br>An assessment of where people travel will provide information about whether people using these transport modes will be able to access the site to other areas such as the Whenuapai local centre and residential areas. We acknowledge that some information on this topic is provided in Section 4.3 of the ITA.<br><br>The activities could generate a number of trips, including freight | Please refer to Section 4.3 of the updated Integrated Transport Assessment (**Attachment B**).<br><br>The Supporting Growth Northwest Detailed Business case has Key Performance Indicator Outcomes of 35% public transport mode share by 2048 and 2,300 additional daily active mode trips. The Whenuapai Business Park PPC will contribute to achieving this outcome. |

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| | | | trips, outside of peak commute times. An assessment of these trips will provide information on effects that might coincide with when school children are travelling on the road network after school, particularly as senior schools are located outside Whenuapai. | |
| 6. | Modelling trip distribution | Please update the trip distribution assessment to include trips to and from the northwest, and potential trips within Whenuapai.<br><br>Please include a comparison of the distribution predicted in the Auckland Forecasting Centre's models.<br><br>Please include an assessment of effects of these trips going northwest, including the SH16 / Brigham Creek Road roundabout. | Section 3.4 of the ITA includes a diagram of the trip distribution used in the assessment. This assumes that 2/3 of trips travel to the SH18/Brigham Creek Road interchange and 1/3 of trips travel to the SH18/Trig Road interchange.<br><br>The assumptions are quite high level, and do not account for any trips heading northwest.<br><br>Including trips to the northwest means that the effects at the SH16/Brigham Creek Road roundabout can be considered.<br><br>Furthermore, the trip distribution at the Brigham Creek Road/Trig Road roundabout may change, with more trips on Brigham Creek Road travelling to the northwest direction. | Please refer to Section 3.4 of the updated Integrated Transport Assessment (**Attachment B**). |

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| | | | Lastly, there is a possibility of some trips which travel south onto SH16 by travelling through the SH16/Brigham Creek Road roundabout. | |
| 7. | Brigham Creek Road/Kauri Road intersection | Please include an assessment, including modelling, of the Brigham Creek Road/Kauri Road intersection.<br><br>Please advise if the Auckland Forecasting Centre models include a new link from the Kauri Road intersection to Trig Road. | An assessment of the Brigham Creek Road/Kauri Road intersection is not provided in the ITA. As the current intersection is priority controlled, it may have operational and safety issues with the additional through traffic on Brigham Creek Road.<br>The current trip distribution shown in the ITA assumes 633 per hour additional through trips during peak hours past this intersection.<br><br>While other developments or plan changes may already consider the upgrade of this intersection, the current application should assess the impacts on this intersection in isolation in the scenario the subject development occurs first. | Please refer to Section 5.4 of the updated Integrated Transport Assessment (**Attachment B**) and the Whenuapai Business Park Saturn Model Extracts Memo (**Attachment L**). |
| 8. | Modelling of SH18 interchanges | Please model the SH18 interchanges to include ramp meter signals, using a network model, eg SIDRA Network. | The ITA includes operational assessments of the SH18 interchanges at Trig Road and Brigham Creek Road. The intersections within the interchanges appear to be modelled in isolation, and do not include ramp meter signals. | Please refer to Section 4.5.5 and 4.5.6 of the Integrated Transport Assessment (**Attachment B**) the Strategic Assessment and Modelling Overview Memo (**Attachment I**). |

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| | | | Ramp meter signals should be included for the interchange onramps, as these generate queues that can impact the local road network.<br><br>Furthermore, each interchange (with ramp meter signals) should be modelled as a network, as interchanges typically operate as a system and there may be queues from one adjacent intersection to the next.<br><br>These changes would allow the effects and capacity of the interchanges to be assessed fully. | |
| 9. | Staging plan | Please provide an assessment of the Brigham Creek Road/Trig Road intersection and Brigham Creek Road corridor upgrades being required by multiple stages. | Appendix I of the application documents provides the proposed infrastructure staging plan of the development. The staging plan consists of four different stages, with corresponding intersection and road corridor upgrades required at each stage.<br><br>This staging plan primarily requires these intersection and road corridor upgrades to occur for stage areas adjacent to the upgrades.<br><br>The intersection upgrade for 'B' (Brigham Creek Road/Trig Road) is tied to stage orange. However, trips | Please refer to Section 4.7 of the updated Integrated Transport Assessment (**Attachment B**). |

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| | | | occurring in the blue, green or red stages may use this intersection to access the wider network, and therefore require the intersection to be upgraded should these stages be developed first.<br><br>Furthermore, some sections of the Brigham Creek Road corridor upgrade may be required for multiple stages to provide walking and cycling connectivity. | |
| 10. | Sight distance | Please provide vertical and horizontal sight distance assessments of each proposed intersection.<br><br>Please assess SISD based on the Austroads criteria of a 2.0 second reaction time and the speed environment (typically +10 km/h of the speed limit). | Section 4 of the ITA provides assessments of sight distance available at the proposed intersections.<br><br>The assessment focuses on horizontal sight distance. On Brigham Creek Road, there are some vertical constraints which means the vertical sight distance should also be assessed.<br><br>The Austroads SISD criteria appears to have been used inconsistently.<br><br>SISD is assessed in 4.5.1 of the proposed signalised intersection on Brigham Creek Road. The ITA states 114m is provided for a 60km/h road. This is based on a 1.5 second reaction | Please refer to Section 4.5.1-4.5.4 of the updated Integrated Transport Assessment (**Attachment B**) and the Safe Intersection Sight Distance Drawings (**Attachment M**). |

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| | | | time and 60km/h speed environment in Austroads. As the speed limit on Brigham Creek Road is 60km/h, a 70km/h speed environment should be assessed. Furthermore, a 2.0 second reaction time should be used in the SISD calculation.<br>Section 4.5.2 assesses the visibility of the Trig Road / WBRPC internal road roundabout. The SISD calculation is based on a 2.0 second reaction time, which is different to the calculation for the Brigham Creek Road signalised intersection.<br><br>For this roundabout, the speed environment should be increased to 50km/h if the vehicle entering speed is 40 km/h. | |
| 11. | Trig Road access | Please assess if direct access onto Trig Road can be safely provided if a fourth leg is not provided at the proposed Trig Road / WPRPC roundabout. | Section 4.5.2 of the ITA assesses the Trig Road / WBRPC internal road roundabout. The roundabout is designed to have three legs, consisting of two legs on Trigg Road and one leg on the WBRPC internal road network.<br><br>No fourth leg to the west is shown in the plans, which would provide access to the orange stage in Appendix I Staging Plan. | This matter is addressed in Section 4.5.2 of the ITA.<br><br>A fourth leg would provide access to 96 and 96a Trig Road, but would not provide access to 94 Trig Road. Existing and separate vehicle access is provided to 94, 96 and 96A Trig Road and these sites are held in different ownership. The existing access is safe and efficient. Future access will be subject to the provisions of E27 Transport. Site access can be designed to accommodate the relevant speed limit of Trig Road and the likely users. |

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| | | | We note that Section 4.5.2 of the ITA states: "There is potential for the proposed Trig Road roundabout to also provide access to the WBPPC land on the western side of Trig Road, alternatively this land can be accessed directly by utilising the median that is to be provided as part of the trig Road upgrade."<br><br>If no fourth leg at the roundabout is currently proposed, then the assessment should consider direct vehicle access being provided from Trig Road, and ensure sufficient visibility and separation from adjacent intersections can be provided.<br><br>While Trig Road is currently classified as a local road in the Unitary Plan, the Notice of Requirement for Trig Road anticipates this being an arterial road, which means vehicle access restrictions in the Unitary Plan could apply in the future. | |
| | Changes to precinct provisions | | | In addition to the amendments above, the following precinct provisions have been amended:<br><br>(4) Wastewater and Water Supply Infrastructure |

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| | | | | Purpose: To ensure that bulk water supply and wastewater infrastructure with sufficient capacity is available to support development within the Precinct.<br><br>a) The subdivision and the construction of any new buildings within the Precinct can only proceed following the completion and commissioning of the wastewater and water supply infrastructure as is required within its catchment. ~~for wastewater servicing of all development within the Precinct.~~<br><br>The previous wording did not include a reference to water supply in the standard and restricted development within the precinct unless wastewater infrastructure to service the entire precinct was completed and commissioned. Given that there are two wastewater catchments within the PCA, the amendments provide flexibility to enable development within each catchment independent of each other. |

## Private Plan Change Application – Whenuapai Business Park – Additional Information Request

**Responses to further information requests under Clause 23 of the Resource Management Act 1991**

**Date of final response: 02/08/24**

| Auckland Council | | | |
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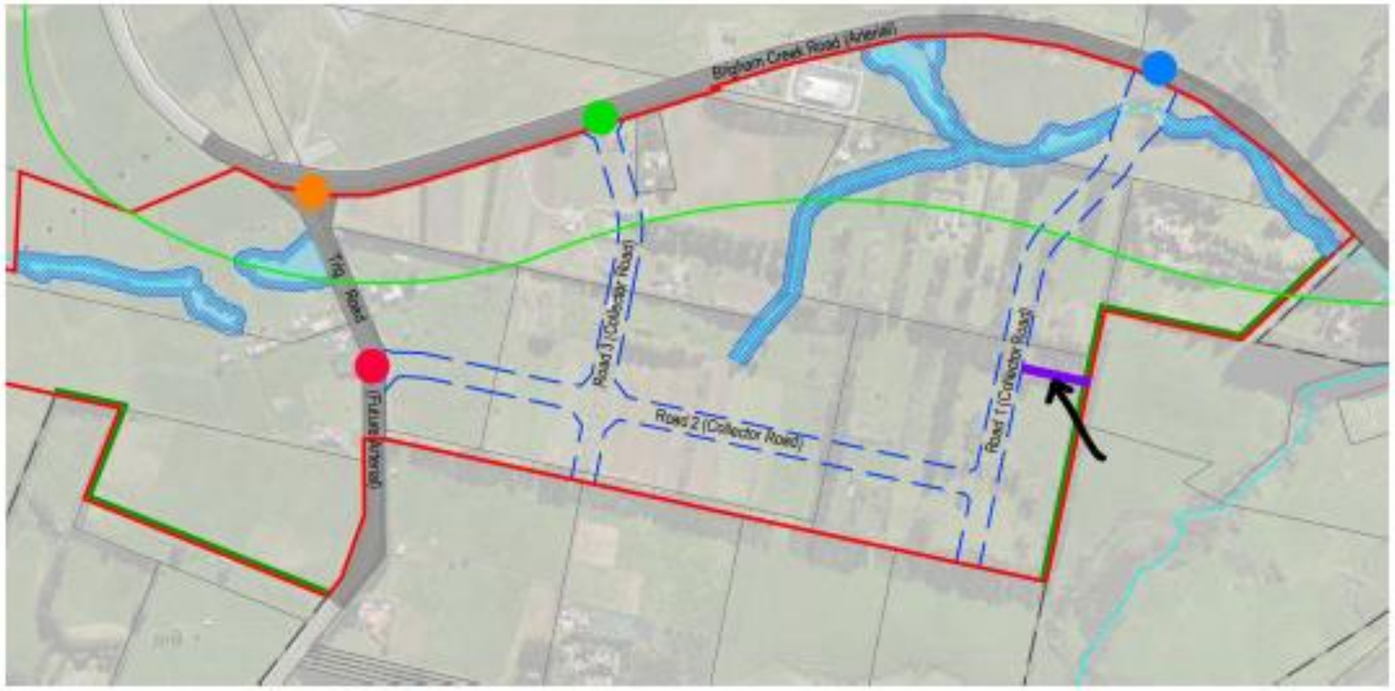
| **#** | **Topic** | **Further information request 12/06/24** | **Applicant response** |
| 2 | Auckland Council Parks Planning, Parks & Community Facilities Department | a. In regard to the applicant's response to OS3 (connectivity), I see a reference to 'proposed pedestrian/cycle link on the eastern side of the PPC land'.<br><br>Does this refer to the purple connection indicated on the plan (see arrow below)? If so, can the applicant please include a provision in the precinct plan to require safe public pedestrian/cycle access within the precinct which would also provide connection between the open spaces to be developed in the vicinity of the PPC site?<br><br>  <br><br><br>b. I understand that proposed objective I1.(2) introduces objectives for Transport Infrastructure that is required to service subdivision and development within the Precinct.<br><br>Objective I1.(2) b) Provides safe and efficient walking and cycling connections.<br><br>However, I cannot see any policy that guides development(s) within the precinct to achieve this objective. Can the applicant please consider including a policy relevant to this objective that requires the provision of safe and efficient walking and cycling connections to be for public? | a. Correct. This reference was to the 'indicative vehicle, cycleway and pedestrian connection' shown in purple on the Precinct Plan.<br><br>Linkages to the future neighbouring Council reserves have been incorporated within the precinct to ensure public access and connectivity between the PPC land and the future open spaces. Table I6XX Road Function and Required Design Elements, requires all roads to include cycle and pedestrian provisions on both sides. Internal road cross sections are detailed within the ITA.<br><br>The applicant consulted with the Auckland Council Parks Planning, Parks and Community Facilities Department prior to lodging the PPC, and this arrangement was mutually agreed upon.<br><br>b. We agree that this is required. Policy I1.3 (2) requires the development of a transport network that implements the elements and connections identified in the Precinct Plan and is in accordance with Table I6XX: Road Function and Design Elements. Table I6XX Road Function and Required Design Elements, requires all roads to include cycle and pedestrian provisions on both sides. |

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| Transportation – Flow Transportation Specialists | | | | | | | |
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| **#** | **Topic** | **Specific Request** | **Reason for the request** | **Applicant response 15/05/24** | **Flow Comment** | **Further information request 04/06/24** | **Applicant response 02/08/24** |
| 1 | Crash history | Please undertake a crash history assessment of the roads leading up to the state highway interchanges, where development traffic is anticipated to access the wider network. | Section 4.6 of the ITA includes a crash history assessment for the sections of Brigham Creek Road and Trig Road fronting the site. The ITA does not include a crash assessment of the wider network. The ITA predicts a relatively large increase of trips accessing the external network via the state highway interchanges. The ITA should assess the safety effects of these additional trips. | Please refer to Section 4.6 of the updated Integrated Transport Assessment (**Attachment B**). | An updated crash search has been undertaken for the wider area. Several serious injury and fatal injury crashes have been identified in the area between the Site and the SH18 / Trig Road ramps. The ITA states that these crashes are "outside of being quantifiably an adverse impact of WBPPC traffic". The trip distribution assessment indicates that over 300 vehicles per hour will be travelling on this section of Trig Road during peak periods, which may have adverse safety effects.<br><br>This area of Trig Road is beyond the area that will be urbanised as part of the Plan Change. While there is an NOR to accommodate the future urbanisation of Trig Road, we understand that funding is not allocated for construction works. | Please provide further assessment of the safety impact of the additional trips travelling on Trig Road between the Site and SH18, and any mitigation that may be required. | Please refer to page 8 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**) |
| 2 | Modelling years of assessment | Please undertake additional/sensitivity tests of the effects on the road network using a 2038 modelling scenario. | The ITA has undertaken a modelling assessment for 2028. This represents a relatively short term timeframe for all development within the site to be completed.<br><br>Furthermore, traffic volumes in Whenuapai would be relatively lower in 2028 compared to 2038, with not as much development in the wider area being completed.<br><br>This means that the modelling for 2028 may not show capacity issues at some intersections, or for midblock | A Strategic Assessment and Modelling Overview Memo (**Attachment H**) has been prepared by Don McKenzie Consulting and provides an in-depth analysis of the rationale for the PPC modelling used. | Accept the reasoning for not using the 2038 SATURN model, which is subject to various assumptions as outlined by Don McKenzie Consulting.<br><br>However, we still request further information is provided for the decision to use the 2028 year as the basis for undertaking all modelling. This is 3 – 4 years away from present, and it may take some time to fully develop the Site (accounting for Plan Change and consent approvals, construction works, and staging of development over time).<br><br>The previous discussions about using 2028 and 2038 was because these are the years that the SATURN models have been created for. However, the current | Please comment on whether it is realistic for the full buildout of the development enabled by the Plan Change to occur by 2028, when the modelling has been undertaken. Consider modelling in an alternative year if adjustments need to be provided. | Please refer to the Gantt chart on page 4 and comments on page 8 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**) |

| Transportation – Flow Transportation Specialists | | | | | | | |
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| **#** | **Topic** | **Specific Request** | **Reason for the request** | **Applicant response 15/05/24** | **Flow Comment** | **Further information request 04/06/24** | **Applicant response 02/08/24** |
| | | | sections.<br><br>Modelling 2038 allows for a medium to long term scenario to test if the proposed intersection upgrades are appropriate beyond the short term. | | approach from the applicant is to apply a 5% annual growth factor. This means that any year could be modelled by applying a growth factor up to that year (ie 2030 or 2031). | | |
| 3 | Traffic demands | Please provide a table of all of the traffic volume datasets and assumptions used in the traffic modelling assessment for each road and intersection assessed.<br><br>Please confirm if there is any allowance for any other approved plan changes or developments such as PC69 Spedding Road. | Section 4.5 of the ITA states:<br><br>"in a 2028 future year scenario that is based on a combination of the Auckland Forecasting Centre's 2028 travel demand forecasts and recent traffic counts with 5% arithmetic growth rate added to 2028"<br><br>It is not clear how the two datasets of the 2028 travel demand forecasts and recent traffic counts have been combined to calculate the volumes used in the assessment.<br><br>Furthermore, it is not clear if these datasets include additional traffic from other approved plan changes or developments such as PC69 Spedding Road. | A Strategic Assessment and Modelling Overview Memo (**Attachment I**) has been prepared by Don McKenzie Consulting and provides an in-depth analysis of the rationale for the PPC modelling used. | Satisfied with the traffic demands which have allowance for PC69 traffic volumes.<br><br>Traffic demands potentially subject to changes from year of modelling assessment, as per additional information request above. | | Noted. |
| 4 | Wider network upgrades | Please outline what wider network upgrades such as the SH16/18 Connections project, are inherently included in the modelling assumptions. | The ITA provides a map showing the Te Tupu Ngatāhi Supporting Growth Northwest Indicative Strategic Transport Network. This includes wider network projects such as the SH16/18 Connections project, which has the potential to | The modelling assumptions are based on the 2028 Saturn Model and do not include the SH16/18 connections project. Please | The SATURN Model Extracts memo provided by Abley outlines the model assumptions for the 2028 SATURN model. This is summarised again in the Don McKenzie Consulting memo. The 2028 SATURN model does not include the SH16/18 Connections project, but does include some other projects that may not | | Noted. |

| Transportation – Flow Transportation Specialists | | | | | | | |
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| **#** | **Topic** | **Specific Request** | **Reason for the request** | **Applicant response 15/05/24** | **Flow Comment** | **Further information request 04/06/24** | **Applicant response 02/08/24** |
| | | | change traffic volumes on SH16, SH18, Brigham Creek Road, and Trig Road. Another project includes the Spedding Road extension with a bridge over SH16.<br><br>Clarification is requested, whether this or any other projects are assumed to be in place by the Auckland Forecasting Centre and the travel demand forecasts that have been provided for use in the ITA.<br><br>We acknowledge that the SH16/SH18 Connections project is currently unfunded under the current Auckland Regional Land Transport Plan 2021-2031. | refer to the updated Integrated Transport Assessment in **Attachment B**. | be realistic (such as a Sinton Road bridge and a new connection between Trig Road and Kauri Road).<br><br>The applicant has not used this SATURN model and has instead relied on using their own traffic volumes for their modelling assessment. For their SIDRA modelling assessment, the applicant has not relied on any external roading upgrades, other than those proposed as part of the Plan Change.<br><br>Therefore, the modelling in its current form does not rely on upgrades being delivered by other parties. No further information is required for this point. | | |
| 5 | Mode share assessment | Please include a mode share assessment of trips that will be generated by the development, including ride-share, as well as walking and cycling and public transport trips.<br><br>Please assess where these trips may travel from and to.<br><br>Please assess trip generation of the expected activities for the peak period of the activities outside commute times.<br><br>Please consider effects on the transport network if this occurs at the same time as school departure time. | The ITA does not include a mode share assessment for all transport modes and only assesses effects of vehicle trip generation of the development during peak network hours (ie commute times).<br><br>Including a mode share assessment provides an estimate of the number of walking, cycling and public transport trips. This may influence what measures are required to accommodate those trips on the road network. It may also influence the vehicle trip generation | Please refer to Section 4.3 of the updated Integrated Transport Assessment (**Attachment B**).<br><br>The Supporting Growth Northwest Detailed Business case has Key Performance Indicator Outcomes of 35% public transport mode share by 2048 and 2,300 additional daily active mode trips. | No mode share data is provided in Section 4.3 of the ITA. The information provided in the information response is for 2048, which is a longer term scenario.<br><br>Mode share data is requested to understand possible walking, cycling and public transport trips. This will be useful to understand alongside the vehicle trips that are being assessed as part of the modelling assessment. | Please provide anticipated mode share data of the Site for the same periods as the vehicle modelling assessment. | Please refer to pages 1-3 and 8 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). |

| Transportation – Flow Transportation Specialists | | | | | | | |
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| **#** | **Topic** | **Specific Request** | **Reason for the request** | **Applicant response 15/05/24** | **Flow Comment** | **Further information request 04/06/24** | **Applicant response 02/08/24** |
| | | | rates used in the ITA.<br><br>An assessment of where people travel will provide information about whether people using these transport modes will be able to access the site to other areas such as the Whenuapai local centre and residential areas. We acknowledge that some information on this topic is provided in Section 4.3 of the ITA.<br><br>The activities could generate a number of trips, including freight trips, outside of peak commute times. An assessment of these trips will provide information on effects that might coincide with when school children are travelling on the road network after school, particularly as senior schools are located outside Whenuapai. | The Whenuapai Business Park PPC will contribute to achieving this outcome. | | | |
| 6 | Modelling trip distribution | Please update the trip distribution assessment to include trips to and from the northwest, and potential trips within Whenuapai.<br><br>Please include a comparison of the distribution predicted in the Auckland Forecasting Centre's models.<br><br>Please include an assessment of effects of these trips going northwest, including the SH16 / | Section 3.4 of the ITA includes a diagram of the trip distribution used in the assessment. This assumes that 2/3 of trips travel to the SH18/Brigham Creek Road interchange and 1/3 of trips travel to the SH18/Trig Road interchange.<br><br>The assumptions are quite high level, and do not account for any trips heading northwest. | Please refer to Section 3.4 of the updated Integrated Transport Assessment (**Attachment B**). | The same trip distribution assumptions have been used as previous. Based on the SATURN Model Extracts memo provided by Abley and the Don McKenzie Consulting memo, the proportion of trips travelling to/from the northwest is very low. While the select link analysis from the SATURN extracts show some trips in the AM peak travelling from the Site towards the SH16 / Brigham Creek Road roundabout, this is likely influenced by the SATURN model road network.<br><br>We acknowledge that the trip distribution assumptions are 'worst case' when | | Noted. |

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| | | Brigham Creek Road roundabout. | Including trips to the northwest means that the effects at the SH16/Brigham Creek Road roundabout can be considered.<br><br>Furthermore, the trip distribution at the Brigham Creek Road/Trig Road roundabout may change, with more trips on Brigham Creek Road travelling to the northwest direction.<br><br>Lastly, there is a possibility of some trips which travel south onto SH16 by travelling through the SH16/Brigham Creek Road roundabout. | | assessing the SH18 interchanges.<br><br>No further information required. | | |
| 7 | Brigham Creek Road/Kauri Road intersection | Please include an assessment, including modelling, of the Brigham Creek Road/Kauri Road intersection.<br><br>Please advise if the Auckland Forecasting Centre models include a new link from the Kauri Road intersection to Trig Road. | An assessment of the Brigham Creek Road/Kauri Road intersection is not provided in the ITA. As the current intersection is priority controlled, it may have operational and safety issues with the additional through traffic on Brigham Creek Road.<br><br>The current trip distribution shown in the ITA assumes 633 per hour additional through trips during peak hours past this intersection.<br><br>While other developments or plan changes may already consider the upgrade of this intersection, the current application should assess the | Please refer to Section 5.4 of the updated Integrated Transport Assessment (**Attachment B**) and the Whenuapai Business Park Saturn Model Extracts Memo (**Attachment L**). | SIDRA modelling results is now provided for the Brigham Creek Road / Kauri Road intersection.<br><br>No further information required. | | Noted. |

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| | | | impacts on this intersection in isolation in the scenario the subject development occurs first. | | | | |
| 8 | Modelling of SH18 interchanges | Please model the SH18 interchanges to include ramp meter signals, using a network model, eg SIDRA Network. | The ITA includes operational assessments of the SH18 interchanges at Trig Road and Brigham Creek Road. The intersections within the interchanges appear to be modelled in isolation, and do not include ramp meter signals.<br><br>Ramp meter signals should be included for the interchange on- ramps, as these generate queues that can impact the local road network.<br><br>Furthermore, each interchange (with ramp meter signals) should be modelled as a network, as interchanges typically operate as a system and there may be queues from one adjacent intersection to the next.<br><br>These changes would allow the effects and capacity of the interchanges to be assessed fully. | Please refer to Section<br><br>4.5.5 and 4.5.6 of the Integrated Transport Assessment (**Attachment B**) the Strategic Assessment and Modelling Overview Memo (**Attachment I**). | **Ramp meter signals**<br><br>The ITA does not provide ramp meter signals in the SIDRA modelling. Instead, the ITA provides a written assessment stating that the these do not need to be included in the modelling as the demands at the ramps are lower than the capacity of a typical 5.5 second dual lane ramp metering system.<br><br>However, the cycle may be higher than 5.5 seconds during peak periods, which could reduce the capacity. Further information about the existing phasing is requested to confirm the capacity and existing operation.<br><br>For the SH18 / Brigham Creek Road roundabout, the demand for the on-ramp is approximately 1,150 vehicles per hour in the PM peak.<br><br>Even if this is less than the potential capacity of 1,300 vehicles per hour, there will still be queuing. Not all of these vehicles will arrive in a uniform pattern, meaning the 95$^{th}$ percentile queues would likely be longer, and may extend back into the roundabout depending on the ramp signal phasing. To assess these effects, the ramp signals should be added to the SIDRA models, using SIDRA network.<br><br>**General modelling of SH18 / Brigham Creek Road interchange**<br><br>At the SH18 / Brigham Creek Road | A. Please provide data of the ramp signal phasing at both SH18 interchanges.<br><br>B. Please include ramp signals to the SIDRA models to fully assess potential queuing.<br><br>C. Please provide an assessment of a base SIDRA model of the SH18 / Brigham Creek Road roundabout and calibrate this to existing conditions. If any changes to the roundabout settings are required as part of calibration, please use this to reassess the development scenarios | Please refer to page 8 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). |

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| | | | | | roundabout, the 'BCR West' approach appears to be reaching close to capacity, with degree of saturation between 90-100% in morning and evening peak periods. If the degree of saturation exceeds 100%, the delays and queue lengths will likely increase significantly.<br><br>We note that roundabouts can be sensitive to model in SIDRA, and SIDRA can often provide more capacity than reality. The ITA provides a modelling scenario of the development only, but not of the existing conditions, or the base scenario (with PC69 and 5% growth traffic).<br><br>Given the sensitivities of this roundabout, we would like to request the applicant calibrates the base model to existing conditions, to ensure it is fit for purpose to model the development scenario. | | |
| 9 | Staging plan | Please provide an assessment of the Brigham Creek Road/Trig Road intersection and Brigham Creek Road corridor upgrades being required by multiple stages. | Appendix I of the application documents provides the proposed infrastructure staging plan of the development. The staging plan consists of four different stages, with corresponding intersection and road corridor upgrades required at each stage.<br><br>This staging plan primarily requires these intersection and road corridor upgrades to occur for stage areas adjacent to the upgrades.<br><br>The intersection upgrade for 'B' (Brigham Creek Road/Trig | Please refer to Section 4.7 of the updated Integrated Transport Assessment (**Attachment B**). | Updated staging plan now has the Brigham Creek Road /Trig Road intersection upgrade as being triggered by 'any two or more stages' instead of just the orange stage. The reasoning provided in the ITA is delays for right turning movements increase to an unsatisfactory level at a certain point based on the existing layout. However, it is not clear exactly what this threshold is.<br><br>Other than traffic capacity reasons, the intersection upgrade for 'B' (Brigham Creek Road/Trig Road) may be needed under the following scenario<br><br>• For the green stage if this occurs first, as the only access would be a left-in / left-out access which may encourage | A. Please assess whether the intersection upgrade for 'B' should be provided as a prerequisite for the green stage, to facilitate U-turns to support the left-in / left- out access on Brigham Creek Road<br><br>B. Please assess how active mode crossing facilities can be provided across Brigham Creek Road can be provided, should the green or red stages be developed first. | Please refer to pages 8 & 9 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). |

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| | | | Road) is tied to stage orange. However, trips occurring in the blue, green or red stages may use this intersection to access the wider network, and therefore require the intersection to be upgraded should these stages be developed first.<br><br>Furthermore, some sections of the Brigham Creek Road corridor upgrade may be required for multiple stages to provide walking and cycling connectivity. | | U- turns or travelling on the network for a longer distance. Providing the upgrade for 'B' would provide opportunities for U- turns to occur safely<br><br>We also note that some staging scenarios may not provide walking and cycling connectivity to the Whenuapai centre to the northwest. If either of the green or red stages were developed first, then there would be no pedestrian or cycle crossing point across Brigham Creek Road to access the rest of Whenuapai. This would encourage travel via private vehicle only. | | |
| 10 | Sight distance | Please provide vertical and horizontal sight distance assessments of each proposed intersection.<br><br>Please assess SISD based on the Austroads criteria of a 2.0 second reaction time and the speed environment (typically +10 km/h of the speed limit). | Section 4 of the ITA provides assessments of sight distance available at the proposed intersections.<br><br>The assessment focuses on horizontal sight distance. On Brigham Creek Road, there are some vertical constraints which means the vertical sight distance should also be assessed.<br><br>The Austroads SISD criteria appears to have been used inconsistently.<br><br>SISD is assessed in 4.5.1 of the proposed signalised intersection on Brigham Creek Road. The ITA states 114m is provided for a 60km/h road. This is based on a 1.5 second reaction time and 60km/h speed | Please refer to Section 4.5.1-4.5.4 of the updated Integrated Transport Assessment (**Attachment B**) and the Safe Intersection Sight Distance Drawings (**Attachment M**). | Visibility drawings are generally acceptable. Noted that vertical alignment will be designed at detailed design stage.<br><br>There are sightlines which go within the site boundaries and outside the road boundary at the Trig Road / Road 2 intersection (for northbound vehicles looking right from Trig Road towards Road 2). Additional land may need to be set aside to ensure these sight distances can be achieved. This could be addressed as part of a future subdivision application. | *Comment: land may need to be set aside at the Trig Road / Road 2 intersection at a future subdivision stage to ensure sufficient sightlines for vehicles can be achieved.* | Noted. |

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| | | | environment in Austroads. As the speed limit on Brigham Creek Road is 60km/h, a 70km/h speed environment should be assessed.<br><br>Furthermore, a 2.0 second reaction time should be used in the SISD calculation.<br><br>Section 4.5.2 assesses the visibility of the Trig Road / WBRPC internal road roundabout. The SISD calculation is based on a 2.0 second reaction time, which is different to the calculation for the Brigham Creek Road signalised intersection.<br><br>For this roundabout, the speed environment should be increased to 50km/h if the vehicle entering speed is 40 km/h. | | | | |
| 11 | Trig Road access | Please assess if direct access onto Trig Road can be safely provided if a fourth leg is not provided at the proposed Trig Road<br><br>/ WPRPC roundabout. | Section 4.5.2 of the ITA assesses the Trig Road / WBRPC internal road roundabout. The roundabout is designed to have three legs, consisting of two legs on Trigg Road and one leg on the WBRPC internal road network.<br><br>No fourth leg to the west is shown in the plans, which would provide access to the orange stage in Appendix I | This matter is addressed in Section 4.5.2 of the ITA.<br><br>A fourth leg would provide access to 96 and 96a Trig Road, but would not provide access to 94 Trig Road. Existing and separate vehicle access is provided to 94, 96 and 96A | Table I6XX Road Function and Required Design Elements identifies Trig Road as 'Future Arterial' and has access restrictions. This would be triggered by a future subdivision application.<br><br>No further information required. | | The Road Function and Required Design Elements Tables acknowledges that Trig Road is likely to be an arterial road in the future. However, for the purposes of this PPC it is not an arterial road and access restrictions will not apply under the Auckland Unitary Plan until the appropriate process is undertaken by Auckland Transport. |

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| | | | Staging Plan.<br><br>We note that Section 4.5.2 of the ITA states: *"There is potential for the proposed Trig Road roundabout to also provide access to the WBPPC land on the western side of Trig Road, alternatively this land can be accessed directly by utilising the median that is to be provided as part of the trig Road upgrade."*<br><br>If no fourth leg at the roundabout is currently proposed, then the assessment should consider direct vehicle access being provided from Trig Road, and ensure sufficient visibility and separation from adjacent intersections can be provided.<br><br>While Trig Road is currently classified as a local road in the Unitary Plan, the Notice of Requirement for Trig Road anticipates this being an arterial road, which means vehicle access restrictions in the Unitary Plan could apply in the future. | Trig Road and these sites are held in different ownership. The existing access is safe and efficient. Future access will be subject to the provisions of E27 Transport. Site access can be designed to accommodate the relevant speed limit of Trig Road and the likely users. | | | |
| 12 [1] | Brigham Creek Road / Trig Road roundabout | | | | Updated modelling has been provided at the Brigham Creek Road / Trig Road roundabout. The modelling results for the evening peak period show degree of saturation of 90 – 100% on both Brigham | Please undertake a sensitivity assessment of the Brigham Creek Road / Trig Road roundabout to determine when two lane approaches may be required. | Please refer to page 9 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**).<br><br>Replacement road design drawings are |

[1] This item is not numbered in the RFI table but follows on from item 11

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| | | | | | Creek Road approaches, which indicates that the proposed layout of the roundabout is close to reaching capacity. While the current queue lengths indicated in the modelling results do not show queues extending back to nearby intersections, these queue lengths would be sensitive to increasing if any further traffic travels through the intersection.<br><br>The proposed intersection design has single lanes on each approach. If the roundabout is close to reaching capacity, then it may need to be future proofed to accommodate the NOR design of two lanes on each approach.<br><br>Recommend a sensitivity test is completed to show a threshold where the two lane design may need to be provided. | | attached as **Attachment B** - Road Upgrade Drawings, showing the addition of a double lane on the norther side of the roundabout.<br><br>Details are amended in the revised Road Function and Design Elements Table |

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| **#** | **Topic** | **Specific Request** | **Reason for the request** | **Applicant response 15/05/24** | **Flow Comment** | **Further information request 30/05/24** | **Applicant response** |
| 9 | ITA - Brigham Creek Road/ Road 1 Signals | The traffic volumes for assessment are considered acceptable, however generally most signals in Auckland operate on a 100 second cycle time. Can the model please be updated for a 100 second cycle time to understand queuing effects? | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the updated Integrated Transport Assessment (Attachment B). Section 4.5.1. | The traffic volumes for assessment are considered acceptable however generally most signals in Auckland operate on a 100 second cycle time. | Can the model please be updated for a 100 second cycle time to understand queuing effects? | Please refer to page 10 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). |
| 11 | ITA - Brigham Creek Road / Trig Road Roundabout | Can the applicant please confirm the following:<br>• that required sight visibility lines do not | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse | Please refer to the updated Integrated Transport Assessment (Attachment B) | Commute acknowledges that PC69 volumes have been included. Commute notes that the queue distances are very long on the Brigham Creek Road approaches (300m approx.) suggesting | Can the applicant please review the SIDRA results and confirm whether they consider the queueing acceptable (particularly as SIDRA generally models roundabouts as | Please refer to page 10 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). |

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| **#** | **Topic** | **Specific Request** | **Reason for the request** | **Applicant response 15/05/24** | **Flow Comment** | **Further information request 30/05/24** | **Applicant response** |
| | | extend over land that is not under their control. Note: this is needed to confirm that safe sight lines can be achieved without approval or agreement needed from other parties.<br><br>• that sufficient land will be set aside within the applicant's landholdings to enable a duallane roundabout to be achieved in the future (as indicated in the Te Tupu Ngātahi NoR). This may require development setbacks requirements in the precinct provisions.<br><br>• whether Spedding Road Plan Change volumes are included in the modelling assessment? | effects may be mitigated. | Section 4.5.1-4.5.4 and the Safe Intersection Sight Distance Drawings (Attachment M)<br><br>Please refer to the Future Tie In Drawings in Attachment J which show how the proposed design integrates with the future NoR design.<br><br>Spedding Road Plan Change volumes are included in the modelling assessment (please refer to the updated Integrated Transport Assessment in Attachment B). | dual-laning of the roundabout should be undertaken sooner rather than later. | operating better than they do in reality)? | Replacement road design drawings are attached as Attachment B - Road Upgrade Drawings, showing the addition of a double lane on the norther side of the roundabout.<br><br>Details are amended in the revised Road Function and Design Elements Table |
| 12 | ITA - Brigham Creek Road / SH18 Interchange | Can the applicant please confirm assessment of where queues are likely to extend to on the intersection approaches (on a plan) and provide confirmation this does not extend to other intersections. We are particularly concerned about the western Brigham Creek Road approach.<br><br>Can the applicant also please confirm whether Spedding Road Plan Change volumes are included in the modelling assessment? | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the updated Integrated Transport Assessment (Attachment B) Section 4.5.1-4.5.4. | | Can the applicant please show the comparison between the base intersection performance i.e. existing surveys + 5% + PC69 volumes, and proposed 'with development' intersection performance? Can the applicant also provide the SIDRA files for this roundabout. | Please refer to the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). This matter is addressed in the opening pages and on page 10. |
| 13 | ITA - Trig Road / SH18 Interchange | No changes are proposed to the existing priority controlled | To better understand the traffic and other transport | Spedding Road Plan Change volumes | Commute considers the volumes at this interchange have likely been | Can the applicant please combine the existing surveyed volumes + 5%, the WBP | Please refer to page 10 of the attached Technical Note prepared by Team (Traffic |

| Auckland Transport | | | | | | | |
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| **#** | **Topic** | **Specific Request** | **Reason for the request** | **Applicant response 15/05/24** | **Flow Comment** | **Further information request 30/05/24** | **Applicant response** |
| | | offramp at the Trig Road / SH18 off-ramp intersection. The intersection is utilised by vehicles travelling to/from the Spedding Road Plan Change Area. As per earlier queries, can the applicant please confirm whether Spedding Road Plan Change volumes are included in the modelling assessment. | effects of the proposal and the ways in which any adverse effects may be mitigated. | are included in the modelling assessment (refer to the updated Integrated Transport Assessment in Attachment B). | underestimated. | volumes, plus the PC69 volumes within the modelling report prepared by Stantec[1] to support PC69 (Appendix G SATURN traffic flow plots, of the Stantec report). | Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). |
| 14 | ITA - Other intersections | The Brigham Creek Road / Kauri Road intersection has not been assessed. Given it is a priority controlled intersection with significant turning movements to and from Kauri Road, we recommend that the Brigham Creek Road / Kauri Road intersection is modelled for existing and future scenarios to understand the effects of the plan change. Can the applicant also please confirm if there are any changes proposed to the existing Kauri Road walking and cycling crossing? | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the updated Integrated Transport Assessment (Attachment B) Section 4.5.4. The existing Kauri Road walking and cycling crossing is to remain as per its current state (refer to the Road Upgrade Drawings in Attachment K). | Commute has reviewed the modelling in the updated ITA but consider that the modelling shows very little queuing for the right turn into Kauri Road (with a high opposing flow). | Can the applicant provide the SIDRA files for this intersection (Brigham Creek Road / Kauri Road)? | Please refer to page 11 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). |

| Advisory comments on ITA | | |
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| **Section / Topic 3.1** | **Auckland Transport Comment** | **Applicant response** |
| Footpath | The applicant has further considered whether a footpath can be provided on the southern side of Brigham Creek Road, east of the Brigham Creek Road / new collector intersection, and advises as follows:<br><br>'It is possible to provide a footpath on the southern side of Brigham Creek Road to the east of the Brigham Creek Road/Road 1 intersection, however, the considerable constraints (such as the steep banks and the proximity of the nearby stream) past this point would make it challenging to extend the footpath further to the intersection of Kauri and Brigham Creek Road. With no connections to other footpaths to the east of the PPC frontage along the southern side of Brigham Creek | Agreed. A potential footpath location on the southern side of Brigham Creek Road to the east of the Brigham Creek Road/Road 1 intersection is shown on Drawing 47712-DR-C-8110 (**Attachment B**). It is proposed that this extend to the eastern extremity of Lot 1 DP 167537 (159 Brigham Creek Road), being the boundary of the PPCA. |

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| | Road, not providing a footpath along the southern side of Brigham Creek Road to the east of the proposed intersection remains the safest option.'<br><br>AT requests that the footpath be provided in conjunction with the upgrade of Brigham Creek Road to support the precinct. | |

| **Advisory comments on precinct provisions** | | |
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| **Provisions** | **Auckland Transport Comment** | **Applicant response 02/08/24** |
| New objective | As per previous comments, AT continues to seek an objective addressing outcomes related to the strategic transport network i.e. the Brigham Creek Road (**BCR**) and Trig Road upgrades. Suggested objective:<br><br>'(x) A safe, efficient and integrated transport network provides for strategic connections and upgrades to service wider development in the Northwest.'<br><br>This matter is not sufficiently covered by Objectives 2 and 3 which focus on transport infrastructure which supports subdivision and development within the precinct. The proposed new objective refers to transport infrastructure which services wider development. | An objective is a statement of what is to be achieved through the resolution of a particular issue. Objectives clearly state what is aimed for in overcoming the issue or promoting a positive outcome. The wording of the suggested objective refers to transport infrastructure to service wider development throughout the Northwest part of the Auckland region. It is not the responsibility of the applicant to resolve this matter. It is the responsibility of the applicant to resolve direct effects associated with the plan change and not significantly contribute to an existing issue. Regardless, the applicant is providing a suite of self-funded infrastructure improvements that will mitigate the effects of the development enabled whilst avoiding any impact on other planned development or infrastructure improvements in the area and preventing the need for infrastructure funding contributions from Council or Auckland Transport.<br><br>Traffic and transportation effects have been comprehensively considered in the ITA. It is considered that any adverse transport effects on the environment as a result of the PPC would be able to be avoided, remedied, or mitigated by the transport infrastructure proposed.<br><br>The proposed objectives seek that the PPC land be served with appropriate and integrated transport infrastructure. This will facilitate active modes and public transport, with commensurate environmental benefits in terms of mitigation of climate change effects on future generations. In addition, provision of required urban transport infrastructure as an integrated element of development of the PPC land will avoid a significant future economic burden falling on the wider community as transport infrastructure is required to be upgraded. |
| Access restrictions | As per previous comments, AT continues to seek access restrictions, including:<br>• a policy about applying vehicle access restrictions to support the effective, efficient and safe operation of the existing and future arterial road network for all modes.<br>• standard applying vehicle access restrictions for the future arterial road (Trig Road).<br>• some modification of existing E27 approach to vehicle access restrictions applying to the existing arterial (BCR). Modifications largely relate to assessment matters.<br>• add matters of discretion and assessment criteria relating to non-compliance with vehicle access restrictions on Trig Road and BCR. The existing assessment matters in E27 (E27.8.1(12) and E27.8.2(11)) apply to BCR but require modification as they do not sufficiently take into account active modes (in particular existing and future cycle facilities), and AT would also support specific reference to considering the effect on future upgrades to BCR and Trig Road.<br>• further consideration in the ITA of how the orange shaded area (west side of | We disagree for the reasons provided within the Clause 23 response dated 15 May 2024. This response is provided below for ease:<br><br>*Whilst Trig Road will most likely be an arterial road in the future, it is not currently and the introduction of a vehicle access restriction will impose additional consenting requirements that are not necessary or required until the road is an arterial. Existing and separate vehicle access is provided to 94, 96 and 96A Trig Road and these sites are held in different ownership. The existing access is safe and efficient. Future access will be subject to the provisions of E27 Transport. Site access can be designed to accommodate the relevant speed limit of Trig Road and the likely users. A workable compromise could include an identified access point on each site with a with a VAR that covers the remainder of the site frontage being added to the Precinct Plan.*<br><br>Under the FDS, the PPC land is identified as being live zoned 2025+. We also note that the FDS explicitly states that some business can take advantage of existing capacity, making the timing a non-issue. The timing in the FDS is unrelated to VAR control. In this case, VAR control is not necessary to mitigate effects, until Trig Road is upgraded to an arterial in the future. Future development would occur in accordance with the Unitary Plan requirements in place at the time. |

| Advisory comments on precinct provisions | | |
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| **Provisions** | **Auckland Transport Comment** | **Applicant response 02/08/24** |
| | Trig Road) will be accessed. | |
| | Trig Road will be an arterial road in the future. Development is seeking to go ahead of the FDS timing, and prior to full upgrade of this road. VAR should be put in place now to ensure appropriate control over vehicle access. This will not prevent the use of the existing access points for existing levels of development. | |
| I1.6 Standards | The numbering in paragraph 3 under I1.6 is still not correct in terms of identifying the requirement for all activities listed in the Activity Table to comply with all of the standards. | Paragraph 3 is correct. Exact numbering within the provisions has not been used due to them being subject to change as the PPC progresses. |
| | As previously requested by AT, a purpose statement has now been included for I1.6(1) and (2). The heading 'Transport infrastructure upgrades' has been added. However some renumbering and reformatting is required for clarity.<br><br>In addition, the following wording included in (2)(b) should be a separate clause (c), and should be repeated in (1) to apply to development / occupation of buildings (as well as to subdivision).<br><br>'New and upgraded roads must be constructed in accordance with Table I6XX: Road Function and Design Elements.'<br><br>There needs to be consistency between standards applying to subdivision, and standards applying to development. | Standard I1.6(2) has been updated to include a separate Clause (c).<br><br>Standard I1.6(1) has been updated to include refence to the Road Function and Design Elements Table.<br><br>Please refer to the updated Whenuapai Business Park Precinct Provisions in **Attachment C**. |
| | Meaning of I1.6(2)(a) remains unclear. The response notes that a similar provision was included in the Spedding Block Precinct. The Spedding Block Precinct was developed prior to lodgement of the AT NOR to route protect for the northwest. The Spedding Block Precinct also includes a specific precinct plan that identified the indicative corridors and connections - of particular importance was the SH16 Overbridge Link that was not yet the subject of an NOR. | This standard applies to subdivision, because it is at this stage that roads, intersections and connections would be created. The purpose of the standard is to ensure that it is designed in accordance with the proposed roads, intersections and connections shown on the Precinct Plan. In anticipation of traffic volumes along Brigham Creek Road increasing in future years Te Tupu Ngatāhi Supporting Growth are progressing a Notice of Requirement (NoR), referred to as NOR W3, to allow Brigham Creek Road to be widened and upgraded with two traffic lanes in each direction together with separated footpaths and cycleways. This standard ensures that any future subdivision is designed to ensure that these corridors are also protected and some of this land is within the precinct. |
| I1.7.2 Assessment criteria | I1.7.2(1) - some of the amendments requested by AT have been adopted. AT continues to support the requests which have not been included. | Noted. |
| I1.8 | (1) Transport Design Report - as raised previously, the intersections of the two internal collector roads also needs to be supported by a Transport Design Report, and therefore needs to be identified on the Precinct Plan. | We disagree. The two internal collector roads are not considered key intersections which require a traffic design report as a special information requirement. |
| RFDE table | The Road Function and Design Elements table has now been included. AT supports the inclusion of such a table. The table has not been included as a separate standard, but as an appendix tied to the transport infrastructure | If the Road Function and Design Elements Table is not complied with, the proposal becomes a non-complying activity as per A6 |

| Advisory comments on precinct provisions | | |
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| **Provisions** | **Auckland Transport Comment** | **Applicant response 02/08/24** |
| | upgrades standard. It is not entirely clear whether non-compliance with this table has a NC status, or whether it defaults to RD under C1.9(2).<br><br>Some other recent precincts apply a RD status to subdivision and development that does not comply with the RFDE table. AT is open to this approach, subject to other amendments to the precinct provisions so that:<br>• more information / description is included in the transport infrastructure upgrade standards about the type of infrastructure and upgrades required<br>• specific matters of discretion and assessment criteria are included for subdivision and development which does not comply with the RFDE table. | within the Activity Table of the Precinct Provisions. |
| | Explain why the freight or heavy vehicle route and been identified as 'Limited' for Brigham Creek Road (west of Intersection D). I note a similar notation was used in the Spedding Block precinct, with an added note that 'Limitations of existing road width may mean that lane width will be sub-optimal for heavy vehicle use'. | The Road Function and Design Elements Table has been updated (**Attachment D**). |
| | Clarify the 20.07m minimum road reserve width identified for Brigham Creek Road (west of Intersection D). Is this the width at the constrained point, rather than the typical minimum width for this section of road? The minimum road reserve width may better be identified as 'various'. | The Road Function and Design Elements Table has been updated (**Attachment D**). |
| | Roads 1 to 3 could be identified in one line - separate entries not required as the road functions and design elements are the same for all three collector roads. | The Road Function and Design Elements Table has been updated (**Attachment D**). |
| | **Table notes**<br>Amend the note for 'bus provision' as follows:<br><br>'Carriageway lanes and geometry of intersections capable of accommodating buses. Bus stop form and locations and bus routes shall be determined with Auckland Transport at resource consent and engineering plan approval stage.'<br><br>Add a note for 'Minimum road reserve width', as follows:<br><br>'Typical minimum width which may need to be varied in specific locations where required to accommodate network utilities. batters, structures, stormwater treatment, intersection design, significant constraints, or other localised design requirements.'<br><br>Add a note for 'Median', as follows:<br><br>'Flush, solid or raised medians subject to Auckland Transport approval at EPA stage.'<br><br>Note 3 - the 'southern side footpath' should be provided by the applicant as part of subdivision and development and not left as a 'future link' (presumably to be provided by others).<br><br>Amend note * to:<br>'Denotes interim upgrades to Brigham Creek Road ~~being undertaken without the full minimum road reserve width being acquired by AT under~~ (i.e. not the ultimate | The Road Function and Design Elements Table notes have been updated (**Attachment D**). |

| Advisory comments on precinct provisions | | |
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| **Provisions** | **Auckland Transport Comment** | **Applicant response 02/08/24** |
| | width provided for by AT's NOR W3)' | |

| Other Comments | |
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| **Auckland Transport Comment** | **Applicant response 02/08/4** |
| In its response to OS3, the applicant advises as follows:<br><br>'The proposed pedestrian/cycle link on the eastern side of the PPC land is also proposed to be vested to Auckland Transport on the basis that the applicant is appropriately compensated for the land required. This will be agreed upon at a later stage via the appropriate processes.'<br><br>AT considers it is the responsibility of the applicant to provide connections to service future development on adjacent sites. In many cases this would involve provision for a future road connection - not just an indicative pedestrian / cycle link. AT would not expect to provide any compensation for the land required to provide a connection to an adjacent site. | Apologies for the confusion our previous response may have caused. Auckland Transport is not expected to provide compensation for a pedestrian/cycling link to the reserve. Discussions have been held with the Parks Department of Auckland Council regarding this matter. |

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| HW1 | Water Quality | Figure 1 (as below) of the SMP relies solely on inert building materials to provide water quality management. However, inert roofing/building materials still present an issue providing a pathway for airborne contaminants deposited on roof/building surfaces to discharge to the environment.<br><br>The Regionwide NDC requires:<br><br>- Treatment of all impervious areas by a water quality device designed in accordance with GD01/TP10; | Please refer to the Healthy Water Response Document (Section 1.1) prepared by Cato Bolam (**Attachment F**).<br><br>A peer review of the stormwater management approach has also been undertaken by MPS Limited and is provided in **Attachment G**. | **Not Satisfied**<br><br>- The applicant has stated that:<br><br>*"Existing technical guidelines, codes of practice, and technical reports are primarily concerned with contaminants resulting from the materials used in the roofing and cladding of buildings".*<br><br>*P*lease provide further information to support the statement.<br><br>- The applicant has stated that:<br><br>*"runoff from inert roofing is lower than the DEQR[1] values".* Please demonstrate this. | Please address the relevant contaminants expected with the proposed change in land use to light industrial use.<br><br>Please address the specific location of the plan change area and site-specific characteristics in the context of potential contaminant sources and pathways, e.g., proximity to the motorway, airport base, streams and ultimate marine receiving environment.<br><br>Inert roofs can be assessed as appropriate where there is discharge to rain tanks which have been plumbed for internal re- use (such as toilet flushing) and where internal reuse water demand will mostly match the retention volume. Is internal reuse proposed | Please refer to the Healthy Water Response Document (Section 1.1) prepared by Cato Bolam (**Attachment E**). |

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| | | OR<br><br>- An alternative level of mitigation on determined through a SMP that:<br>• Applies an Integrated Stormwater Management Approach;<br>• Meets the NDC objectives and outcomes in Scehdule 2; and<br>• Can demonstrate it is the BPO<br><br>Please provide information as to how the effects of deposition of airborne contaminants on roof surfaces will be appropriately mitigated given the current omission of any proposed mitigation of roof runoff, and discussions as to why is this considered to be the BPO. | | Has the breakdown/degradation of inert building materials over time been considered?<br><br>The site discharges into a low energy highly sensitive receiving environment. The applicant's response does not demonstrate that the proposed management approach for roofs is the BPO specific to the plan change area and given this context.<br><br>An integrated management approach seeks to avoid adverse effects on freshwater system especially in greenfield development. The proposed change in land use will enable high levels of imperviousness (including potential building coverage of 15 hectares) and with it associated contaminants. | for the plan change area? Please update the SMP.<br><br>If internal reuse is not proposed as an option to mitigate the effects of contaminants from roof areas on streams, please advise what treatment of runoff from roof areas is proposed. | |
| HW2 | Water Quality | Aside from providing a pathway for airborne contaminants deposited on roof/building surfaces, roof surfaces heated by the sun elevate the temperature of rainfall runoff passing across these surfaces which is then discharged to receiving water environments.<br><br>Please discuss how temperature will be mitigated given potential roof areas enabled by the proposed change in land use encompassing approximately 15 hectares. | Please refer to the Healthy Water Response Document (Section 1.2) prepared by Cato Bolam (**Attachment F**). | **Satisfied.** | Please update the SMP to include the proposed mitigation. | Please refer to the updated Stormwater Management Plan (**Attachment F**). |
| HW3 | Water Quality | Please clarify the relationship between the Supporting Growth | Please refer to the Healthy Water Response Document | **Satisfied.** | | |

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| | | upgrade of Brigham Creek Road and the Plan Change Area with respect to water quality management. | (Section 1.3) prepared by Cato Bolam (**Attachment F**). | No further information required. | | |
| HW4 | Water Quality | Please provide addition information as to whether 'green' outfalls have been considered at stream outfalls?<br><br>Green outfalls whilst providing amenity – reduce the impact of discharges on the receiving stream – and comprise a length of manmade naturalised vegetated channel between the outfall and the stream that dissipates energy and provides additional contaminant removal polishing.<br><br>These typically comprise a riprap section, about 10m long, used to reduce the velocity of the discharge, and a planted channel section, approximately 10-20m long, to provide further treatment before the discharge enters the stream. | Please refer to the Healthy Water Response Document (Section 1.4) prepared by Cato Bolam (**Attachment F**). | **Satisfied.** | Please update the SMP and provide guidance regarding matters that will need to be taken into consideration at detailed design during the Resource Consent and Engineering Approval stages to ensure suitable design and location of outfalls. | Please refer to the updated Stormwater Management Plan (**Attachment F**). |
| HW5 | Hydrology Mitigation | During the Unitary Plan process future urban areas were excluded from the SMAF management layer, on the basis that during structure plan and plan change processes the most appropriate method of hydrology mitigation would be applied/determined.<br><br>Section 6.2.1 of the SMP proposes SMAF 1 – i.e., retention of the first 5mm of runoff from impervious surfaces, and detention (temporary storage), and a drain down period of 24 hours for the difference between the pre- | Please refer to the Healthy Water Response Document (Section 2.1) prepared by Cato Bolam (**Attachment F**). | **Not Satisfied.**<br><br>Regarding the 'Whenuapai Business Park Stream Condition Assessment', please provide further information as to why a four-year time frame was used, and how this pertains to determining the erosion rate for these streams. It is noted that clay or silty clay streams erode slowly.<br><br>The Stream Condition Assessment provided is qualitative. Quantitative geomorphic assessment is required. There are several professionally accepted methods that can be used. A quantitative assessment would demonstrate whether channels in the plan change area and | Please provide further information re the following:<br><br>- What effects of the concentration of flows from the plan change area are anticipated on the Brigham Creek Road culvert?<br><br>- How will this impact the stability of the downstream channel?<br><br>- What consideration has been given to providing direction re the design of the outlet structure to dissipate the channel forming flows before entering the stream? | Please refer to the Healthy Water Response Document (Section 2.1) prepared by Cato Bolam (**Attachment E**).<br><br>Please refer to the updated Stormwater Management Plan (**Attachment F**).<br><br>In regard to the 10m riparian yard setback proposed for the plan change area, it is considered sufficient. The proposed riparian yard setback is in accordance with the proposed zoning for the land and Auckland Council's guidance, as stated in TP148 a 10m wide buffer: *"allow[s] for indigenous vegetation succession and should result in a relatively low-maintenance riparian zone. Edge effects mean that the outer 1-2 metres of the buffer is likely to suffer weed infestations, and these weeds would spread to the interior of the riparian zone wherever canopy gaps occurred."* |

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| | | development and post-development runoff volumes from the 95th percentile 24-hour rainfall event minus the achieved retention volume.<br><br>Please discuss if the use of SMAF is the BPO and will be sufficient to mitigate effects on the stream environment such as erosion, instream habitat changes, etc., accounting for the existing state of the stream, its vulnerability to erosion and future changes in flow associated with the change in land use, and address the following:<br>- What is the current condition of stream?<br>- Can the infiltration requirements of SMAF 1 be met? Given the limited opportunity for stormwater reuse within commercial and industrial buildings, and that the infiltration rate to soils is limited, it is unlikely that the retention component of hydrology mitigation will be able to be provided for the majority of the plan change area.<br>- Please provide a geomorphic assessment of the stream(s) to verify whether the proposed SMAF 1 (without retention) is sufficient, alongside an assessment of the current condition of existing stream – to demonstrate infiltration requirements can be achieved and effects of the change in land use and increased flows can be appropriately mitigated. See as also addressed in the Ecology RFI/cl23 Request. | | receiving environment are sufficiently stable and would remain stable subsequent to the change in land use enabled by this plan change.<br><br>Technical Report TR2013/035 supported the Unitary Plan stormwater management approach. SMAF[2] was not applied to future urban areas, on the basis that during structure plan and plan change processes the most appropriate method of hydrology mitigation would be applied/determined.<br><br>The applicant addresses works in streams, however no information is provided regarding effects of the plan change on the stream channel downstream. It is noted that the watercourse downstream of the Brigham Creek Road culvert is incising. This indicates the channel is already actively adjusting to an increase in hydraulic forces. The proposed change in land use will further impact infiltration rates of land discharging to the stream network, increasing the rate of incision currently occurring. | - Is it anticipated that works involving the banks around the outlet structure will be necessary, and additionally across the channel and downstream?<br>- Has there been consultation with the Auckland Transport as the development enabled by the plan change will affect their structures.<br>- Is the proposed 10m riparian margin for the plan change area sufficient?<br><br>Please review and update the SMP to include responses to the above. | The existing riparian yards are of limited ecological value and are comprised of narrow strips of exotic vegetation and pasture. Future development enabled by the PPC adjacent to the waterways on the site will require the planting of the 10m riparian yard setback which will significantly improve the current status of the land.<br><br>The proposed 10m riparian yard setback is consistent with the proposed zoning and Unitary Plan requirements and is considered to be appropriate.<br><br>The applicant has undertaken to consult further with Healthy Waters and complete a quantitative stream erosion risk assessment for permanent waterway 2 and intermittent waterway 3 identified the Viridis Ecological Impact Assessment Report November 2023 prior to a hearing on the PPC application. |

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| | | - How will the stream be affected and will any works to the stream be required to support the plan change? | | | | |
| HW6 | Flooding | Please detail the impact/effect of the proposed change of land use on land and structures (such as culverts) **outside the PPC area** in terms of flood flows, flood extents, velocities, depths, duration, for the 2, 10 and 100 year Rainfall events (**excluding climate change**). | Please refer to the Healthy Water Response Document (Section 3.1) prepared by Cato Bolam (**Attachment F**). | **Not Fully Satisfied.** | Please provide the following information in Appendix A: HW63 to allow better understanding of the assessment used.<br>- Cross-sections of flow.<br>- Difference maps between pre- and post-development.<br>- Plans to show Sect1 – 161 BC Rd driveway and Profile Lin 8.<br>- Plans showing pre- and post-development flood extents.<br>Please provide a digital copy of the model used to Healthy Waters.<br>Please provide further information on the flood depth increases for the various storm events (2, 10 and 100 year events). Does the increased flood depth remain within the channel for example for the 2 year event?<br>Do the increased flows, depths, etc. impact on the pump station? Has there been any consultation with Watercare about the increased flood flows, depths, duration, etc.?<br>Please identify on a plan the 1050 culvert referenced in Tables 1 to 3, within Section 3.1[4].<br>The post development flows for 163 BC Rd are bigger than 161 BC Rd. 163 BC Rd is upstream of 161 BC Rd so we would expect the flows in 163 BC Rd to be smaller than 161 BC Rd. Has the data for 161 and 163 BC Rd been incorrectly entered in the tables such that the data in the tables for 163 BC Rd is actually for 161 BC Rd and | Please refer to the Healthy Water Response Document (Section 3.1) prepared by Cato Bolam (**Attachment E**). |

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| | | | | | vice versa? Please clarify.<br><br>A Watercare pump station is located at 161 BC Rd. Please provide further information on how emergency access to 161 BC Rd and 163 BC Rd is provided in the post development scenario.<br><br>For 163 BC Rd the flood depths, flows, etc. increase in the post development scenario. The applicant states that the owner of 163 BC Rd was not contactable. Has there been any consultation with the owners of 163 BC Rd?<br><br>For flood duration a flood depth above 200mm has been selected. Why has 200mm been selected? It is understood that 200mm is the maximum allowable depth on public roads. On private property why is a threshold of 200mm considered acceptable?<br><br>Please provide information on the effects of the proposed development on 162 Brigham Creek Road.<br><br>Does the downstream stream network have capacity for 10 year flows from the proposed development in the plan change area plus existing flows already discharging to the streams?<br><br>Please provide further information on whether the development enabled within the proposed plan change area will avoid the increase of existing flooding.<br><br>The information provided has not fully addressed the specific request. Please review and update the SMP to include responses to the above. | |
| HW7 | Flooding | It is understood that the proposed Plan Change Area covers **land not owned by the applicant** e.g., 159 Brigham | Please refer to the Healthy Water Response Document (Section 3.2) prepared by Cato Bolam (**Attachment F**). | **Not Fully Satisfied.** | Please provide further information on the flood depth increases for the various storm events (2, 10 and 100 year events). Does the increased flood depth remain within the channel for example for the 2 year | Please refer to the Healthy Water Response Document (Section 3.2) prepared by Cato Bolam (**Attachment E**). |

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| | | Creek Road.<br><br>What is the impact/effect of the proposed development on land (not owned by the applicant) and structures (such as culverts) **within the PCA** in terms of flood flows, flood extents, velocities, depths, and duration, for the 2, 10 and 100 year rainfall events (**excluding climate change**)?<br><br>What is the impact/effect of the proposed development on land (not owned by the applicant) and structures (such as culverts) **within the PCA** in terms of flood flows, flood extents, velocities, depths, and duration, for the 2, 10 and 100 year rainfall events (**with climate change**)? | | | event. Please provide difference maps.<br><br>Has there been any consultation with the owners of 159 Brigham Creek Road about the increased flood flows, depths, duration, etc.?<br><br>Within Appendix B: HW7[5] reference is made to *'Sect1 – 159 BCH Rd'*. Please provide a plan to show the locations of this.<br><br>Does the downstream stream network have capacity to accommodate 10 year flows from the proposed plan change area?<br><br>Please provide further information as to whether the development enabled within the proposed plan change area will avoid the increase of existing flooding.<br><br>GeoMaps overland flow path layer indicates that runoff from 94 Trig Road currently discharges to 96A Trig Road and 4 Spedding Road. In the post development scenario, the applicant indicates that a channel within 96A Trig Road is likely to be proposed along the southern and western boundaries of 96A Trig Road to convey flow for discharge to a tributary of the Sinton Stream.<br><br>Has there been consultation with the owner of 96A Trig Road regarding a channel along their boundary to convey flow from 94 Trig Road to a tributary of Sinton Stream?<br><br>Is the owner of 96A Trig Road aware of a potential flood depth increase of up to 250mm on their land?<br><br>The information provided has not fully addressed the specific request. Please review and update the SMP to include responses to the above. | |
| HW8 | Flooding | The effects with and without climate change need to be | Please refer to the Healthy Water Response Document | **Not Fully Satisfied.** | Please provide maps showing flood levels and the FFL of at-risk property for: | Please refer to the Healthy Water Response Document (Section |

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| | | assessed.<br><br>The Healthy Waters regionwide model indicates that the existing habitable floor at 162 Brigham Creek Road will be inundated under a 100-year ARI MPD scenario (with both 2.1- and 3.8-degree climate change).<br><br>The same model indicates that the house will not be inundated under the ED scenario (existing development imperviousness, no climate change allowance).<br><br>Section 3.3 of the requestor's flood report states that the house will be *"encroached by the flood plain in the existing situation"*.<br><br>Please can you identify and provide the model inputs in the existing situation. | (Section 3.3) prepared by Cato Bolam (**Attachment F**). | Section 3.3 – Figure 2[6] reflects 50% blockage of the culvert so flows upstream of the culvert (including the plan change area) will be held back. Therefore, the impact of the proposed development on 162 Brigham Creek Road is not clearly understood. Please provide a pre-development versus post- development model assessment to identify whether the development enabled within the PPC area will affect 162 Brigham Creek Road. | - Scenario 1: pre-development, no culvert blockage, 1% AEP existing climate flood levels in the vicinity of 162 Brigham Creek Road;<br><br>- Scenario 2: pre-development, 50% culvert blockage, 1% AEP existing climate flood levels in the vicinity of the 162 Brigham Creek Road;<br><br>- Scenario 3: post-development (PCA only), no culvert blockage, 1% AEP existing climate flood levels in the vicinity of 162 Brigham Creek Road;<br><br>- Scenario 4: post-development (PCA only), 50% culvert blockage, 1% AEP existing climate flood levels in the vicinity of 162 Brigham Creek;<br><br>- comparison maps of Scenario 1 and 3 as above; and<br><br>- comparison maps of Scenarios 2 and 4 as above.<br><br>The maps will allow for a better understanding of the effects of the PPC enabled development on 162 Brigham Creek Road.<br><br>Please provide the survey of the habitable floor.<br><br>The information provided has not fully addressed the specific request. Please review and update the SMP to include responses to the above. | 3.3) prepared by Cato Bolam (**Attachment E**). |
| HW9 | Flooding | The text in Section 3.3 of the SMP appears to indicate that a climate change allowance of 3.8 degrees has been used in the existing development scenario.<br><br>Please confirm if this is correct? | Please refer to the Healthy Water Response Document (Section 3.4) prepared by Cato Bolam (**Attachment F**) | **Satisfied.** | | |

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| HW10 | Flooding | With reference to the Flood and Flood Hazard Risk Assessment Report provided, (Neil Construction Ltd, 141, 145, 151, 153, 155-157 & 159 Brigham Creek Road - 69, 71, 73, 94, 96A & 96 Trig Road, Whenuapai, Auckland Private Plan Change – Flood and Flood Hazard Risk Assessment Report, Cato Bolam, 15/12/2023):<br><br>- Please clarify what you mean by mesh size of 2.5-5m – page 2. Is that a mesh area? Or the size of the side of each mesh? (Within flood areas Healthy Waters generally use up to 8m² area (triangular mesh) and 2 x 2 for a rectangular mesh).<br><br>- What tailwater level was used in the model?<br><br>- Please confirm impervious percentages used in each scenario for all modelled extents.<br><br>- Please specify what Manning's n values were used for each land use.<br><br>- Please provide details on how the 4-metre culvert is represented in the model.<br><br>The HW model information indicates that full development of the upstream catchment (including the PPC area) – plus climate change – will result in habitable floor flooding of 162 Brigham Creek Road.<br><br>Please explain how increasing the risk of habitable floor flooding at 162 Brigham Creek Road and | Please refer to the Healthy Water Response Document (Section 3.5) prepared by Cato Bolam (**Attachment F**). | **Not Fully Satisfied.**<br><br>The specific request has not been fully addressed. | Please submit a digital copy of the model used to Healthy Waters. Once this is reviewed, there may be further questions.<br><br>Please update the SMP with the information provided and in response to the above. | Please refer to the Healthy Water Response Document (Section 3.5) prepared by Cato Bolam (**Attachment E**).<br><br>Please refer to the updated Stormwater Management Plan (**Attachment F**). |

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| | | increasing the flood depth along Brigham Creek is consistent with RPS Objective B10.2.1(3). | | | | |
| HW11 | Flooding | The upgrade of Brigham Creek Road is assumed in the model, however: what is the likely timing of this upgrade; what is proposed should development of the PCA proceed ahead of the upgrade; and what is proposed should the upgrade not proceed?<br><br>How do the proposed precinct provisions ensure that flooding effects will be appropriately managed and mitigated should the development of the PCA proceed ahead of the upgrade of Brigham Creek Road, and/or if the upgrade of Brigham Creek Road does not proceed? | Please refer to the Healthy Water Response Document (Section 3.6) prepared by Cato Bolam (**Attachment F**). | **Satisfied.** | | |
| HW12 | Flooding | It appears that a number of scenarios have been considered as part of the flood assessment. These scenarios consider different imperviousness, pre- and post-development, different climate change factors, blockage scenarios etc.<br><br>However, it is unclear in the report which scenario assumes what and which scenarios are being compared or explained when discussing results.<br><br>Please show flood levels in Figure 6, 8, 9 and 10 of the Flood and Flood Hazard Risk Assessment Report for easier comparison. | Please refer to the Healthy Water Response Document (Section 3.7) prepared by Cato Bolam (**Attachment F**). | **Not Satisfied.** | Please update the SMP and Flood Hazard Risk Report so that it is clear which scenario assumes what, and which scenarios are being compared or explained when discussing results. | Please refer to the Healthy Water Response Document (Section 3.7) prepared by Cato Bolam (**Attachment E**). |
| HW13 | Flooding | Section 3.1 of the Flood Assessment states that existing | Please refer to the Healthy Water Response Document | **Not Satisfied.** | Please provide flood difference maps (e.g., depths and extents) so that the | Please refer to the Healthy Water Response Document (Section |

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| | | culverts under the motorway in the upstream catchment are assumed to be 50% blocked.<br><br>Please provide an assessment of the existing culverts under the motorway with no blockage. | (Section 3.8) prepared by Cato Bolam (**Attachment F**). | The impact of the plan change is not clear in this scenario.<br><br>The effects pre- and post-development need to be assessed to understand the effect of the plan change.<br><br>The 100% capacity (no blockage) SH18 Culvert scenario should be simulated for both the pre-development 50%, 10% and 1% AEP with and without climate change (CC); and post-development (plan area only) 50%, 10% and 1% AEP with and without CC scenarios to understand the effects of the plan change. | impact of the plan change area enabled development can be clearly understood. | 3.8) prepared by Cato Bolam (**Attachment E**). |

| Other Matters (Non-CL23 Requests) | | | | |
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| Of relevance to water quality measures proposed for the PCA<br><br>- the sites encompassed by this proposed PPC ultimately discharge to the Upper Waitemata Harbour (via the Sinton Stream (Trig Road sites), and the Waiarohia Stream (Brigham Creek sites)), which is a low energy and highly sensitive receiving environment with a number of Significant Ecological Areas (SEAs).<br><br>These include:<br><br>SEA_M2_57b, Marine – Sinton Stream Coastal Marine Area (CMA) receiving environment; and<br><br>SEA_T_4733, Terrestrial – associated with the Waiarohia Stream. | NA | NA | | |

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| **Specific Request** | **Applicant response 15/05/24** | **Healthy Waters Comment** | **Request 06/24** | **Applicant response 02/08/24** |
| The executive summary of the Stormwater Management Plan (SMP) references the 'Whenuapai 3 Precinct Stormwater Management Plan'. The executive summary states that "This SMP has been prepared to support the private plan change and the plan change is consistent with the SMP".<br><br>Please be advised that the Whenuapai 3 Precinct Stormwater Management Plan was never formally adopted into the Regionwide Network Discharge Consent (NDC).<br><br>Any development/change of land use proposed in an area with no adopted SMP needs to prepare a site specific SMP which meets the requirements of Schedule 4 and Schedule 2 of the NDC, and which demonstrates mitigation proposed is the Best Practicable Option (BPO) for the site.<br><br>The 'Whenuapai 3 Precinct Stormwater Management Plan' may contain useful background material and catchment context information. | NA | NA | | |
| Figure 1 'Proposed Stormwater Management Treatment Chain', on page 4 of the SMP (as per HW1 above); and repeated on page 22 as Figure 11 (below), includes a box labelled 'Other Impervious Areas'.<br><br>Figures 1 & 11 indicate these areas will be treated for water quality by Gross Pollutant Traps (GPTs) and subsequently by rain garden/bioretention devices.<br><br>As these are likely to be | Please refer to the Healthy Water Response Document (Section 4) prepared by Cato Bolam (**Attachment F**).<br><br>*We provide the below update to enable more options:* | | Please update the SMP accordingly to ensure this is reflected in the relevant section of the SMP.<br><br>Please provide detail as to options re what 'an alternative BPO for treatment and mitigation' for 'other impervious areas' could feasibly be, to ensure water quality effects can be addressed appropriately. | Please refer to the updated Stormwater Management Plan (**Attachment F**). |

| Other Matters (Non-CL23 Requests) | | | | |
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| **Specific Request** | **Applicant response 15/05/24** | **Healthy Waters Comment** | **Request 06/24** | **Applicant response 02/08/24** |
| primarily on private sites the applicant may wish to consider allowing for a wider range of options that can be selected from that will achieve the outcomes sought – rather than restricting private sites to these option/s only.<br>Please either expand the treatment chain or supply a comment in reply. | | | | |

## Private Plan Change Application – Whenuapai Business Park – Additional Information Request

**Responses to further information requests under Clause 23 of the Resource Management Act 1991**

**Date of response: 30/08/24**

| Transportation – Flow Transportation Specialists | | | | | | | | | | |
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| # | Topic | Specific Request | Reason for the request | Applicant response 15/05/24 | Flow comment 04/06/24 | Further information request 04/06/24 | Applicant response 02/08/24 | Flow comment 16/08/24 | Further information request 16/08/24 | Applicant response |
| **1** | Crash history | Please undertake a crash history assessment of the roads leading up to the state highway interchanges, where development traffic is anticipated to access the wider network. | Section 4.6 of the ITA includes a crash history assessment for the sections of Brigham Creek Road and Trig Road fronting the site. The ITA does not include a crash assessment of the wider network. The ITA predicts a relatively large increase of trips accessing the external network via the state highway interchanges. The ITA should assess the safety effects of these additional trips. | Please refer to Section 4.6 of the updated Integrated Transport Assessment (**Attachment B**) | An updated crash search has been undertaken for the wider area. Several serious injury and fatal injury crashes have been identified in the area between the Site and the SH18 / Trig Road ramps. The ITA states that these crashes are "outside of being quantifiably an adverse impact of WBPPC traffic". The trip distribution assessment indicates that over 300 vehicles per hour will be travelling on this section of Trig Road during peak periods, which may have adverse safety effects. This area of Trig Road is beyond the area that will be urbanised as part of the Plan Change. While there is an NOR to accommodate the future urbanisation of Trig Road, we understand that funding is not allocated for construction works. | Please provide further assessment of the safety impact of the additional trips travelling on Trig Road between the Site and SH18, and any mitigation that may be required. | Please refer to page 8 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**) | The applicant's traffic engineer provides an updated assessment for Trig Road. The assessment states that Trig Road has recently had a speed limit reduction which could improve road safety.<br><br>The Trig Road speed limit reduction from 80 km/h to 60 km/h occurred in early/mid-2023 based on Google Streetview. Only 2 non-injury crashes occurred after this time, although this is a short time period to assess crash trends.<br><br>We note that there has been one fatal injury and one serious injury crash reported at the Trig Road/Spedding Road intersection. While the speed limit reduction may result in some safety improvements, it is not clear whether it mitigates the existing safety issues. The plan change will increase the number of trips travelling through this intersection. Further assessment should be provided at this intersection | Please provide a more detailed safety assessment of Trig Road /Spedding Road intersection and the impacts of the additional trips generated by the plan change. | Please refer to the traffic response prepared by TEAM in **Attachment A.** |

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| **2** | Modelling years of assessment | Please undertake additional/sensitivity tests of the effects on the road network using a 2038 modelling scenario. | The ITA has undertaken a modelling assessment for 2028. This represents a relatively short term timeframe for all development within the site to be completed.<br><br>Furthermore, traffic volumes in Whenuapai would be relatively lower in 2028 compared to 2038, with not as much development in the wider area being completed. This means that the modelling for 2028 may not show capacity issues at some intersections, or for midblock sections.<br><br>Modelling 2038 allows for a medium to long term scenario to test if the proposed intersection upgrades are appropriate beyond the short term. | A Strategic Assessment and Modelling Overview Memo (**Attachment H**) has been prepared by Don McKenzie Consulting and provides an in-depth analysis of the rationale for the PPC modelling used. | Accept the reasoning for not using the 2038 SATURN model, which is subject to various assumptions as outlined by Don McKenzie Consulting.<br><br>However, we still request further information is provided for the decision to use the 2028 year as the basis for undertaking all modelling. This is 3 – 4 years away from present, and it may take some time to fully develop the Site (accounting for Plan Change and consent approvals, construction works, and staging of development over time).<br><br>The previous discussions about using 2028 and 2038 was because these are the years that the SATURN models have been created for. However, the current approach from the applicant is to apply a 5% annual growth factor. This means that any year could be modelled by applying a growth factor up to that year (ie 2030 or 2031). | Please comment on whether it is realistic for the full buildout of the development enabled by the Plan Change to occur by 2028, when the modelling has been undertaken. Consider modelling in an alternative year if adjustments need to be provided. | Please refer to the Gantt chart on page 4 and comments on page 8 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). | The new assessment provides a completion & occupancy date of 2030 (previously 2028), to reflect project timeframes and a potential full buildout scenario. We support looking at this slightly pushed out timeframe. | | Noted. |
| **3** | Traffic demands | Please provide a table of all of the traffic volume datasets and assumptions used in the traffic modelling assessment for each road and intersection assessed. Please confirm if there is any allowance for any other approved plan changes | Section 4.5 of the ITA states:<br><br>*"in a 2028 future year scenario that is based on a combination of the Auckland Forecasting Centre's 2028 travel demand forecasts and recent traffic counts with 5% arithmetic* | A Strategic Assessment and Modelling Overview Memo (**Attachment I**) has been prepared by Don McKenzie Consulting and provides an in-depth analysis of the rationale for the PPC modelling used. | Satisfied with the traffic demands which have allowance for PC69 traffic volumes.<br><br>Traffic demands potentially subject to changes from year of modelling assessment, as per additional | | Noted. | The applicant's traffic engineer has updated their annual traffic growth rate assumptions from 5% to 2.6%. Their estimate of future traffic volumes make a separate allowance for PC69. | Please check trip distribution diagram to ensure volumes between intersections align, and update the modelling assessment as appropriate. | Please refer to the traffic response prepared by TEAM in **Attachment A** and by Abley in **Attachment B.** |

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| | | or developments such as PC69 Spedding Road. | *growth rate added to 2028"*<br><br>It is not clear how the two datasets of the 2028 travel demand forecasts and recent traffic counts have been combined to calculate the volumes used in the assessment.<br><br>Furthermore, it is not clear if these datasets include additional traffic from other approved plan changes or developments such as PC69 Spedding Road. | | information request above. | | | For the Trip Distribution Plan diagrams, we note that there appears to be some missing traffic volumes between intersections. For example, in the AM peak, there appears to be 100 vehicles per hour missing between Kauri Road and the SH18 interchange for the southbound traffic (green text). This should be checked in case it affects the SIDRA modelling, and updated as required. | | |
| **4** | Wider network upgrades | Please outline what wider network upgrades such as the SH16/18 Connections project, are inherently included in the modelling assumptions. | The ITA provides a map showing the Te Tupu Ngatāhi Supporting Growth Northwest Indicative Strategic Transport Network. This includes wider network projects such as the SH16/18 Connections project, which has the potential to change traffic volumes on SH16, SH18, Brigham Creek Road, and Trig Road. Another project includes the Spedding Road extension with a bridge over SH16.<br><br>Clarification is requested, whether this or any other projects are assumed to be in place by the Auckland Forecasting Centre and the travel demand forecasts that have been provided for use in the ITA.<br><br>We acknowledge that the SH16/SH18 Connections project is currently unfunded | The modelling assumptions are based on the 2028 Saturn Model and do not include the SH16/18 connections project. Please refer to the updated Integrated Transport Assessment in **Attachment B**. | The SATURN Model Extracts memo provided by Abley outlines the model assumptions for the 2028 SATURN model. This is summarised again in the Don McKenzie Consulting memo. The 2028 SATURN model does not include the SH16/18 Connections project, but does include some other projects that may not be realistic (such as a Sinton Road bridge and a new connection between Trig Road and Kauri Road).<br><br>The applicant has not used this SATURN model and has instead relied on using their own traffic volumes for their modelling assessment. For their SIDRA modelling assessment, the applicant has not relied on any external roading upgrades, other than | | | | | Please refer to the traffic response prepared by TEAM in **Attachment A.** |

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| | | | under the current Auckland Regional Land Transport Plan 2021-2031. | | those proposed as part of the Plan Change.<br><br>Therefore, the modelling in its current form does not rely on upgrades being delivered by other parties. No further information is required for this point. | | | | | |
| **5** | Mode share assessment | Please include a mode share assessment of trips that will be generated by the development, including ride-share, as well as walking and cycling and public transport trips.<br><br>Please assess where these trips may travel from and to.<br><br>Please assess trip generation of the expected activities for the peak period of the activities outside commute times. Please consider effects on the transport network if this occurs at the same time as school departure time. | The ITA does not include a mode share assessment for all transport modes and only assesses effects of vehicle trip generation of the development during peak network hours (ie commute times).<br><br>Including a mode share assessment provides an estimate of the number of walking, cycling and public transport trips. This may influence what measures are required to accommodate those trips on the road network. It may also influence the vehicle trip generation rates used in the ITA.<br><br>An assessment of where people travel will provide information about whether people using these transport modes will be able to access the site to other areas such as the Whenuapai local centre and residential areas. We acknowledge that some information on this topic is provided in Section 4.3 of the ITA. | Please refer to Section 4.3 of the updated Integrated Transport Assessment (**Attachment B**). The Supporting Growth Northwest Detailed Business case has Key Performance Indicator Outcomes of 35% public transport mode share by 2048 and 2,300 additional daily active mode trips. The Whenuapai Business Park PPC will contribute to achieving this outcome. | No mode share data is provided in Section 4.3 of the ITA. The information provided in the information response is for 2048, which is a longer term scenario. Mode share data is requested to understand possible walking, cycling and public transport trips. This will be useful to understand alongside the vehicle trips that are being assessed as part of the modelling assessment. | Please provide anticipated mode share data of the Site for the same periods as the vehicle modelling assessment. | Please refer to pages 1-3 and 8 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). | A mode share assessment has been provided.<br><br>We note that this mode share data has been applied to the 950 total peak hour trips, assessed in previous iterations of the applicant's assessment. By inference of that assessment (diagrams of vehicle trips included in modelling), these were vehicle trips.<br><br>In their assessment of different modes of travel, the applicant's traffic engineer has assumed the 950 trips are split amongst different travel modes, with 725 vehicle trips per peak hour (a reduction of 225 vehicle trips per hour). These 225 trips are assumed to instead be made by walking, cycling, public transport, or sharing a ride in someone else's vehicle.<br><br>We note that the previous ITA report assessed the following for trip generation<br>• 1,180 trips per hour based on | Please provide clarity around the assumptions regarding person trip rates and vehicle trip rates, and update the mode share assessment, and vehicle traffic modelling, as appropriate. | Please refer to the traffic response prepared by TEAM in **Attachment** A and by Abley in **Attachment B.**<br><br>A new precinct provision has also been proposed to address the matters raised. The provision includes a development cap with a 725 vehicle/hour limit. Please refer to the updated Precinct Provisions in **Attachment C.** |

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| | | | The activities could generate a number of trips, including freight trips, outside of peak commute times. An assessment of these trips will provide information on effects that might coincide with when school children are travelling on the road network after school, particularly as senior schools are located outside Whenuapai. | | | | | a rate of 0.78 trips per 100 m2 GFA and an estimated developable area of 36 hectares<br>• 720 trips based on a rate of 20 trips per hectare<br>• 950 trips was adopted as a midpoint<br><br>Our understanding is that the original trip rates are vehicle trip rates, instead of total person trip rates. Therefore, we consider that it is not appropriate to apply reduction factors for other travel modes to rates that originally accounted for vehicles only.<br><br>This has the potential to underestimate the potential number of peak hour vehicle trips generated by the plan change.<br><br>We note that the likelihood of walking, cycling and using public transport rely on connected and viable networks, supporting infrastructure (eg bus stops, pedestrian crossings), with supporting land uses, that enable the shorter active mode trips to be made. | | |
| **6** | Modelling trip distribution | Please update the trip distribution assessment to include trips to and from the northwest, | Section 3.4 of the ITA includes a diagram of the trip distribution used in the assessment. | Please refer to Section 3.4 of the updated Integrated Transport | The same trip distribution assumptions have been used as previous. Based | | Noted. | We note that the trip distribution has been updated to assign 40% of trips generated by | Please provide further detail and justification for the 40% vehicle trip | Please refer to the traffic response prepared by TEAM in |

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| | | and potential trips within Whenuapai.<br><br>Please include a comparison of the distribution predicted in the Auckland Forecasting Centre's models.<br><br>Please include an assessment of effects of these trips going northwest, including the SH16 / Brigham Creek Road roundabout. | This assumes that 2/3 of trips travel to the SH18/Brigham Creek Road interchange and 1/3 of trips travel to the SH18/Trig Road interchange.<br><br>The assumptions are quite high level, and do not account for any trips heading northwest.<br><br>Including trips to the northwest means that the effects at the SH16/Brigham Creek Road roundabout can be considered.<br><br>Furthermore, the trip distribution at the Brigham Creek Road/Trig Road roundabout may change, with more trips on Brigham Creek Road travelling to the northwest direction.<br><br>Lastly, there is a possibility of some trips which travel south onto SH16 by travelling through the SH16/Brigham Creek Road roundabout. | Assessment (**Attachment B**). | on the SATURN Model Extracts memo provided by Abley and the Don McKenzie Consulting memo, the proportion of trips travelling to/from the northwest is very low. While the select link analysis from the SATURN extracts show some trips in the AM peak travelling from the Site towards the SH16 / Brigham Creek Road roundabout, this is likely influenced by the SATURN model road network. | | | the plan change to the Trig Road interchange, compared to 33% previously. The remainder of trips would be assigned to Brigham Creek Road East (60% assumed now compared to 67% assumed previously).<br><br>The reason provided in the applicant's response is *"This has been done to better align with other recent Plan Change applications in the area, and with Supporting Growth's northwest SATURN model that Abley Ltd have been engaged to assist with".*<br><br>We suggest that the Trig Road interchange is unlikely to serve many trips to and from SH18, as it only serves trips travelling to/from the northeast. Trips travelling in this direction would instead be able to use the Brigham Creek Road interchange as a more direct connection point to SH18.<br><br>We acknowledge that some trips using Trig Road could travel towards/from Westgate and the SH16 interchange. If this is the case, then there may be traffic effects at the Trig Road/Hobsonville Road intersection that should be assessed. | distribution to Trig Road.<br><br>Should the trip distribution assessment show trips heading south on Trig Road towards/from Westgate, please assess effects at the Trig Road/Hobsonville Road intersection. | **Attachment A** and by Abley in **Attachment B.** |
| **7** | Brigham Creek | Please include an assessment, including | An assessment of the Brigham Creek | Please refer to Section 5.4 of the updated | SIDRA modelling results is now provided for the | | Noted. | | | |

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| | Road/Kauri Road intersection | modelling, of the Brigham Creek Road/Kauri Road intersection.<br><br>Please advise if the Auckland Forecasting Centre models include a new link from the Kauri Road intersection to Trig Road. | Road/Kauri Road intersection is not provided in the ITA. As the current intersection is priority controlled, it may have operational and safety issues with the additional through traffic on Brigham Creek Road.<br><br>The current trip distribution shown in the ITA assumes 633 per hour additional through trips during peak hours past this intersection.<br><br>While other developments or plan changes may already consider the upgrade of this intersection, the current application should assess the impacts on this intersection in isolation in the scenario the subject development occurs first. | Integrated Transport Assessment (**Attachment B**) and the Whenuapai Business Park Saturn Model Extracts Memo (**Attachment L**). | Brigham Creek Road / Kauri Road intersection. No further information required. | | | | | |
| **8** | Modelling of SH18 interchanges | Please model the SH18 interchanges to include ramp meter signals, using a network model, eg SIDRA Network. | The ITA includes operational assessments of the SH18 interchanges at Trig Road and Brigham Creek Road. The intersections within the interchanges appear to be modelled in isolation, and do not include ramp meter signals.<br><br>Ramp meter signals should be included for the interchange on-ramps, as these generate queues that can impact the local road network. | Please refer to Section 4.5.5 and 4.5.6 of the Integrated Transport Assessment (**Attachment B**) the Strategic Assessment and Modelling Overview Memo (**Attachment I**). | **Ramp meter signals**<br><br>The ITA does not provide ramp meter signals in the SIDRA modelling. Instead, the ITA provides a written assessment stating that the these do not need to be included in the modelling as the demands at the ramps are lower than the capacity of a typical 5.5 second dual lane ramp metering system.<br><br>However, the cycle may be higher than 5.5 seconds during peak periods, which could reduce the capacity. | A. Please provide data of the ramp signal phasing at both SH18 interchanges.<br><br>B. Please include ramp signals to the SIDRA models to fully assess potential queuing.<br><br>C. Please provide an assessment of a base SIDRA model of the SH18 / Brigham Creek Road roundabout and calibrate this to existing conditions. If any changes to the roundabout settings are required as part of calibration, please use | Please refer to page 8 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). | We have reviewed the modelling and have the following comments:<br><br>Trig Road interchange<br><br>• Two scenarios have been tested: with and without staged right turns.<br>• We assume that the staged right turn has been modelled so that right turns from the Trig Road off-ramp would use the flush median to | Please calibrate the Trig Road / SH18 assessment to take account of existing right turn behaviour from the SH18 off-ramp.<br><br>Should the right turns at the Trig Road off-ramp be predicted to operate at/near full capacity and long delays, please assess if any mitigation may be required.<br><br>Note: we recommend that NZTA Waka Kotahi is provided opportunity to provide comments on the modelling results at the SH18 | Please refer to the traffic response prepared by TEAM in **Attachment A.** |

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| | | | Furthermore, each interchange (with ramp meter signals) should be modelled as a network, as interchanges typically operate as a system and there may be queues from one adjacent intersection to the next.<br><br>These changes would allow the effects and capacity of the interchanges to be assessed fully. | | Further information about the existing phasing is requested to confirm the capacity and existing operation.<br><br>For the SH18 / Brigham Creek Road roundabout, the demand for the onramp is approximately 1,150 vehicles per hour in the PM peak. Even if this is less than the potential capacity of 1,300 vehicles per hour, there will still be queuing. Not all of these vehicles will arrive in a uniform pattern, meaning the 95th percentile queues would likely be longer, and may extend back into the roundabout depending on the ramp signal phasing. To assess these effects, the ramp signals should be added to the SIDRA models, using SIDRA network.<br><br>**General modelling of SH18 / Brigham Creek Road interchange**<br><br>At the SH18 / Brigham Creek Road roundabout, the 'BCR West' approach appears to be reaching close to capacity, with degree of saturation between 90-100% in morning and evening peak periods. If the degree of saturation exceeds 100%, the delays and queue lengths will likely increase significantly.<br><br>We note that roundabouts can be | this to reassess the development scenarios | | make an interim right turn, followed by a merge with the through lane on Trig Road, which would improve the modelled capacity<br>• The scenario without the staged right turn predict 99 – 106% capacity would be reached for the right turns from the off-ramp, with long delays of 107 – 142 seconds per vehicle<br>• The staged right turn scenarios predict no capacity or delay issues. However, we consider that not many people will be confident or willing to undertake a staged right turn<br>• That the effects will be somewhere between these two extremes is not useful, given that this could result in the intersection operating close to its capacity.<br>• We would like to understand | interchanges at Brigham Creek Road and Trig Road. | |

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| | | | | | sensitive to model in SIDRA, and SIDRA can often provide more capacity than reality. The ITA provides a modelling scenario of the development only, but not of the existing conditions, or the base scenario (with PC69 and 5% growth traffic). Given the sensitivities of this roundabout, we would like to request the applicant calibrates the base model to existing conditions, to ensure it is fit for purpose to model the development scenario. | | | how often this occurs at present, and recommend that the assessment be updated to better reflect the likely occurrence to existing conditions.<br>• Should these right turn movements be near 100% capacity and show high delays, we believe this presents safety and capacity issues which may need to be mitigated<br>• We note that the Trig Road Notice of Requirement (NoR W1) has identified signalised intersections at the Trig Road on and off ramp intersections.<br><br>Brigham Creek Road interchange<br><br>• Both the AM and PM peak modelled outputs with the proposed plan change traffic show that many approaches would be at 90 – 100% of capacity | | |

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| | | | | | | | | • While there do not appear to be significant queues or average delays predicted at the SH18 Brigham Creek Road interchange, we note that the operation of the interchange's 3 roundabouts will be very sensitive to any additional traffic, given some approaches are predicted to operate at 90-100% of capacity. Any additional traffic (either generated by the proposed plan change or on the network) may result in adverse operation of the interchange and consequently SH18<br><br>Given the potential impacts on the State Highway interchanges, we recommend that NZTA Waka Kotahi is provided opportunity to provide comments on the modelling results. | | |
| **9** | Staging plan | Please provide an assessment of the Brigham Creek | Appendix I of the application documents provides the proposed | Please refer to Section 4.7 of the updated Integrated Transport | Updated staging plan now has the Brigham Creek Road /Trig Road | A. Please assess whether the intersection upgrade | Please refer to pages 8 & 9 of the attached Technical Note | The staging plan has been updated, so that intersection upgrade 'B' | Please assess how pedestrians will be able to cross Brigham Creek | Please refer to the traffic response |

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| | | Road/Trig Road intersection and Brigham Creek Road corridor upgrades being required by multiple stages. | infrastructure staging plan of the development. The staging plan consists of four different stages, with corresponding intersection and road corridor upgrades required at each stage.<br><br>This staging plan primarily requires these intersection and road corridor upgrades to occur for stage areas adjacent to the upgrades<br><br>The intersection upgrade for 'B' (Brigham Creek Road/Trig Road) is tied to stage orange. However, trips occurring in the blue, green or red stages may use this intersection to access the wider network, and therefore require the intersection to be upgraded should these stages be developed first.<br><br>Furthermore, some sections of the Brigham Creek Road corridor upgrade may be required for multiple stages to provide walking and cycling connectivity. | Assessment (**Attachment B**). | intersection upgrade as being triggered by 'any two or more stages' instead of just the orange stage. The reasoning provided in the ITA is delays for right turning movements increase to an unsatisfactory level at a certain point based on the existing layout. However, it is not clear exactly what this threshold is.<br><br>Other than traffic capacity reasons, the intersection upgrade for 'B' (Brigham Creek Road/Trig Road) may be needed under the following scenario<br><br>• For the green stage if this occurs first, as the only access would be a left-in / left-out access which may encourage U-turns or travelling on the network for a longer distance. Providing the upgrade for 'B' would provide opportunities for U-turns to occur safely<br><br>We also note that some staging scenarios may not provide walking and cycling connectivity to the Whenuapai centre to the northwest. If either of the green or red stages were developed first, then there would be no | for 'B' should be provided as a prerequisite for the green stage, to facilitate U-turns to support the left-in / left-out access on Brigham Creek Road<br><br>B. Please assess how active mode crossing facilities can be provided across Brigham Creek Road can be provided, should the green or red stages be developed first. | prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**). | is provided as a prerequisite for the green stage. This addresses the first component of our previous request.<br><br>In response to the request about pedestrian connections should the green or red stages be developed first, the green stage would have a pedestrian connection provided with the upgrade of intersection 'B'. However, should the red stage be constructed first, pedestrian connectivity to the Whenuapai Centre may not be provided. There would not be an immediate way to either cross onto the opposite side of Trig Road or Brigham Creek Road. For the red stage, we also note that the footpath at the southwest corner of the Brigham Creek Road / Trig Road roundabout may need to be upgraded to provide a suitable pedestrian connection.<br><br>We also note that all roads in the Road Function and Required Design Elements have 'bus provision'. For staging and the delivery of these bus facilities on Brigham Creek Road and Trig Road, we would like to understand how pedestrian connections will be provided for paired bus stops on | Road and Trig Road safely should the red stage be developed first in isolation, to provide connectivity to the Whenuapai Centre.<br><br>Please assess how pedestrian crossing points can be provided safely on Trig Road and Brigham Creek Road for potential bus stops, when considering staging and the full buildout. | prepared by TEAM in **Attachment A.**<br><br>Please refer to the updated Staging Plan in **Attachment D**. |

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| | | | | | pedestrian or cycle crossing point across Brigham Creek Road to access the rest of Whenuapai. This would encourage travel via private vehicle only. | | | opposite sides of the road. | | |
| **10** | Sight distance | Please provide vertical and horizontal sight distance assessments of each proposed intersection.<br><br>Please assess SISD based on the Austroads criteria of a 2.0 second reaction time and the speed environment (typically +10 km/h of the speed limit). | Section 4 of the ITA provides assessments of sight distance available at the proposed intersections.<br><br>The assessment focuses on horizontal sight distance. On Brigham Creek Road, there are some vertical constraints which means the vertical sight distance should also be assessed.<br><br>The Austroads SISD criteria appears to have been used inconsistently.<br><br>SISD is assessed in 4.5.1 of the proposed signalised intersection on Brigham Creek Road. The ITA states 114m is provided for a 60km/h road. This is based on a 1.5 second reaction time and 60km/h speed environment in Austroads. As the speed limit on Brigham Creek Road is 60km/h, a 70km/h speed environment should be assessed. Furthermore, a 2.0 second reaction time should be used in the SISD calculation.<br><br>Section 4.5.2 assesses the visibility of the Trig Road / WBRPC internal road roundabout. The SISD calculation is | Please refer to Section 4.5.1-4.5.4 of the updated Integrated Transport Assessment (**Attachment B**) and the Safe Intersection Sight Distance Drawings (**Attachment M**). | Visibility drawings are generally acceptable. Noted that vertical alignment will be designed at detailed design stage.<br><br>There are sightlines which go within the site boundaries and outside the road boundary at the Trig Road / Road 2 intersection (for northbound vehicles looking right from Trig Road towards Road 2). Additional land may need to be set aside to ensure these sight distances can be achieved. This could be addressed as part of a future subdivision application. | *Comment: land may need to be set aside at the Trig Road / Road 2 intersection at a future subdivision stage to ensure sufficient sightlines for vehicles can be achieved.* | Noted. | | | |

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| | | | based on a 2.0 second reaction time, which is different to the calculation for the Brigham Creek Road signalised intersection.<br><br>For this roundabout, the speed environment should be increased to 50km/h if the vehicle entering speed is 40 km/h. | | | | | | | |
| **11** | Trig Road access | Please assess if direct access onto Trig Road can be safely provided if a fourth leg is not provided at the proposed Trig Road / WPRPC roundabout. | Section 4.5.2 of the ITA assesses the Trig Road / WBRPC internal road roundabout. The roundabout is designed to have three legs, consisting of two legs on Trigg Road and one leg on the WBRPC internal road network.<br><br>No fourth leg to the west is shown in the plans, which would provide access to the orange stage in Appendix I Staging Plan<br><br>We note that Section 4.5.2 of the ITA states: *"There is potential for the proposed Trig Road roundabout to also provide access to the WBPPC land on the western side of Trig Road, alternatively this land can be accessed directly by utilising the median that is to be provided as part of the trig Road upgrade."*<br><br>If no fourth leg at the roundabout is currently proposed, then the assessment should consider direct vehicle access being provided from Trig Road, and | This matter is addressed in Section 4.5.2 of the ITA.<br><br>A fourth leg would provide access to 96 and 96a Trig Road, but would not provide access to 94 Trig Road. Existing and separate vehicle access is provided to 94, 96 and 96A Trig Road and these sites are held in different ownership. The existing access is safe and efficient. Future access will be subject to the provisions of E27 Transport. Site access can be designed to accommodate the relevant speed limit of Trig Road and the likely users. | Table I6XX Road Function and Required Design Elements identifies Trig Road as 'Future Arterial' and has access restrictions. This would be triggered by a future subdivision application.<br><br>No further information required. | | The Road Function and Required Design Elements Tables acknowledges that Trig Road is likely to be an arterial road in the future. However, for the purposes of this PPC it is not an arterial road and access restrictions will not apply under the Auckland Unitary Plan until the appropriate process is undertaken by Auckland Transport.<br><br>A further response was provided for a similar request from Auckland Transport as below:<br><br>We disagree for the reasons provided within the Clause 23 response dated 15 May 2024. This response is provided below for ease:<br><br>*Whilst Trig Road will most likely be an arterial road in the future, it is not currently and the introduction of a vehicle access restriction will impose additional consenting requirements that are* | We acknowledge there are existing vehicle crossings and separate sites, but consider there should be a mechanism to limit new vehicle crossings on Trig Road, as it is a future arterial road. Vehicle Access Restriction controls still allow for provision of access points onto arterial roads (where suitable), but encourage the number of accesses to be limited.<br><br>If a fourth leg on the west side is not provided at the Trig Road / Road 2 intersection, then more vehicle crossings may be required on Trig Road. While Trig Road is a 'future arterial', once any new development or vehicle access has been constructed then it would not be possible to restrict accesses retrospectively.<br><br>The response also states that that the FDS can take advantage of existing capacity. We consider that the number of vehicle | Please provide further details of the 'workable compromise' with identified access points and Vehicle Access Restrictions on Trig Road | Please refer to the traffic response prepared by TEAM in **Attachment A.** |

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| | | | ensure sufficient visibility and separation from adjacent intersections can be provided.<br><br>While Trig Road is currently classified as a local road in the Unitary Plan, the Notice of Requirement for Trig Road anticipates this being an arterial road, which means vehicle access restrictions in the Unitary Plan could apply in the future. | | | | *not necessary or required until the road is an arterial. Existing and separate vehicle access is provided to 94, 96 and 96A Trig Road and these sites are held in different ownership. The existing access is safe and efficient. Future access will be subject to the provisions of E27 Transport. Site access can be designed to accommodate the relevant speed limit of Trig Road and the likely users. A workable compromise could include an identified access point on each site with a with a VAR that covers the remainder of the site frontage We acknowledge there are existing vehicle crossings and separate sites, but consider there should be a mechanism to limit new vehicle crossings on Trig Road, as it is a future arterial road. Vehicle Access Restriction controls still allow for provision of access points onto arterial roads (where suitable), but encourage the number of accesses to be limited. If a fourth leg on the west side is not provided at the Trig Road / Road 2 intersection, then more vehicle crossings may be required on Trig Road. While Trig Road is a 'future arterial', once any new development or vehicle access has been* | crossings is not only a capacity issue, but also for safety and the general function of Trig Road. While Trig Road may be able to support some vehicle crossings, not having Vehicle Access Restrictions could encourage the construction of many vehicle crossings.<br><br>We maintain our position with regard to Vehicle Access Restrictions on Trig Road. However, we are interested to understand how a 'workable compromise' would function. | | |

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| | | | | | | | *constructed then it would not be possible to restrict accesses retrospectively. The response also states that that the FDS can take advantage of existing capacity. We consider that the number of vehicle crossings is not only a capacity issue, but also for safety and the general function of Trig Road. While Trig Road may be able to support some vehicle crossings, not having Vehicle Access Restrictions could encourage the construction of many vehicle crossings. We maintain our position with regard to Vehicle Access Restrictions on Trig Road. However, we are interested to understand how a 'workable compromise' would function. Please provide further details of the 'workable compromise' with identified access points and Vehicle Access Restrictions on Trig Road. Transport – Flow Transportation Specialists # Topic Specific Request Reason for the request Applicant response 15/05/24 Flow comment 04/06/24 Further information request 4/06/2024 Applicant response 2/08/2024 Flow comment 16/08/24 Further information request 16/08/24 Plan could apply in the future. being added to the Precinct Plan.* | | | |

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| | | | | | | | Under the FDS, the PPC land is identified as being live zoned 2025+. We also note that the FDS explicitly states that some business can take advantage of existing capacity, making the timing a non-issue. The timing in the FDS is unrelated to VAR control. In this case, VAR control is not necessary to mitigate effects, until Trig Road is upgraded to an arterial in the future. Future development would occur in accordance with the Unitary Plan requirements in place at the time. | | | |
| **12** | Brigham Creek Road / Trig Road roundabout | | | | Updated modelling has been provided at the Brigham Creek Road / Trig Road roundabout. The modelling results for the evening peak period show degree of saturation of 90 – 100% on both Brigham Creek Road approaches, which indicates that the proposed layout of the roundabout is close to reaching capacity. While the current queue lengths indicated in the modelling results do not show queues extending back to nearby intersections, these queue lengths would be sensitive to increasing if any further traffic travels through the intersection.<br><br>The proposed intersection design has single lanes on each | Please undertake a sensitivity assessment of the Brigham Creek Road / Trig Road roundabout to determine when two lane approaches may be required. | Please refer to page 9 of the attached Technical Note prepared by Team (Traffic Engineering and Management Ltd) dated 24 July 2024 (**Attachment A**)<br><br>Replacement road design drawings are attached as **Attachment B** - Road Upgrade Drawings, showing the addition of a double lane on the northern side of the roundabout.<br><br>Details are amended in the revised Road Function and Design Elements Table.<br><br>The Team response provides further detail as follows:<br><br>*An additional circulating lane has* | We acknowledge that the roundabout is predicted to perform within capacity with the adjustments made to the intersection layout.<br><br>However, we note that the modelled layout has removed the pedestrian crossings on the west Brigham Creek Road approach. The updated roading plan also does not include a pedestrian crossing.<br><br>The Brigham Creek Road Notice of Requirement (NoR W3) design allows for pedestrian crossings on all approaches. | Please outline if a safe pedestrian crossing can be provided on the west Brigham Creek Road approach of the Brigham Creek Road / Trig Road roundabout. | Please refer to the traffic response prepared by TEAM in **Attachment A.** |

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| | | | | | approach. If the roundabout is close to reaching capacity, then it may need to be future proofed to accommodate the NOR design of two lanes on each approach.<br><br>Recommend a sensitivity test is completed to show a threshold where the two lane design may need to be provided. | | *been added to the roundabout design, refer to the revised design below and the full trig Road upgrade design in Appendix E on page 53. The SIDRA model output of this roundabout design is provided on pages 30-35 in Appendix B. This roundabout design has acceptable spare capacity in 2030 with the Whenuapai Business Park traffic. The peak 85th percentile queue length modelled is 32 metres for BCR west and 57 metres for BCR east, with the degree of saturation less than 0.7, which provides confidence that extended two lane approaches is not required.* | | | |

| Auckland Transport – Further information requests | | | |
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| # | Specific request | Reasons for request | Applicant response |
| | **Updated trip distributions**<br>For clarity, please set out (e.g. in bullet points) which plan changes and other projects have been included in the analysis (e.g. PC69, PC86, Whenuapai Green etc). | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the traffic response prepared by TEAM in **Attachment A.** |
| **9** | **ITA - Brigham Creek Road / Road 1 Signals**<br>The model has been updated to a 100 second cycle time as requested. However Commute has some concerns about the 'wider' traffic volume distribution (this is discussed in next item but Commute wants to be sure that the volumes used for assessment at this intersection are correct). No movement summaries were provided for review and the SIDRA files provided did not include this intersection. Please check trip distribution and provide SIDRA 'movement summaries' to understand degree of saturation for each movement. | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the traffic response prepared by TEAM in **Attachment A.** |
| **11** | **ITA - Brigham Creek Road / Trig Road Roundabout**<br>Please check vehicle distribution. For example, at the Trig Road / Collector Road 2 intersection in the AM peak hour, the SIDRA models (as per volume summaries in Appendix B of the TEAM memo) have a northbound through volume on Trig Road of 784 vehicles per hour, however the northbound flow on Trig Road at the Brigham Creek Road / Trig Road intersection is 208 vph. Where have all the vehicles gone? On the trip distribution plans, please show through volumes at all intersections to assist the reviewer. | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the traffic response prepared by TEAM in **Attachment A.** |

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| | Also, AT subject matter experts would like to understand the difference between a single lane roundabout at the BCR / Trig Road intersection and the current proposal (single lane roundabout with a second lane on Brigham Creek Road west). We need to compare the options using the same volumes. Please provide movement summaries for quick comparison between options. | | |
| **12** | **ITA - Brigham Creek Road / SH18 Interchange**<br>Commute has printed off network site summaries for the 2030 with WBP scenario and note that there is substantial queuing and delays at the SH18 Brigham Creek South roundabout – essentially the plan change results in this roundabout being over capacity in the morning peak hour. This is not considered acceptable. Provide further commentary to justify why this is considered to be an appropriate level of effects.<br><br>Queues on the BCR east approach are also very long (over 1km) and therefore warrant analysis of the SH18 southbound offramp onto Brigham Creek Road – are queues onto the motorway anticipated?<br><br>The model also included the Brigham Creek Road / Kauri Road intersection and the queue from the Brigham Creek Road north roundabout on the BCR West approach extends to 235m i.e. not quite up to the Kauri Road. This approach performance is considered acceptable. | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the traffic response prepared by TEAM in **Attachment A** and by Abley in **Attachment B.** |
| **13** | **ITA - Trig Road / SH18 Interchange**<br>Please check volumes as per previous items. Sight distance at the SH18 / Trig Road offramp is considered to be restricted. Given the potential for queuing at the | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the traffic response prepared by TEAM in **Attachment A.** |

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| | offramp, and the need to undertake at least some two stage right turns to operate acceptably, does the applicant consider this level of performance acceptable, and safe? | | |
| **14** | **ITA - Other intersections**<br>Commute notes that the gap acceptance parameters for the right turn from Brigham Creek Road into Kauri Road have been reduced. Was there a reason for this? (The right turn out gap acceptance has been changed as well however this is considered to be realistic versus the standard defaults). | To better understand the traffic and other transport effects of the proposal and the ways in which any adverse effects may be mitigated. | Please refer to the traffic response prepared by TEAM in **Attachment A** and by Abley in **Attachment B.** |

| **Auckland Transport – Advisory comments on ITA** | | | |
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| # | Section / topic | Comment | Applicant response |
| | Footpath<br>(Topic 3.1) | In response to AT's query the applicant has confirmed that a footpath will be provided on the southern side of Brigham Creek Road (west of Intersection D) up to the eastern boundary of Lot 1 DP 167537 (159 Brigham Creek Road). This is now included in the Road Function and Design Elements table. The footpath is still identified as 'potential future footpath location' on Drawing No. 47712-DR-C-8102. For avoidance of doubt, this notation should be changed to 'proposed footpath location' | Refer to Drawing 47712-DR-8110 (**Attachment E**), reference to 'potential future footpath location' has been removed and replaced with 'proposed footpath location.' |

| **Auckland Transport – Advisory comments on precinct provisions** | | |
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| Provision(s) | Comment / recommendation | Applicant response |
| New objective | AT notes the applicant's response to the additional objective sought to address outcomes related to the strategic transport network. | Noted. |
| Access restrictions | AT continues to seek the access restrictions (including supporting policy, standards and assessment matters) for Trig Road and BCR as outlined previously. AT also seeks that the ITA further consider how the west side of Trig Road (shown with orange shading in the staging plan) will be accessed. | Noted. We maintain the opinion that the inclusion of vehicle access restrictions for Trig Road is not required until the road is identified as an arterial. It is anticipated that future access into the area to the west of Trig Road will occur at the western leg of the proposed roundabout (intersection A in the staging plan). Otherwise, the existing AUP framework provides sufficient provision for future vehicle crossings to be assessed at the resource consent stage. |
| I1.6 Standards | For clarity 'Transport Infrastructure Upgrades' should be numbered as Standard (1). The existing (1) and (2) should be subclauses under that. Consequential amendment will be required of cross-references within the precinct provisions. | The Precinct Provisions have been updated and are provided in **Attachment C**. |
| | AT notes the applicant's explanation of I1.6(2)(a). | Noted. |
| I1.7.2 Assessment criteria | I1.7.2(1) - AT continues to support the previously requested amendments which have not been included. | Noted. |
| I1.8 | (1) Transport Design Report - AT remains of the view that intersections of the two internal collector roads also need to be supported by a Transport Design Report, and therefore need to be identified on the Precinct Plan. | The two internal intersections are now identified on the Precinct Plan (**Attachment F**). |
| RFDE table | Some amendments have been made to the Road Function and Design Elements table and associated notes in response to AT feedback. | Reference to a future link has been removed. Please refer to the updated RFDE Table **Attachment G**. |

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| | For clarity, Note 5 should be amended as follows: 'Southern side footpath ~~for future link~~, extending to the eastern extremity of Lot 1 DP 167537 (159 Brigham Creek Road)' | |
| | In response to AT's query, the Applicant has clarified that if the Road Function and Design Elements table is a not complied with, the proposal becomes a noncomplying activity as per A6 (Subdivision that does not comply with Standard I6XX.6(1) (2) and (4)). | Noted. |
| | A separate Excel spreadsheet has been provided with the Road Function and Design Elements table. The spreadsheet also contains a table with the intersection upgrades. AT understands both of the tables in the spreadsheet need to be complied with or the proposal becomes non-complying.<br><br>The second table should have its own numbered title. | The second table is now titled 'Table 2: Intersection Type and Design'. Please refer to the updated RFDE Table in **Attachment G**. |
| | The provisions now include a requirement for the intersections to be designed in general accordance with specific drawings. The specific drawings reference will not reproduce well in the AUP and cover more than just the intersections. There may be some value in including conceptual intersection drawings. | Concept plans of the specified intersections have been prepared and are provided in **Attachment H.** The concept plan drawings are now referenced in the RFDE Table and will be included in the Precinct Provisions. |

**DATE:** 2 September 2024

**TO:** Todd Elder (Senior Policy Planner, Auckland Council)

**FROM:** Philip Brown (Director, Campbell Brown Planning Limited)

**SUBJECT:** **PLANNING RESPONSE – WBP CLAUSE 23 REQUEST (HEALTHY WATERS)**

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The Healthy Waters Clause 23 request of 28 August 2024 suggests that a 20m wide riparian margin should be adopted for the PPC (refer item HW5). The applicant is not proposing to provide for a 20m wide riparian margin through the Precinct provisions and instead will provide for a 10m wide riparian margin. The 10m width accords with the requirements of the Auckland Unitary Plan.

While '*the wider the better*' philosophy is not challenged, it needs to be balanced with the benefits of using serviced urban land efficiently. The Auckland Unitary Plan has weighed those competing objectives and determined that 10m is the appropriate width for urban situations.

'*Te Haumanu Taiao Restoring the natural environment in Tāmaki Makaurau*' is a non-statutory document. The Council's website notes that:

> "*The resource has no formal regulatory status but provides best practice guidance for restoration projects and conservation planting that may be required as part of resource consent processes in the Tāmaki Makaurau / Auckland region*."

It is focused solely on restoration and, appropriately in that context, does not seek to balance restoration outcomes against other important environmental outcomes.

By contrast, the Auckland Unitary Plan is a document that was extensively consulted on, underwent a comprehensive cost-benefit evaluation in respect of each provision, was subject to submissions and further submissions, and was scrutinised and tested through independent decision making from experienced commissioners. The process arrived at a 10m riparian margin standard for urban areas, and that dimension has been used consistently since that time across the region.

If Healthy Waters considers that the consistent application of a 10m riparian margin is no longer appropriate across Auckland, it has recourse to promulgate its own Plan Change to amend it. That would then be subject to the same level of testing and scrutiny that sits behind the current standard.

For these reasons, the applicant proposes to utilise a 10m riparian margin within the Precinct.

Philip Brown
**Director**
**Campbell Brown Planning Limited**

Cato Bolam
creating great places

**Neil Construction Limited**
**Whenuapai Business Park Private Plan Change**
**Whenuapai, Auckland**

# Request for Further Information Response

PLANNERS | SURVEYORS | ENGINEERS | ARCHITECTS | ENVIRONMENTAL

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## Document Record

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| Client | Neil Construction Limited - Brigham Creek Road |
| Site Address | Whenuapai Business Park Private Plan Change, Whenuapai, Auckland |
| Job Number | 47712 |
| Document | Request for Further Information – Healthy Waters |
| Document No | 47712-RI-C-E05 RFI4 Response to HW RFI 20240912 |

## Issue and Status

| | |
|---|---|
| Date of Issue | 12/09/2024 |
| Status | Final |
| Author | Paul Kleynhans – CPEng, Engineering Manager, Associate |

## Originating Office


| | |
|---|---|
| Office | Henderson |
| Postal Address | PO Box 21355, Henderson 0650 |
| Phone | 09 837 0486 |

# Contents

The following is a response to the Healthy Waters specialist request items in the RFI issued for the private plan change application, Proposed "Whenuapai Business Park", on 10 September 2024.

## 1.0 Water Quality

### 1.1 HW1

**No further information required.**

### 1.2 HW2

**No further information required.**

### 1.3 HW3

**No further information required.**

### 1.4 HW4

**No further information required.**

## 2.0 HYDROLOGY MITIGATION

### 2.1 HW5

**The percentage of time exceedance provides limited information. The focus on the EST is the potential for erosion and that is reflected in the excess shear value. It is important to evaluate the excess shear value at pre-development and post-development scenario but also the overall excess shear value.**

**As you outlined the different between pre and post-development excess shear value is 'small', however the actual excess shear value is greater than 2 for both pre and post development flows. This means that even with the potential effects of the plan change mitigated to pre-development levels the stream is likely experiencing adjustments and there will likely be active erosion in the future. This in turn can mean future development adjacent to the stream is at risk by stream bank instability. An excess shear value of more than 2 is accepted as the value where active channel adjustment can easily be expected in the near future and easily observed.**

**SMAF and 10m planted riparian margin will unlikely be enough to manage the ongoing stream erosion sensitivity or progressively reduce existing adverse effects on the stream in the plan change area, which are necessary to restore and enhance freshwater systems (B7) and ensure communities are more resilient to natural hazards and the effects of climate change (B10).**

As per the previous response:

There has been no empirical evidence or data submitted by Healthy Waters demonstrating that a value above 2 indicates that a channel is proven to be mobile and that mitigation is required to manage any minor effect as shown by the results. It only indicates that there is a potential risk.

Evidence on site indicates that the stream is not mobile. Historical aerial imagery from 1959, 1972 and 1988 [1] shows no discernible movement of the main watercourse. The comments from Healthy Waters on the erosion assessment memo indicate agreement that a 10m wide riparian margin would be within guidance, and:

"The adjustment occurring is minor and easily managed at this state. Any proactive measures maintain and firm up the network will prevent potential extensive and expensive works in the future."

We maintain our view that 10 metres riparian margin is appropriate, and discuss proactive mitigation measures below:

There are proactive measures proposed which include:

- Removing existing culverts and reinstating the stream
- Removing the ponding area and reinstating the stream
- 10m wide riparian planting
- Using green outfall structures where practicable,
- Riprap protection at outlets.

The riparian margin will be located within private property and responsibility for avoiding the placement of buildings in an area prone to erosion falls upon the owner of the relevant lot. This matter can be dealt with at resource consent and building consent stages and by consent notices on the titles.

However, in addition to the above, if specific areas cannot be satisfactorily protected from erosion there are additional measures available to address potentially mobile sections of stream. For example, these banks could be geotechnically reinforced to mitigate against future erosion.

The comment is made that "SMAF and 10m planted riparian margin will unlikely be enough to manage the ongoing stream erosion sensitivity or progressively reduce existing adverse effects on the stream in the plan change area…". An expert witness at the plan change hearing would need to provide evidence to support this statement. Our view and that of the Peer Reviewer (John Jaggard) is that this opinion is not supportable.

**It is recommended given the topography of the site that at a minimum the slope towards the stream is left unchanged. This can be achieved by having a minimum of 15m planted riparian margin and a building setback requirement of at least 20m from the bank of the stream. This will ensure if the stream does erode there is sufficient riparian margin to manage this and to ensure future development adjacent to the stream are protected. Please note under B10 the natural system such as vegetation and riparian margins are preferred over hard protection.**
**If a guidance document is referred to for riparian margins it is recommended to refer to Te Haumanu Taiao (March 2024) which is the current best practice guidance by Auckland Council. TP148 (August 2000) recommends a buffer width of 10 -20m, but notes that wider is better, site specific information is important, and that the 10-20m does not meet all the functions provided by riparian margins, and that evidence should be provided alongside the suggested buffer width. This was not outlined in the response.**

The topography of the site is the result of several approved bulk earthworks consents having been given effect to, which are not the final intended form of the land. These consents sought specifically to avoid touching any areas near watercourses, those final finishing works to be the subject of future

[1] "Appendix S - Archaeological Assessment Report" submitted with the PPC application package (1972 & 1988 images) and an earlier Archaeological Report dated March 2019 (1959 image), copies available on request.

stream works and subdivision consents. The slopes towards the streams are expected to be modified by future consents.

The above RFI was responded to in the memo provided by Campbell Brown Ltd. An excerpt from the memo included:

> "While '*the wider the better*' philosophy is not challenged, it needs to be balanced with the benefits of using serviced urban land efficiently. The Auckland Unitary Plan has weighed those competing objectives and determined that 10m is the appropriate width for urban situations.
>
> '*Te Haumanu Taiao Restoring the natural environment in Tāmaki Makaurau*' is a non-statutory document.
>
> The Council's website notes that: "*The resource has no formal regulatory status but provides best practice guidance for restoration projects and conservation planting that may be required as part of resource consent processes in the Tāmaki Makaurau / Auckland region*."
>
> It is focused solely on restoration and, appropriately in that context, does not seek to balance restoration outcomes against other important environmental outcomes."

It is accepted that for short sections of stream a riparian margin greater than 10m might be the only viable method of ensuring erosion protection, but this has yet to be established by scientific evidence and would be expected to be determined in an appropriate planning process or hearing. Such consideration would apply to specific areas of stream that may be deemed to have a higher risk of erosion as opposed to imposing blanket measures to the entire length of all streams and watercourses within the PPCA.

**Please included details about what is involve in reinstating the stream bed in the SMP. Please include information about the removal of structures in the stream and what works would be needed after this to ensure the stream is protected.**

Section 6.2 of the SMP has been expanded. Note that the details of the stream reinstatement will form part of the future consenting process.

**From the site visit the steam in the plan change area is a natural stream with established vegetation in some sections. As the stream in the plan change area is not 'clean and straight', it is recommended that a Mannings roughness value of 0.04 is used. And how would this change the result?**

Most of the stream is considered clean and straight as can be seen in the photographs in the Stream Condition Assessment and would be visible from a site inspection. There is an area of ponding and heavy root presence upstream of the wetland, however, this area is proposed to be reinstated with the ponding removed as recommended in the Arborist Report. This section represents approximately 75m of stream out of a total of approximately 1,200m of stream within the PCA as shown below:


**Figure 1: Area of existing ponding to be reinstated**

As per the previous response (which Healthy Waters did not comment on), allowing for an increase in the Mannings roughness value without allowing for an increase in the critical shear strength of the stream banks – due to the vegetation and roots causing the increase – would result in an artificially higher result of risk in the Erosion Risk Tool. Without an increase in the critical shear strength (as would be expected from higher vegetation), the tool would appear to indicate that a vegetated stream is more prone to erosion than a bare channel. The results are included in Appendix A, using a Mannings Roughness Value of 0.04. The results are considered at odds with the evidence on site and conventional stream restoration methodology.

**Technical Report TR2013/035 supported the Auckland Unitary Plan stormwater management approach. SMAF was not applied to future urban areas, on the basis that during structure plan and plan change processes the most appropriate method of stream hydrology mitigation would be applied/determined. SMAF is one method of stream hydrology mitigation.**

As previously stated, the regionwide network discharge consent does apply to future urban areas, and Schedule 2 and 4 of the consent requires SMAF equivalent mitigation. The technical justification for SMAF equivalent mitigation provided by TR2013/035 as relates to the requirements of the network discharge consent remains relevant.

## 3.0 FLOODING

### 3.1 HW6

**Please consult with Watercare regarding changes to flood effects and access to their pump station at 161 Brigham Creek Road.**

A package of information is being prepared and will be sent to Watercare before the end of this week.

The pump station is not accessible from the driveway or crossing at 161 Brigham Creek Road. It is accessed from its own driveway as below:


**Figure 2: Location of Watercare Pump Station access**

**The precinct plan shows an indicative connection of Road 1 into 161 Brigham Creek Road, however it does not appear as part of the road network for the plan change, please clarify? Who will provide this road. How will future access be provided across the stream at 161 Brigham Creek, to provide access to the rest of the site, as well as access to the pump station.**

The access strip from Road 1 will be vested in Council, as set out in correspondence in previous RFI's:

- Auckland Council letter 12 June 2024
- Applicant responses 1 August 2024
- Auckland Council acknowledgement 20 August 2024

Copies are attached in Appendix B.

An extension of any such vehicle access into 161 BCR as well as any stream crossings would form part of the future development of this land by Council. It is understood that this park land is proposed to be used for sport fields. The pump station has its own accessway as shown above. Additional access provisions could be provided if deemed necessary when Council develops the land. The future Council Park is not part of the PPC area.

**Please provide further information on the effects that would be mitigated if the driveway and culvert were upgraded for 163 Brigham Creek Road, would there be any change to flood risk? Please clarify who would implement this, noting that the proposed Designation by Auckland Transport for Brigham Creek Road has a lapse date of up to 15 years.**

The applicant will implement a culvert upgrade at its cost. The culvert would be upgraded with sufficient capacity to convey the 10-year storm event (allowing for 2.1 degrees climate change) and to limit the depth of flood water overtopping the driveway to less than 200mm. This would dramatically reduce the existing flood risk and provide safe egress.

It is noted that the NoR has a lapse period.

**Minor and less than minor are not a common term used when describing flood effects. They are planning terms used to determine notification and when assessing non-complying activities. SGA was questioned by the commissioners about this categorisation during the NW NoR hearing, this classification was not carried forward in subsequent NoR assessment and hearing. Please note 0.05 and 0.5m is a wide range, and 0.5m change is not considered a 'minor' flood effect. Please state what the actual effects of the flood change is and not use 'minor/less than minor'.**

There is no case where the post development flood effect modelled for 2, 10 or 100 year events exceeds 50mm across the property accessways, above the pre-development flood level. We included the reference to 0.5m as a guide to our assessment of what constitutes a "minor" flood effect when impacting land as opposed to a habitable room.

The modelled effects have been included in the flood report and in the previous RFI responses. The effects are summarised below as related to the 100-year storm (excluding climate change in order to assess the impact of the change of land use enabled by rezoning, as opposed to climate change):

| Property | Pre-Development Flood Depth | Flooding Effect | Mitigation Measures | Flooding Effect Post-Mitigation |
|---|---|---|---|---|
| **159 Brigham Creek Road** | 590mm | An increase in maximum flood depth of 50mm. Access restricted in the 100-year storm for an additional 2 hours (from 14 hours to 16 hours). | A new access point will be available from proposed Road 1. | Improved safe access during storm events |
| **161 Brigham Creek Road** | 360mm | Access restricted in the 100-year storm for an additional 7 minutes and the maximum flood depth increases by 50mm. | A new access point will be available from proposed Road 1. | Improved safe access during storm events |
| **163 Brigham Creek Road** | 370mm | Access is restricted for the same amount of time as pre-development. The maximum flood depth increases by 30mm | It is recommended to upgrade the driveway culvert to convey the 10-year storm, and to limit the flood depth overtopping the drive to less than 200mm. | Improved safe access during storm events |
| **162 Brigham Creek Road** | NA | No effect on the flood levels at the existing buildings or causing access restrictions. | None | N/A |
| **Watercare Pump Station** | 400mm | The flood depth adjacent to the pump station is modelled to increase by 10mm. | None | The impact of a 10mm increase in flood level in an existing flood plain is considered insignificant. |

### 3.2 HW10

**It would be expected that there would be a difference between a normal depth boundary condition and tailwater level of 3.5m, please clarify.**

The HEC-RAS model was used to model the 1%AEP storm event with and without coastal inundation. 3.5m tailwater used as a downstream boundary condition to allow for coastal inundation.

The results show that the limits of the tail water's effect were downstream of 162 Brigham Creek Road. That is to say that the modelled tailwater had no effect on 162 Brigham Creek Road, or upstream of this property, and therefore had no effect on the properties assessed.

The cross sections below show the flood depths of the normal flood depth (without coastal inundation) shown in light blue, and with coastal inundation allowed for in dark blue). The cross sections were taken at 162 Brigham Creek, and further downstream along the boundary of 59 and 65 Kauri Road. The sections show no difference in the flood level at 162 Brigham Creek Road between the two scenarios but does show a difference further downstream at 59 and 65 Kauri Road. This indicates that the downstream boundary condition does affect the downstream flood level but does not affect the flood level at the properties assessed in the flood assessments.

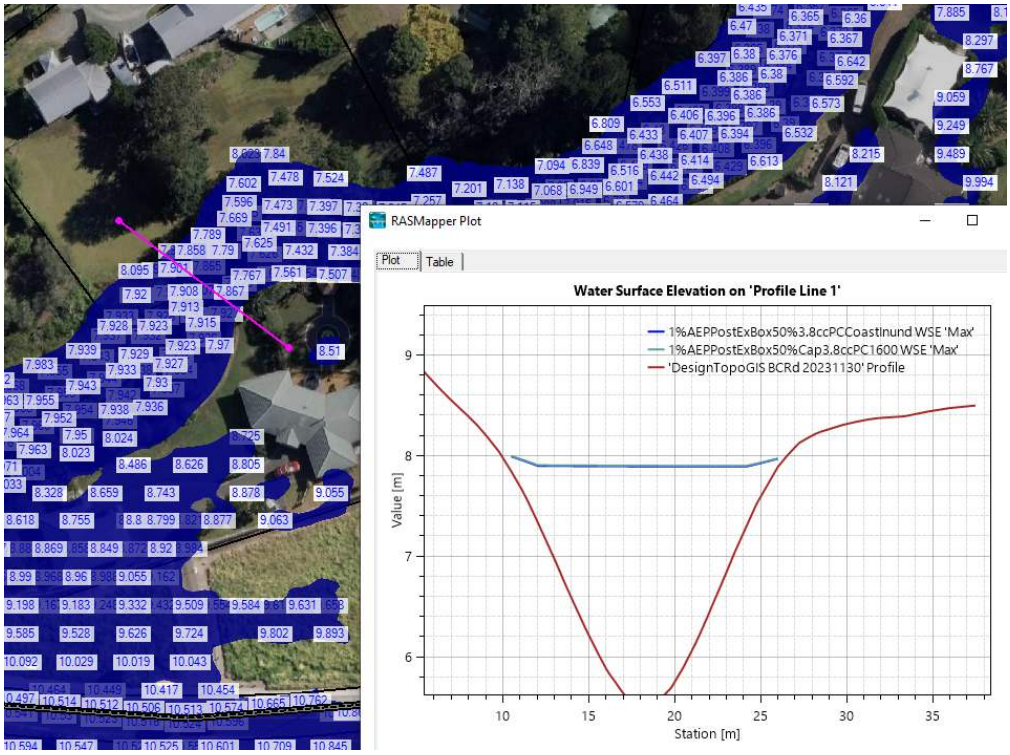


**Figure 3: Cross Section at 162 Brigham Creek Road - 1% AEP Post with 100% Box culvert capacity**

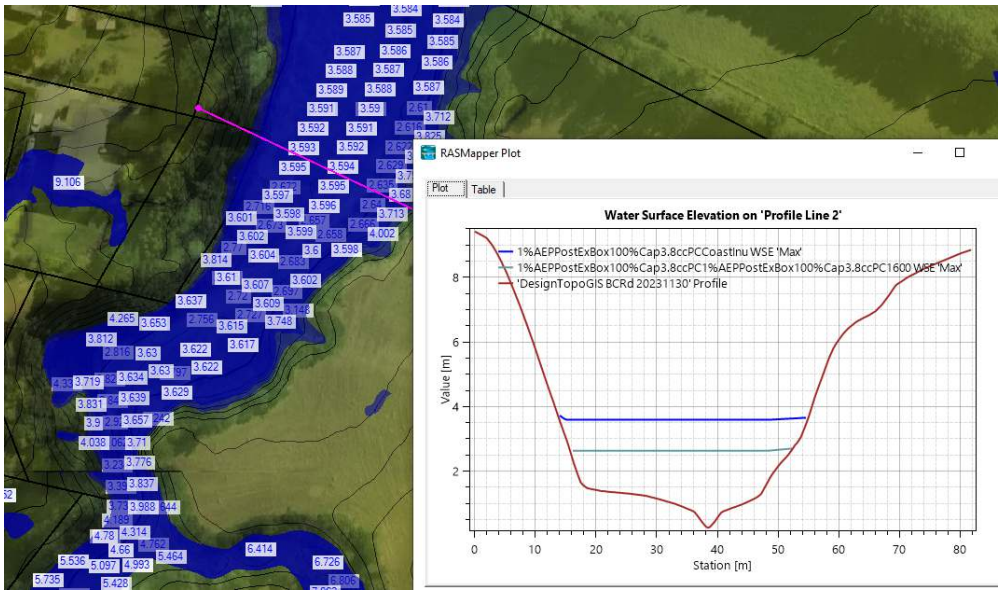


**Figure 4: Cross Section at 59 & 65 Kauri Road - 1% AEP Post with 100% Box culvert capacity**

**Neil Construction Limited - Brigham Creek Road**

**Brigham Creek Road, Whenuapai, Auckland**

**Request for Further Information**

# Appendix A: Additional Stream Erosion Risk Tool Results

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PLANNERS
SURVEYORS
ENGINEERS
ARCHITECTS
ENVIRONMENTAL

**Whenuapai Business Park PPC**

| Location 1 (2 year) | | | | |
|---|---|---|---|---|
| | n=0.03 | | n =0.04 | |
| | Pre -dev (ED+C) | Post-dev (PD+C) | Pre -dev (ED+C) | Post-dev (PD+C) |
| Bdry shear stress at peak | 61.22 | 83.66 | 68.81 | 97.97 |
| Excess shear at peak | 1.88 | 2.57 | 2.11 | 3.01 |
| <1 (min) | 1390 | 1350 | 1360 | 1270 |
| >1 & <2 (min) | 50 | 80 | 70 | 140 |
| >2 & <10 (min) | 0 | 10 | 10 | 30 |
| Percentage of duration excess shear >1 | 3.50% | 6.25% | 5.55% | 11.80% |
| Percentage of duration excess shear >1 Changes between pre and post | 2.75% | | 6.25% | |

| Location 2 (2 year) | | | | |
|---|---|---|---|---|
| | n=0.03 | | n =0.04 | |
| | Pre -dev (ED+C) | Post-dev (PD+C) | Pre -dev (ED+C) | Post-dev (PD+C) |
| Bdry shear stress at peak | 57.07 | 59.6 | 59.6 | 67.32 |
| Excess shear at peak | 1.66 | 1.83 | 1.83 | 2.07 |
| <1 (min) | 1370 | 1350 | 1350 | 1320 |
| >1 & <2 (min) | 70 | 90 | 90 | 110 |
| >2 & <10 (min) | 0 | 0 | 0 | 10 |
| Percentage of duration excess shear >1 | 4.86% | 6.25% | 4.10% | 8.33% |
| Percentage of duration excess shear >1 Changes between pre and post | 1.39% | | 4.23% | |

| Location 3 (2 year) | | | | |
|---|---|---|---|---|
| | n=0.03 | | n =0.04 | |
| | Pre -dev (ED+C) | Post-dev (PD+C) | Pre -dev (ED+C) | Post-dev (PD+C) |
| Bdry shear stress at peak | 78.1 | 86.03 | 82.43 | 93.51 |
| Excess shear at peak | 2.4 | 2.64 | 2.53 | 2.87 |
| <1 (min) | 1200 | 1170 | 1020 | 1010 |
| >1 & <2 (min) | 200 | 230 | 370 | 360 |
| >2 & <10 (min) | 40 | 40 | 50 | 70 |
| Percentage of duration excess shear >1 | 16.67% | 18.75% | 29.17% | 29.86% |
| Percentage of duration excess shear >1 Changes between pre and post | 2.08% | | 0.69% | |

| Location 4 (2 year) | | | | |
|---|---|---|---|---|
| | n=0.03 | | n =0.04 | |
| | Pre -dev (ED+C) | Post-dev (PD+C) | Pre -dev (ED+C) | Post-dev (PD+C) |
| Bdry shear stress at peak | 27.71 | 36.3 | 32.5 | 41.9 |
| Excess shear at peak | 0.85 | 1.11 | 1 | 1.29 |
| <1 (min) | 1440 | 1420 | 1440 | 1410 |
| >1 & <2 (min) | 0 | 20 | 0 | 30 |
| >2 & <10 (min) | 0 | 0 | 0 | 0 |
| Percentage of duration excess shear >1 | 0.00% | 1.39% | 0.00% | 2.08% |
| Percentage of duration excess shear >1 Changes between pre and post | 1.39% | | 2.08% | |