I hereby give notice that a hearing by commissioners will be held on:

Date:	**Mondays through Thursdays from 18 September until 12 October 2023**
Time:	**9:30am**
Meeting Room:	**Council Chambers**
Venue:	**Level 2, Henderson Civic, 3 Smythe Road, Henderson, Auckland 0612**

NOTIFICATION MATERIAL

VOLUME 11

NORTH-WEST HOUSING INFRASTRUCTURE FUND (HIF): PROJECT ON TRIG ROAD (NoR)

TE TUPU NGĀTAHI SUPPORTING GROWTH

AUCKLAND TRANSPORT & WAKA KOTAHI NZ TRANSPORT AGENCY

COMMISSIONERS

Chairperson	**Richard Blakey (Chairperson)**
Commissioners	**Mark Farnsworth**
	Vaughan Smith

Patrice Baillargeon
Kaitohutohu Mataamua Whakawā /
Senior Hearings Advisor

Telephone: 09 890 4692 or 027 338 5383
Email: patrice.baillargeon@@aucklandcouncil.govt.nz
Website: www.aucklandcouncil.govt.nz

Note: The reports contained within this agenda are for consideration and should not be construed as a decision of Council. Should Commissioners require further information relating to any reports, please contact the Team Leader Hearings.

ATTACHMENT 01

TRIG ROAD CORRIDOR UPGRADE
PUBLIC NOTICE

Auckland Unitary Plan

Notice of Requirement for an upgrade of Trig Road, Whenuapai, to an urban arterial corridor. This includes the upgrade of the existing Hobsonville Road/Trig Road and Hobsonville Road/Luckens Road intersections.

Notice of Requirement (Trig Road Corridor Upgrade)
Auckland Council has received a notice of a requirement for a designation from Auckland Transport as the Requiring Authority, for public work.

The requirement is for the construction, operation and maintenance of a transport corridor to enable the Requiring Authority to:

- Provide an urban arterial transport corridor between State Highway 18 and Hobsonville Road to support and integrate with the planned urban residential growth of Whenuapai.
- Provide arterial transport corridors that are safe for all transport users.
- Contribute to mode shift by providing a choice of transport options including walking, cycling and public transport.

The site to which the requirement applies is as follows: Trig Road in Whenuapai, between State Highway 18 and Hobsonville Road.

Viewing the notice of requirement

The explanation of the notice of requirement can be found on our web site https://www.aucklandcouncil.govt.nz/nor. If you don't have access to a computer, please visit your local library or service centre and they will help you view the notice of requirement on our website.

If you have any questions about the notice of requirement, please contact: Unitary Plan at unitaryplan@aucklandcouncil.govt.nz 09 365 3786.

Making a submission on the notice of requirement

Any person or organisation may make a submission on the notice of requirement, but a person who is a trade competitor or the requiring authority may do so only if that person is directly affected by an effect of the activity to which the requirement relates that –

(a) Adversely affects the environment; and
(b) Does not relate to trade competition or the effects of trade competition.

You may make a submission by sending a written or electronic form to Auckland Council at:

- Auckland Council, Unitary Plan Private Bag 92300, Auckland 1142, Attention: Planning Technician, or
- By using the online form on the Auckland Council website at https://www.aucklandcouncil.govt.nz/nor, or
- By email to: unitaryplan@aucklandcouncil.govt.nz ;or
- Lodging your submission in person at Auckland Council, Libraries or offices.

Submissions close on 24 April 2022.

You must serve a copy of your submission on Auckland Transport, whose address for service is, Auckland Transport, Level 5, 203 Queen Street, Auckland 1010, as soon as reasonably practicable after serving your submission on Auckland Council.

John Duguid
Manager – Plans & Places

Notification date: 23/03/2022

ATTACHMENT 02

TRIG ROAD CORRIDOR UPGRADE
LODGEMENT COVER LETTER

TE TUPU NGĀTAHI
SUPPORTING GROWTH

19 December 2022

Te Tupu Ngātahi
Supporting Growth
PO Box 105218
Auckland 1143

Auckland Council
C/o Todd Elder
Planning North/West – Plans and Places

Dear Todd

Re: NORTH WEST HOUSING INFRASTRUCTURE FUND NOTICES OF REQUIREMENT

This letter is to advise that Auckland Transport gives notices of requirement for five new designations as part of the North West Housing Infrastructure Fund (HIF) Project.

The lodgment documents have been prepared as two packages:

- Redhills Arterial Transport Network; and
- Trig Road Corridor Upgrade

Each package comprises four volumes as follows:

- Volume 1: Form 18 for each of the notices
- Volume 2: Assessment of Effects on the Environment
- Volume 3: General Arrangement Layout Plans
- Volume 4: Supporting Technical Assessments

These have been emailed to you via file transfer links.

Please contact me in the first instance if there are any queries.

Yours sincerely,

Bridget O'Leary
North West HIF – AEE Lead
info@supportinggrowth.nz
0800 4769 255

ATTACHMENT 03

TRIG ROAD CORRIDOR UPGRADE – FORM 18

Auckland Transport
An Auckland Council Organisation

20 Viaduct Harbour Avenue, Auckland 1010
Private Bag 92250, Auckland 1142, New Zealand
Phone 09 355 3553 **Website** www.AT.govt.nz

NOTICE OF REQUIREMENT FOR DESIGNATION OF LAND UNDER s168(2) OF THE RESOURCE MANAGEMENT ACT 1991

TO: Auckland Council

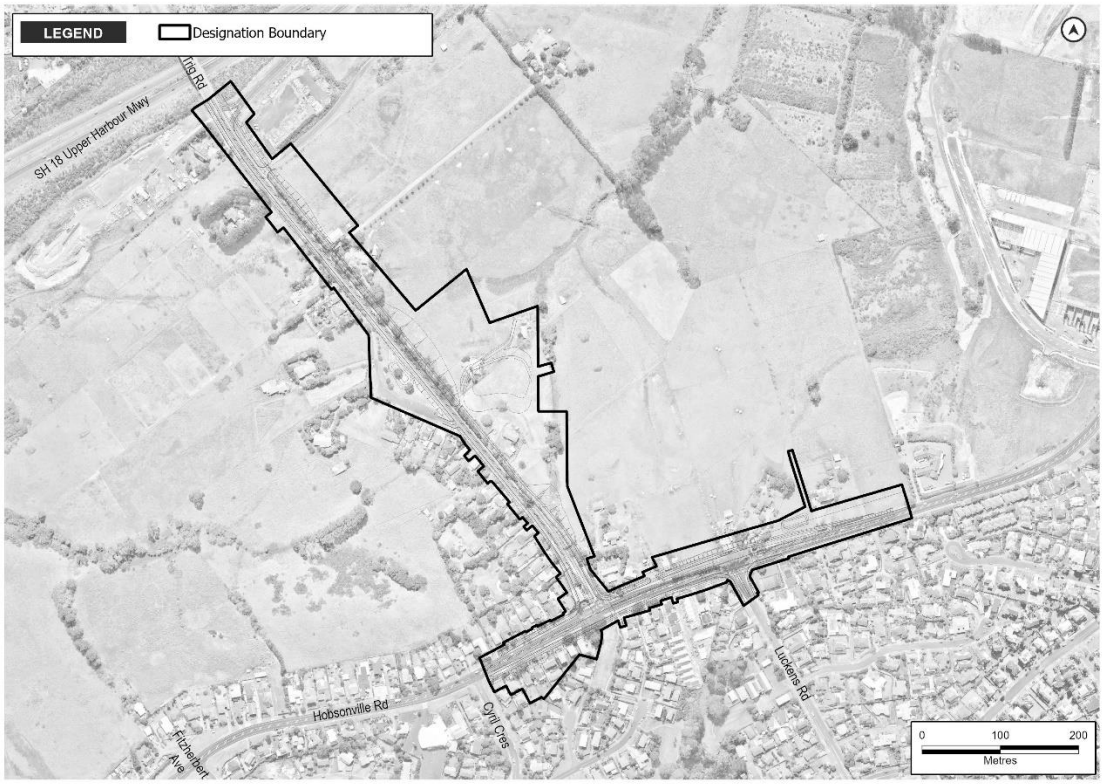
FROM: Auckland Transport

Auckland Transport (AT) (an Auckland Council Controlled Organisation) as a Requiring Authority under section 167 of the Resource Management Act 1991 (RMA) gives notice of requirement (NOR) for a designation in the Auckland Unitary Plan for a public work, being the construction, operation and maintenance of an arterial transport corridor on Trig Road in Whenuapai, between State Highway 18 and Hobsonville Road.

1 SUMMARY

AT is proposing to upgrade Trig Road in Whenuapai, between State Highway 18 and Hobsonville Road, to an arterial transport corridor in the next 15 years. The Trig Road Corridor Update Project (the Project) sits under the Te Tupu Ngātahi Supporting Growth Programme.

The extent of the project, designation and boundary is outlined below and shown in detail on the Designation Plans contained in Attachment A.



The purpose of the designation is for the construction, operation and maintenance of a transport corridor. The activities to be enabled by the designation include environmental mitigation, temporary construction areas, ancillary structure and other activities required for the Project.

The Project Objectives are to:

- **Project Objective 1**: Provide an urban arterial transport corridor between State Highway 18 and Hobsonville Road to support and integrate with the planned urban residential growth of Whenuapai.
- **Project Objective 2**: Provide arterial transport corridors that are safe for all transport users.
- **Project Objective 3**: Contribute to mode shift by providing a choice of transport options including walking, cycling and public transport.

As an approved Requiring Authority under section 176 of the RMA via section 47(1) of the Local Government (Auckland Council) Act 2009, Auckland Transport may designate to construct, operate and maintain a road and undertake ancillary activities.

2 THE SITE TO WHICH THE REQUIREMENT APPLIES IS AS FOLLOWS:

The area of the NOR is shown on the Designation Plans included in Attachment A of this Notice. The NOR applies to an area of land of approximately 67072 square metres (not including legal roads) located in Whenuapai. The requirement applies to 66 land parcels (not including legal roads). The land directly affected by the NOR is identified in the Schedule of Directly Affected Property included in Attachment B of this Notice.

3 THE NATURE OF THE PROPOSED WORKS IS:

The proposed work is the construction, operation and maintenance of an arterial transport corridor on Trig Road in Whenuapai, between State Highway 18 and Hobsonville Road, and associated activities. The nature of the proposed work is described in Section 3: The Trig Road Project and Section 7: Construction Works of the accompanying Assessment of Effects on the Environment (AEE) Report.

In summary, the proposed work includes:

- The widening and upgrading of the existing Trig Road transport corridor to accommodate a 24m wide, two-lane arterial standard transport corridor between the SH18 off-ramps and Hobsonville Road. A dedicated, bi-directional cycleway is proposed on the eastern side of the Trig Road corridor as well as footpaths on either side of the corridor.
- Changes to the SH18 bridge layout to accommodate walking and cycling facility upgrades and tie in works within the existing road reserve north of SH18.
- The upgrade and widening of Hobsonville Road generally between Cyril Crescent and Luckens Road to provide a four-lane corridor, which is generally 25m in width. These works include separated cycle paths and footpaths on both sides of the corridor. The widening will require land to provide for the construction and operation of the corridor including earthworks and driveway modifications.
- Two staggered signalised T-intersections at the Hobsonville Road / Trig Road and Hobsonville Road / Luckens Road intersections.
- Provision for public transport to improve bus travel time and reliability. This includes providing for bus only through movements in the the left-turn lanes on Hobsonville Road at the intersections of

Luckens Road and Trig Road, providing a dedicated kerb-side lane on both sides of Hobsonville Road and providing a right-turn bus advance lane on Trig Road.

- Upgrades to the existing stormwater culverts that cross beneath Trig Road.
- Fill embankment over a groundwater seepage area just off the eastern side of Trig Road at the upper branch of Trig Stream, and appropriate groundwater management to capture and convey the constant groundwater feed out of the fill embankment.
- The provision of new stormwater management devices. This includes a dry pond for the attenuation of additional post-development peak flows and to meet water sensitive design requirements. Raingardens are proposed to provide stormwater treatment and retention, with “at source” treatment within the berms along the carriageway as well as “end of pipe” treatment in larger raingardens.
- Bulk earthworks.
- Removal and relocation of existing utilities.
- Other construction related activities required outside the permanent corridor including re-grading of driveways, construction traffic manoeuvring and construction laydown areas.

4 THE NATURE OF THE PROPOSED CONDITIONS THAT WOULD APPLY ARE:

The proposed conditions that will apply to the work are included in **Attachment C** of this Notice.

5 THE EFFECTS THAT THE PROPOSED WORK WILL HAVE ON THE ENVIRONMENT, AND THE WAYS IN WHICH ANY ADVERSE EFFECTS WILL BE MITIGATED ARE:

The AEE Report contains a description of the existing and likely future environment (Section 5), an assessment of the effects on the environment from the Project (Section 9), and the proposed measures to avoid, remedy or mitigate the adverse effects of the Project (Section 10).

Positive Effects

The Project will generate a range of positive effects. The nature and degree of these positive effects are outlined in the AEE, in particular Section 9.1. However, they are summarised as follows:

- The Project will support the ongoing urbanisation of the area, by providing improved accessibility to the Future Urban Zoned land surrounding the Project area through an upgraded urban transport corridor and greater connectivity between SH18 and Hobsonville Road..
- The Project will provide pedestrian, cycle and public transport facilities along Trig Road, which will enable greater choice of mode and provide improved safety outcomes for transport users.
- The proposal includes planting and fencing and protection of two wetlands in perpetuity.
- The Project will improve transport network functions and contribute to a high-quality urban environment for local residents, businesses and road users.

Adverse Effects

There will be a range of potential adverse effects during the construction and operational phases of the Project, which are assessed in the following sections of the AEE Report:

- Transportation Effects (Section 9.2)

- Noise and Vibration Effects (Section 9.3)
- Archaeology and Heritage Effects (Section 9.4)
- Cultural Effects (Section 9.5)
- Landscape and Visual Effects (Section 9.6)
- Ecological Effects (Section 9.7)
- Property, Land Use and Business Effects (Section 9.8)
- Stormwater and Flooding Effects (Section 9.9)
- Earthworks, Erosion and Sediment Deposition (Section 9.10)
- Contamination (Section 9.11)

The AEE Report draws on information provided in the supporting technical documents (contained in Volume 4).

6 ALTERNATIVE SITES, ROUTES, AND METHODS HAVE BEEN CONSIDERED TO THE FOLLOWING EXTENT:

A wide range of alternatives have been investigated for addressing the future transport needs in Whenuapai. Alternatives were assessed at all stages of Project development. In summary, once problems, issues and objectives had been established, a list of corridor options were developed to achieve the outcomes. These were refined into a range of alignment options with the preferred options further refined to develop the indicative alignment.

The process by which AT considered alternative sites, routes and methods for the Project is detailed in Appendix A of the AEE: Assessment of Alternatives Report. Development of the Project was based on a comprehensive and robust optioneering process taking into account Mana Whenua, stakeholder and landowner feedback and specialist assessment inputs.

7 THE PROPOSED WORK AND DESIGNATION ARE REASONABLY NECESSARY FOR ACHIEVING THE OBJECTIVES OF THE REQUIRING AUTHORITY BECAUSE:

The works and designation are reasonably necessary to meet the objectives of AT, refer to Section 12.3 of the AEE.

AT's purpose under section 39 of the Local Government (Auckland Council) Act 2009 (LGA) is “to contribute to an effective, efficient, and safe Auckland land transport system in the public interest”. The Project will assist AT in meeting this objective.

The AT objectives for the Project are to:

- **Project Objective 1**: Provide an urban arterial transport corridor between State Highway 18 and Hobsonville Road to support and integrate with the planned urban residential growth of Whenuapai.
- **Project Objective 2**: Provide arterial transport corridors that are safe for all transport users.
- **Project Objective 3**: Contribute to mode shift by providing a choice of transport options including walking, cycling and public transport.

The Project achieves these objectives by:

- The proposed works will assist in the efficient operation of the local transport network.
- The proposed works will provide additional transport network capacity for planned growth in the Whenuapai area, in particular it will enable the use and development of planned future urban land adjoining the Project in accordance with the Auckland Unitary Plan.
- Sufficient space and facilities will be provided to ensure that the proposed transport corridors are safe for all transport users, including vehicles, public transport, walking and cycling.
- The proposed works contribute to mode shift by providing a choice of transport options through the provision of separated and protected walking and cycling facilities, including signalised pedestrian/cycle crossing facilities, and public transport measures to improve bus travel time and reliability.
- It will allow AT and/or its authorised agents to undertake the works for the construction, operation and maintenance of the Project comprising transport corridors and associated ancillary components/ activities.
- It will enable works to be undertaken in a comprehensive and integrated manner.
- It will add protection to the route from future incompatible development which may preclude or put at risk the construction and/or operation and maintenance of the corridor.
- The designation will be included in the Auckland Unitary Plan providing certainty to the public as to the intended use of the land and nature of the activity authorised.

The proposed designation is reasonably necessary as a planning tool, as it identifies and protects land required for the Project and will enable AT to carry out the proposed work.

8 THE FOLLOWING RESOURCE CONSENTS ARE NEEDED FOR THE PROPOSED ACTIVITY AND HAVE BEEN APPLIED FOR:

The Project will require resource consents for a number of activities to enable the proposed works. The necessary resource consents are being sought in parallel to the NOR. The resource consents being sought are summarised below.

- Resource consents for the disturbance of contaminated, or potentially contaminated land under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.
- Resource consents for the construction of specified infrastructure within, and within 100m of natural wetlands, reclamation of natural wetlands, and construction of culverts and associated structures and disturbance within natural wetlands under the Resource Management (National Environmental Standards for Freshwater) Regulations 2020.
- Resource consents for the following activities under the Auckland Unitary Plan:
    - Activities (including structures and associated works) in, on, under or over the bed of rivers, streams, wetlands. Specifically, the construction of batter slopes and culvert extensions resulting in the loss of natural wetland.
    - Vegetation removal within a riparian yard.
    - Bulk earthworks.
    - Discharge of contaminants to land.

9 THE FOLLOWING CONSULTATION HAS BEEN UNDERTAKEN WITH PARTIES THAT ARE LIKELY TO BE AFFECTED:

Consultation and engagement is ongoing with various parties who are directly affected by or have an interest in the Project including Mana Whenua, property owners and occupiers, Auckland Council, Waka Kotahi, network utility operators, business and community representative groups and the wider community. Engagement activities include online video meetings, phone calls, face to face meetings, workshops, hui, newsletters and online information.

The consultation and engagement undertaken is detailed in Section 11 of the AEE Report.

10 EXTENDED LAPSE PERIOD PROPOSED:

Under section 184(1) of the RMA a designation lapses on the expiry of 5 years after the date on which it is included in the district plan unless it is given effect to, substantial progress or effort has been made to give effect to, or a different period is specified when incorporated into the plan. There is a need for long term route protection to protect the corridor from inappropriate development until such time as the transport corridor is required to support and facilitate the planned urban growth. Therefore, pursuant to section 184(1)(c) of the RMA, AT proposes an extended lapse period of 15 years for implementation of the proposed designation.

11 INFORMATION REQUIRED TO BE INCLUDED IN THIS NOTICE BY THE AUCKLAND UNITARY PLAN OR ANY REGULATION MADE UNDER THE RESOURCE MANAGEMENT ACT 1991:

AT attaches the following information required to be included in this notice by the Auckland Unitary Plan, or any regulations made under the Resource Management Act 1991.

- Volume 2: Assessment of Effects on the Environment
- Volume 3: Indicative Design and Designation Drawings
- Volume 4: Supporting Technical Assessment Reports

Signed on behalf of AT

Jane Small
Group Manager PMO, Strategic Programmes & Property pursuant to authority delegated by Auckland Transport

19 December 2022

Attachment A – Designation Plans

Attachment B – Schedule of Directly Affected Property

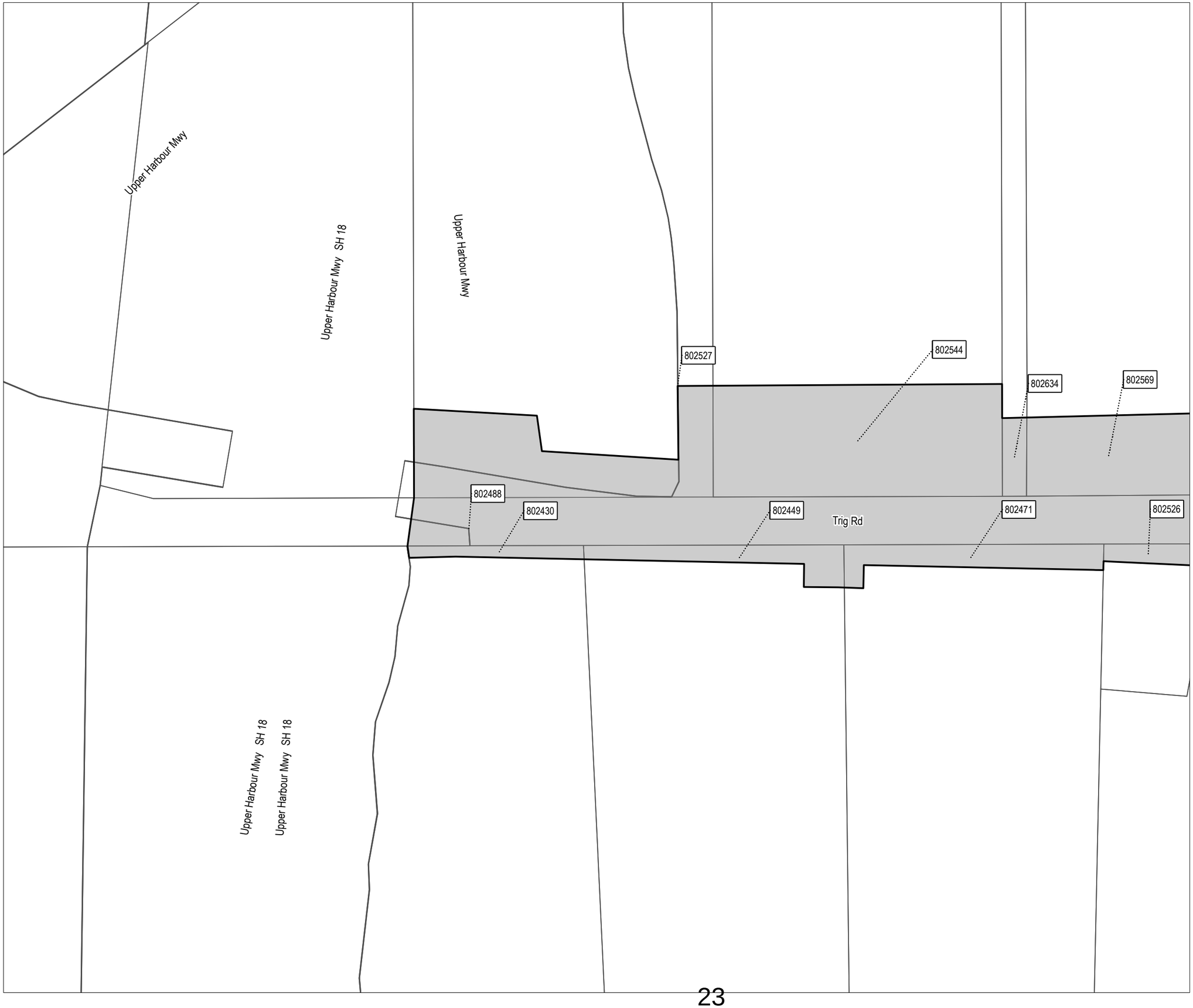
Attachment C – Proposed Conditions for the Designation

Attachment A – Designation Plans

Date Exported: 29/11/2022 3:54

Name of Map: SGA-PA-NW-41-NW_HIF_TRIG

Path: P:\381\38109341\TGI\01 Map\06 ArcGIS Pro\03 North West\SGA_Pro_NW_Designation_Plan_Deliverable.aprx

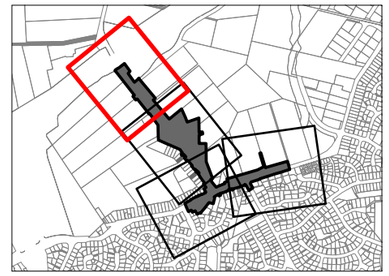


Designation Plan

Land to be Designated
Trig Road Corridor Upgrade

Legend

- Proposed Designation
- Parcel Boundary
- 507729 Property ID



This map contains data derived in part or wholly from sources other than those party to the Supporting Growth Alliance, and therefore, no representations or warranties are made by those party to the Supporting Growth Alliance as to the accuracy or completeness of this information.

Map intended for distribution as a PDF document.
Scale may be incorrect when printed.

Map Scale @ A3: 1:1,500

0 25 50
Metre

Revision	Author	Verified	Approved	Date
1	BAP	RJL	RE	27/11/2022

Client: **Auckland Transport / Waka Kotahi**

Discipline: **GIS**

Project: **Trig Road Arterial**

Drawing No: **SGA-PA-NW-041**
Sheet No : 1 of 4

Date Exported: 29/11/2022 3:54

Name of Map: SGA-PA-NW-41-NW_HIF_TRIG

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802621
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Trig Rd
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802582
802585
802575
802630
Ryans Rd
802564
802566
802593
802597
802619
802606

Designation Plan

Land to be Designated
Trig Road Corridor Upgrade

Legend

- Proposed Designation
- Parcel Boundary
- 507729 Property ID

Map Scale @ A3: 1:1,500

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Metre

Revision	Author	Verified	Approved	Date
1	BAP	RJL	RE	27/11/2022

Client: **Auckland Transport / Waka Kotahi**	Discipline: **GIS**
Project: **Trig Road Arterial**	Drawing No: **SGA-PA-NW-041** Sheet No : 2 of 4

802574 802621 802632 802577 802566 802582 802585 802593 802575 802597 802606 802616 802599 802619 802572 802576 802584 802590 802596 802613 802626 802630 802641 802580 802610 802532 802581 802592 802598 802607 802623 802631 802638 802643 802650 802655 802614 802645 802646 802658 802583 802653 807206 802651 807205 802611

Trig Rd
Hobsonville Rd
Cyril Cres
Hanson Pl
Louise Pl
Mona Vale
Forster Pl

Designation Plan

Land to be Designated
Trig Road Corridor Upgrade

Legend

- Proposed Designation
- Parcel Boundary
- 507729 Property ID

Map Scale @ A3: 1:1,500

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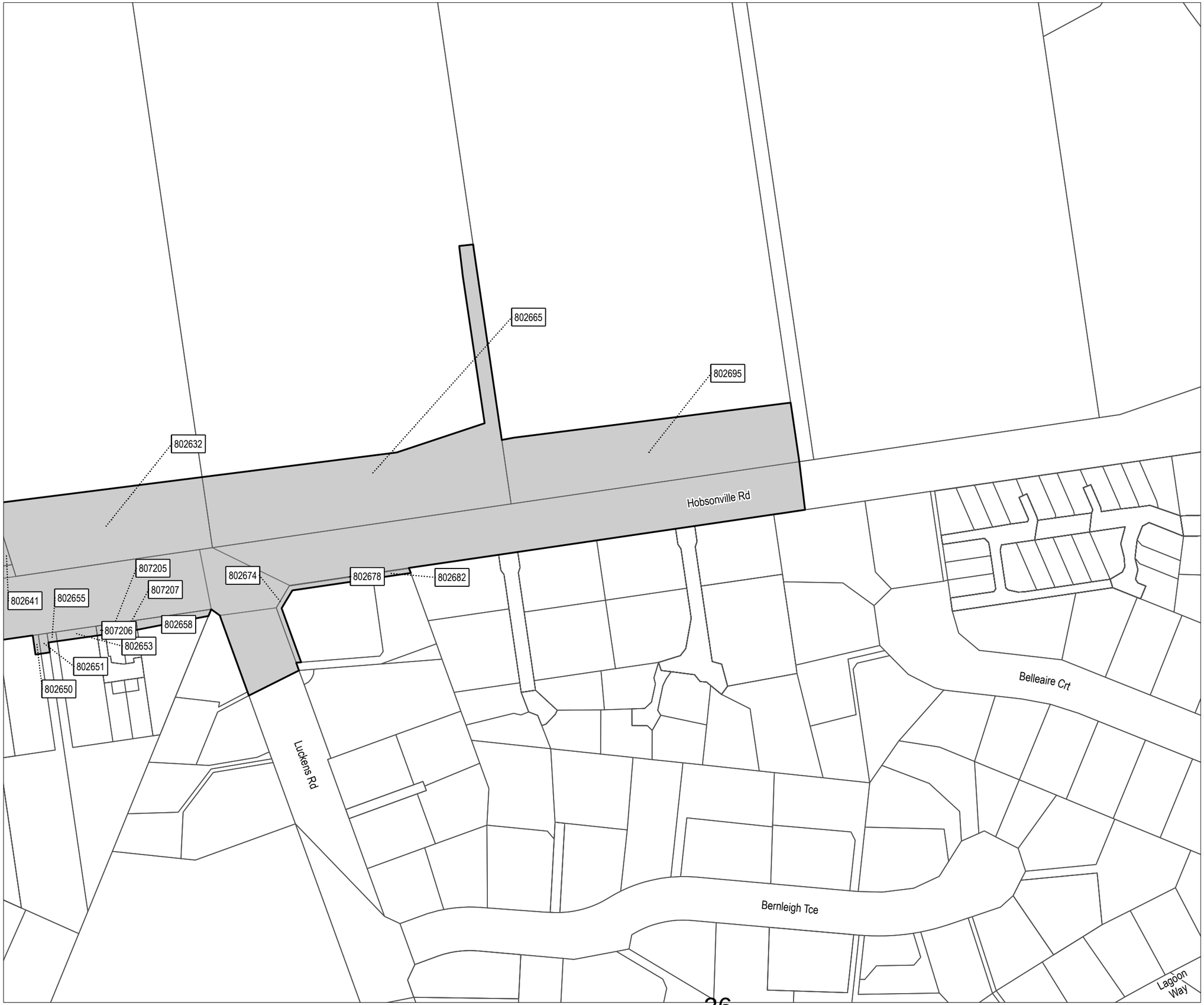
Revision	Author	Verified	Approved	Date
1	BAP	RJL	RE	27/11/2022

Client: **Auckland Transport / Waka Kotahi**

Discipline: **GIS**

Project: **Trig Road Arterial**

Drawing No: **SGA-PA-NW-041**
Sheet No : 3 of 4



Designation Plan

Land to be Designated
Trig Road Corridor Upgrade

Legend

- Proposed Designation
- Parcel Boundary
- 507729 Property ID

Map Scale @ A3: 1:1,500

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Revision	Author	Verified	Approved	Date
1	BAP	RJL	RE	27/11/2022

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Client: **Auckland Transport / Waka Kotahi**

Discipline: **GIS**

Project: **Trig Road Arterial**

Drawing No: **SGA-PA-NW-041**
Sheet No : 4 of 4

Attachment B – Schedule of Directly Affected Property

Property ID	Address	Title Number	Legal Description	Approx. land to be designated (m^2)	Sheet Number
802430		570610	Section 7 SO 445955	369	1
802449	46 Trig Road	NA26B/618	Lot 2 DP 67207	925	1
802471	44 Trig Road	NA46C/506	Lot 3 DP 67207	1117	2
802480	38 Trig Road	NA61D/402	Part Lot 2 DP 86769	229	2
802488	Trig Road	579743	Section 44 SO 447691	7	1
802526	40 Trig Road	NA62A/827	Lot 1 DP 110173	374	2
802527	Trig Road	579742	Section 46 SO 447691	31	1
802532	22A Trig Road	NA111C/540	Lot 2 DP 180500	293	2
802544	19 Trig Road	NA21C/1293	Lot 3 DP 66045	5632	1
802562	28 Trig Road	NA1539/84	Lot 41 DP 41172	27	2
802564	26 Trig Road	NA10D/299	Lot 40 DP 41172	156	2
802566	18 Trig Road	NA1353/93	Lot 2 DP 41560	173	2
802567	24 Trig Road	NA111C/539	Lot 1 DP 180500	45	2
802569	15 Trig Road	192542	Lot 5 DP 66045	4097	2
802572	60 Hobsonville Road	NA1332/82	Lot 24 DP 41172	52	3
802574	22 Trig Road	NA1136/106	Lot 38 DP 41172	86	2
802575	10 Trig Road	NA1199/49	Lot 1 DP 41560	42	2
802576	62 Hobsonville Road	NA1621/89	Lot 25 DP 41172	50	3
802577	20 Trig Road	NA1155/1	Lot 37 DP 41172	110	2
802580	64 Hobsonville Road	NA1600/93	Lot 26 DP 41172	98	3
802581	77 Hobsonville Road	NA1968/84	Lot 8 DP 43467	242	3
802582	16 Trig Road	NA1894/66	Lot 35 DP 41172	122	2
802583	79 Hobsonville Road	649590	Lot 1 DP 467569	460	3
802584	66 Hobsonville Road	NA1950/7	Lot 27 DP 41172	96	3
802585	14 Trig Road	NA1529/13	Lot 34 DP 41172	96	2
802590	68 Hobsonville Road	NA1313/4	Lot 28 DP 41172	83	3
802591	9 Trig Road	NA21C/1296	Lot 6 DP 66045	14699	2
802592	81 Hobsonville Road	NA3C/1174	Lot 10 DP 43467	810	3
802593	12 Trig Road	NA1387/91	Lot 33 DP 41172	179	2
802596	70A Hobsonville Road	NA133B/325	Lot 2 DP 204901	13	3
802597	8 Trig Road	NA2053/54	Lot 32 DP 41172	221	2
802598	83 Hobsonville Road	NA22D/1210	Lot 11 DP 43467	857	3
802599	70 Hobsonville Road	NA133B/324	Lot 1 DP 204901	60	3
802606	6 Trig Road	NA1999/58	Lot 31 DP 41172	234	2
802607	85 Hobsonville Road	199623	Lot 1 DP 348652	402	3
802610	72 Hobsonville Road	376596	Lot 1 DP 394135	39	3
802611	85A Hobsonville Road	199624	Lot 2 DP 348652	453	3
802613	72 Hobsonville Road	376596	Lot 5 DP 394135	17	3
802613	72C Hobsonville Road	376597	Lot 5 DP 394135	17	3
802613	72A Hobsonville Road	376598	Lot 5 DP 394135	17	3
802613	72B Hobsonville Road	376599	Lot 5 DP 394135	17	3
802614	1/87 Hobsonville Road	NA74D/281	Lot 13 DP 43467	846	3
802614	2/87 Hobsonville Road	NA74D/282	Lot 13 DP 43467	846	3
802616	72C Hobsonville Road	376597	Lot 2 DP 394135	357	3
802619	2 Trig Road	110146	Lot 1 DP 327126	1121	2
802621	7 Trig Road	NA21C/1297	Lot 7 DP 66045	13184	2

802623	89 Hobsonville Road	NA11A/72	Lot 14 DP 43467	1048	3
802626			Part Allot 53 PSH OF Waipareira	51	3
802630	1 Trig Road	NA31C/472	Part Lot 8 DP 66045	103	2
802631	91 Hobsonville Road		Lot 330 DP 92222	215	3
802632	76 Hobsonville Road	NA21C/1298	Part Lot 8 DP 66045	8235	4
802634	17 Trig Road	NA21C/1294	Lot 4 DP 66045	334	1
802638	1/93 Hobsonville Road	NA79B/111	Lot 1 DP 133982	235	3
802638	2/93 Hobsonville Road	NA79B/112	Lot 1 DP 133982	235	3
802638	3/93 Hobsonville Road	NA79B/113	Lot 1 DP 133982	235	3
802638	3/14 Mona Vale	NA79B/114	Lot 1 DP 133982	235	3
802638	4/14 Mona Vale	NA79B/115	Lot 1 DP 133982	235	3
802638	2/14 Mona Vale	NA79B/116	Lot 1 DP 133982	235	3
802638	1/14 Mona Vale	NA79B/117	Lot 1 DP 133982	235	3
802641	74 Hobsonville Road	287255	Section 1 SO 364200	421	4
802643	97 Hobsonville Road	NA38A/548	Lot 17 DP 43467	125	3
802645	95 Hobsonville Road	NA85B/400	Lot 16 DP 43467	27	3
802645	2/95 Hobsonville Road	NA94A/23	Lot 16 DP 43467	27	3
802645	1/95 Hobsonville Road	NA94A/24	Lot 16 DP 43467	27	3
802646	2/99 Hobsonville Road	NA76B/800	Lot 18 DP 43467	80	3
802646	1/99 Hobsonville Road	NA76B/801	Lot 18 DP 43467	80	3
802650	101 Hobsonville Road	NA11A/76	Lot 19 DP 43467	20	4
802651	103 Hobsonville Road	NA11A/77	Lot 20 DP 43467	30	4
802653	107 Hobsonville Road	NA7D/1392	Lot 22 DP 43467	66	4
802655	105 Hobsonville Road	NA38A/715	Lot 21 DP 43467	15	4
802658	1/111 Hobsonville Road	NA83C/586	Lot 24 DP 43467	100	4
802658	2/111 Hobsonville Road	NA83C/587	Lot 24 DP 43467	100	4
802665	78 Hobsonville Road	NA21C/1299	Lot 9 DP 66045	4165	4
802674	2 Luckens Road	NA106C/431	Lot 1 DP 173673	136	4
802678	Hobsonville Road	NA106C/434	Lot 5 DP 173673	11	4
802682	4 Luckens Road	756484	Lot 2 DP 173673	32	4
802695	80 Hobsonville Road	NA21C/1300	Lot 10 DP 66045	3115	4
807205	109A Hobsonville Road	1000393	Lot 1 DP 563162	28	4
807206	109A Hobsonville Road	1000393	Lot 5 DP 563162	14	4
807206	109D Hobsonville Road	1000396	Lot 5 DP 563162	14	4
807206	109C Hobsonville Road	1000395	Lot 5 DP 563162	14	4
807206	109B Hobsonville Road	1000394	Lot 5 DP 563162	14	4
807207	109B Hobsonville Road	1000394	Lot 2 DP 563162	27	4

Attachment C – Proposed Conditions for the Designation

Abbreviations and definitions

Acronym/Term	Definition
Activity sensitive to noise	Any dwelling, visitor accommodation, boarding house, marae, papakāinga, integrated residential development, retirement village, supported residential care, care centre, lecture theatre in a tertiary education facility, classroom in an education facility and healthcare facility with an overnight stay facility.
ARI	Annual Recurrence Interval
Average increase in flood hazard	Flow depth times velocity.
AUP	Auckland Unitary Plan.
BPO or Best Practicable Option	Has the same meaning as in section 2 of the RMA 1991.
CEMP	Construction Environmental Management Plan
Certification	Confirmation from the Manager that a plan or material change to a plan or CNVMP Schedule plan has been prepared in accordance with the condition to which it relates. A management plan shall be deemed certified: (a) where the Requiring Authority has received written confirmation from Council that a management plan is certified; or (b) five working days from the submission of a management plan where no written confirmation of certification has been received. A material change to a management plan or CNVMP Schedule shall be deemed certified: (a) where the Requiring Authority has received written confirmation from Council that the material change to the management plan is certified; or (b) ten working days from the submission of the material change to the management plan where no written confirmation of certification has been received. (c) five working days from the submission of the material change to a CNVMP Schedule where no written confirmation of certification has been received.
CNVMP	Construction Noise and Vibration Management Plan
CNVMP Schedule or Schedule	A schedule to the CNVMP
Completion of Construction	When construction of the Project (or part of the Project) is complete and it is available for use.
Construction Works	Activities undertaken to construct the Project excluding Enabling Works.
Council	Auckland Council
CTMP	Construction Traffic Management Plan
Enabling works	Includes, but is not limited to, the following and similar activities: • geotechnical investigations (including trial embankments) • archaeological site investigations • formation of access for geotechnical investigations • establishment of site yards, site entrances and fencing • constructing and sealing site access roads • demolition or removal of buildings and structures • relocation of services • establishment of mitigation measures (such as erosion and sediment control measures, temporary noise walls, earth bunds and planting)

Acronym/Term	Definition
Existing authorised habitable floor	The floor level of any room (floor) in a residential building which is authorised by building consent and exists at the time the outline plan is submitted, excluding a laundry, bathroom, toilet or any room used solely as an entrance hall, passageway or garage.
Flood prone area	A potential ponding area that relies on a single culvert for drainage and does not have an overland flow path.
Manager	The Manager – Resource Consents of the Auckland Council, or authorised delegate.
Mana whenua	Mana Whenua as referred to in the conditions is considered to be (as a minimum but not limited to) the following (in no particular order), who at the time of Notice of Requirement expressed a desire to be involved in the Project: • Te Kawerau a Maki • Ngāti Whātua o Kaipara • Te Ākitai Waiohua • Ngāti Whanaunga **Note**: Other iwi and hapu not identified above may have an interest in the Project and should be consulted.
Maximum Probable Development	Design case for consideration of future flows allowing for development within a catchment that takes into account the maximum impervious surface limits of the current zone or, if the land is zoned Future Urban in the Auckland Unitary Plan, the probable level of development arising from zone changes.
Network Utility Operator	Has the same meaning as set out in section 166 of the RMA.
NOR	Notice of Requirement
NZAA	New Zealand Archaeological Association
Outline Plan	An outline plan prepared in accordance with section 176A of the RMA.
Pre-Project development	Existing site condition prior to the Project (including existing buildings and roadways).
Post-Project development	Site condition after the Project has been completed (including existing and new buildings and roadways).
Project Liaison Person	The person or persons appointed for the duration of the Project's Construction Works to be the main point of contact for persons wanting information about the Project or affected by the Construction Works.
Protected Premises and Facilities (PPF)	Protected Premises and Facilities as defined in New Zealand Standard NZS 6806:2010: *Acoustics – Road-traffic noise – New and altered roads.*
Requiring Authority	Has the same meaning as section 166 of the RMA and, for this Designation is Auckland Transport.
RMA	Resource Management Act (1991)
SCEMP	Stakeholder Communication and Engagement Management Plan
Stage of Work	Any physical works that require the development of an Outline Plan.
Start of Construction	The time when Construction Works (excluding Enabling Works) start.

Acronym/Term	Definition
Suitably Qualified Person	A person (or persons) who can provide sufficient evidence to demonstrate their suitability, experience and competence in the relevant field of expertise.
ULDMP	Urban and Landscape Design Management Plan

Proposed Conditions for the Designation

No.	Condition
General Conditions	
1.	**Activity in General Accordance with Plans and Information** (a) Except as provided for in the conditions below, and subject to final design and Outline Plan(s), works within the designation shall be undertaken in general accordance with the following plans and information Project description and concept plan in schedule 1: (b) Where there is inconsistency between: (i) the documents listed in condition 1(a) above Project description and concept plan in schedule 1 and the requirements of the following conditions, the conditions shall prevail; (ii) the documents listed in condition 1(a) above Project description and concept plan in schedule 1, and the management plans under the conditions of the designation, the requirements of the management plans shall prevail.
2.	**Project Information** (a) A project website, or equivalent virtual information source, shall be established within 12 months of the date on which this designation is included in the AUP. All directly affected owners and occupiers shall be notified in writing once the website or equivalent information source has been established. The project website or virtual information source shall include these conditions and shall provide information on: (i) the status of the Project; (ii) anticipated construction timeframes; and (iii) contact details for enquiries. (iv) a subscription service to enable receipt of project updates by email; and (v) how to apply for consent for works in the designation under s176(1)(b) of the RMA. (b) At the start of detailed design for a Stage of Work, the project website or virtual information source shall be updated to provide information on the likely date for Start of Construction, and any staging of works.
3.	**Designation Review** (a) The Requiring Authority shall within 6 months of Completion of Construction or A as soon as otherwise practicable following Completion of Construction the Requiring Authority shall: (i) review the extent of the designation to identify any areas of designated land that it no longer requires for the on-going operation, maintenance or mitigation of effects of the Project; and (ii) give notice to Auckland Council in accordance with section 182 of the RMA for the removal of those parts of the designation identified above.
4.	**Lapse** (a) In accordance with section 184(1)(c) of the RMA, this designation shall lapse if not given effect to within 15 years from the date on which it is included in the AUP.
5.	**Network Utility Operators (Section 176 Approval)** (a) Prior to the start of Construction Works, Network Utility Operators with existing infrastructure located within the designation will not require written consent under section 176 of the RMA for the following activities: (i) operation, maintenance and urgent repair works; (ii) minor renewal works to existing network utilities necessary for the on-going provision or security of supply of network utility operations; (iii) minor works such as new service connections; and (iv) the upgrade and replacement of existing network utilities in the same location with the same or similar effects as the existing utility. (b) To the extent that a record of written approval is required for the activities listed above, this condition shall constitute written approval.

No.	Condition
Pre-construction Conditions	
6.	**Outline Plan** (a) An Outline Plan (or Plans) shall be prepared in accordance with section 176A of the RMA. (b) Outline Plans (or Plan) may be submitted in parts or in stages to address particular activities (e.g. design or construction aspects), or a Stage of Work of the Project. (c) Outline Plans shall include any management plan or plans that are relevant to the management of effects of those activities or Stage of Work, which may include: (i) Construction Environmental Management Plan; (ii) Construction Traffic Management Plan; (iii) Construction Noise and Vibration Management Plan; (iv) Urban and Landscape Design Management Plan; (v) Tree Management Plan
7.	**Management Plans** (a) Any management plan shall: (i) Be prepared and implemented in accordance with the relevant management plan condition; (ii) Be prepared by a Suitably Qualified Person(s); (iii) Include sufficient detail relating to the management of effects associated with the relevant activities and/or Stage of Work to which it relates. (iv) Summarise comments received from Mana Whenua and other stakeholders as required by the relevant management plan condition, along with a summary of where comments have: a. Been incorporated; and b. Where not incorporated, the reasons why. (v) Be submitted as part of an Outline Plan pursuant to s176A of the RMA, with the exception of SCEMPs CEMPs, CTMPs and CNVMP Schedules. (vi) Once finalised, uploaded to the Project website or equivalent virtual information source. (b) Any management plan developed in accordance with Condition 7 may: (i) Be submitted in parts or in stages to address particular activities (e.g. design or construction aspects) a Stage of Work of the Project, or to address specific activities authorised by the designation. (ii) Except for material changes, be amended to reflect any changes in design, construction methods or management of effects without further process. (iii) If there is a material change required to a management plan which has been submitted with an Outline Plan, the revised part of the plan shall be submitted to the Council as an update to the Outline Plan or for Certification as soon as practicable following identification of the need for a revision; (c) Any material changes to the SCEMPs, CEMPs or CTMPs are to be submitted to the Council for information.
8.	**Cultural Advisory Report** (a) At least six (6) months prior to the start of detailed design for a Stage of Work, Mana Whenua shall be invited to prepare a Cultural Advisory Report for the Project. (b) The objective of the Cultural Advisory Report is to assist in understanding and identifying Ngā Taonga Tuku Iho ('treasures handed down by our ancestors') affected by the Project, to inform their management and protection. To achieve the objective, the Requiring Authority shall invite Mana Whenua to prepare a Cultural Advisory Report that: (i) Identifies the cultural sites, landscapes and values that have the potential to be affected by the construction and operation of the Project; (ii) Sets out the desired outcomes for management of potential effects on cultural sites, landscapes and values; (iii) Identifies traditional cultural practices within the area that may be impacted by the Project; (iv) Identifies opportunities for restoration and enhancement of identified cultural sites, landscapes and values within the Project area; (v) Taking into account the outcomes of (i) to (iv) above, identify cultural matters and principles that should be considered in the development of the Urban and Landscape Design Management Plan, Stakeholder and Communication and Engagement Management Plan, and the Cultural Monitoring Plan referred to in Condition 14. (vi) Identifies and (if possible) nominates traditional names along the Project alignment. Noting there may be formal statutory processes outside the project required in any decision-making.

No.	Condition
	(c) The desired outcomes for management of potential effects on cultural sites, landscapes and values identified in the Cultural Advisory Report shall be discussed with Mana Whenua and those outcomes reflected in the relevant management plans where practicable. (d) Conditions 8(b) and (c) above will cease to apply if: (i) Mana Whenua have been invited to prepare a Cultural Advisory Report by a date at least 6 months prior to start of Construction Works; and (ii) Mana Whenua have not provided a Cultural Advisory Report within six months prior to start of Construction Works.
9.	**Urban and Landscape Design Management Plan (ULDMP)** (a) A ULDMP shall be prepared prior to the Start of Construction for a Stage of Work. (b) Mana Whenua shall be invited to participate in the development of the ULDMP(s) to provide input into relevant cultural landscape and design matters including how desired outcomes for management of potential effects on cultural sites, landscapes and values identified and discussed in accordance with Condition 8(c) may be reflected in the ULDMP. The objective of the ULDMP(s) is to: (i) Enable integration of the Project's permanent works into the surrounding landscape and urban context; and (ii) Ensure that the Project manages potential adverse landscape and visual effects as far as practicable and contributes to a quality urban environment. (c) The ULDMP shall be prepared in general accordance with: (i) Auckland Transport's Urban Roads and Streets Design Guide; (ii) Waka Kotahi Urban Design Guidelines: Bridging the Gap (2013) or any subsequent updated version; (iii) Waka Kotahi Landscape Guidelines (2013) or any subsequent updated version; (iv) Waka Kotahi P39 Standard Specification for Highway Landscape Treatments (2013) or any subsequent updated version; and (v) Auckland's Urban Ngahere (Forest) Strategy or any subsequent updated version. (d) To achieve the objective, the ULDMP(s) shall provide details of how the project: (i) Is designed to integrate with the adjacent urban (or proposed urban) and landscape context, including the surrounding existing or proposed topography, urban environment (i.e. centres and density of built form), natural environment, landscape character and open space zones; (ii) Provides appropriate walking and cycling connectivity to, and interfaces with, existing or proposed adjacent land uses, public transport infrastructure and walking and cycling connections; (iii) Promotes inclusive access (where appropriate); and (iv) Promotes a sense of personal safety by aligning with best practice guidelines, such as: a. Crime Prevention Through Environmental Design (CPTED) principles; b. Safety in Design (SID) requirements; and c. Maintenance in Design (MID) requirements and anti-vandalism/anti-graffiti measures. (e) The ULDMP(s) shall include: (i) a concept plan – which depicts the overall landscape and urban design concept, and explain the rationale for the landscape and urban design proposals; (ii) developed design concepts, including principles for walking and cycling facilities and public transport; and (iii) landscape and urban design details – that cover the following: a. Road design – elements such as intersection form, carriageway gradient and associated earthworks contouring including cut and fill batters and the interface with adjacent land uses, benching, spoil disposal sites, median width and treatment, roadside width and treatment; b. Roadside elements – such as lighting, fencing, wayfinding and signage; c. architectural and landscape treatment of all major structures, including bridges and retaining walls; d. Architectural and landscape treatment of noise barriers; e. Landscape treatment of permanent stormwater control wetlands and swales; f. Integration of passenger transport; g. Pedestrian and cycle facilities including paths, road crossings and dedicated pedestrian/ cycle bridges or underpasses; and h. Re-instatement of construction and site compound areas, driveways, accessways and fences. (f) The ULDMP shall also include the following planting details and maintenance requirements: (i) planting design details including:

No.	Condition
	a. identification of existing trees and vegetation that will be retained with reference to the Tree Management Plan. Where practicable, mature trees and native vegetation should be retained; b. street trees, shrubs and ground cover suitable for berms; c. treatment of fill slopes to integrate with adjacent land use, streams, riparian margins and open space zones; d. planting of stormwater wetlands; e. identification of vegetation to be retained and any planting requirements under Condition 20; f. integration of any planting requirements required by conditions of any resource consents for the project; and g. re-instatement planting of construction and site compound areas as appropriate. (ii) a planting programme including the staging of planting in relation to the construction programme which shall, as far as practicable, include provision for planting within each planting season following completion of works in each Stage of Work; and (iii) detailed specifications relating to the following: a. weed control and clearance; b. pest animal management (to support plant establishment); c. ground preparation (top soiling and decompaction); d. mulching; and e. plant sourcing and planting, including hydroseeding and grassing, and use of eco-sourced species.
	Advice Note: *This designation is for the purpose of construction, operation and maintenance of a transport corridor and it is not for the specific purpose of "road widening". Therefore, it is not intended that the front yard definition in the Auckland Unitary Plan which applies a set back from a designation for road widening purposes applies to this designation. A set back is not required to manage effects between the designation boundary and any proposed adjacent sites or lots.*
Specific Outline Plan Requirements	
10.	**Flood Hazard** (a) The Project shall be designed to achieve the following flood risk outcomes: (i) no increase in flood levels for existing authorised habitable floors that are already subject to flooding; (ii) no more than a 10% reduction in freeboard for existing authorised habitable floors; (iii) no increase of more than 50mm in flood level on land zoned for urban or future urban development where there is no existing dwelling; (iv) no new flood prone areas; and (v) no more than a 10% average increase of flood hazard (defined as flow depth times velocity) for main access to authorised habitable dwellings existing at time the Outline Plan is submitted. (b) Compliance with this condition shall be demonstrated in the Outline Plan, which shall include flood modelling of the pre-Project and post-Project 100 year ARI flood levels (for Maximum Probable Development land use and including climate change). (c) Where the above outcomes can be achieved through alternative measures outside of the designation such as flood stop banks, flood walls, raising existing authorised habitable floor level and new overland flow paths or varied through agreement with the relevant landowner, the Outline Plan shall include confirmation that any necessary landowner and statutory approvals have been obtained for that work or alternative outcome.

No.	Condition
Construction Conditions	
11.	**Construction Environmental Management Plan (CEMP)** (a) A CEMP shall be prepared prior to the Start of Construction for a Stage of Work. (b) The objective of the CEMP is to set out the management procedures and construction methods to be undertaken to, avoid, remedy or mitigate any adverse effects associated with Construction Works as far as practicable. To achieve the objective, the CEMP shall include: (i) the roles and responsibilities of staff and contractors; (ii) details of the site or project manager and the Project Liaison Person, including their contact details (phone and email address); (iii) the Construction Works programmes and the staging approach, and the proposed hours of work; (iv) details of the proposed construction yards including temporary screening when adjacent to residential areas, site layouts (including construction yards), locations of refuelling activities and construction lighting; (v) methods for controlling dust and the removal of debris and demolition of construction materials from public roads or places; (vi) methods for providing for the health and safety of the general public; (vii) procedures for incident management; (viii) procedures for the refuelling and maintenance of plant and equipment to avoid discharges of fuels or lubricants to Watercourses; (ix) measures to address the storage of fuels, lubricants, hazardous and/or dangerous materials, along with contingency procedures to address emergency spill response(s) and clean up; (x) procedures for responding to complaints about Construction Works; and (xi) methods for amending and updating the CEMP as required. (c) Any CEMP prepared for a Stage of Work shall be submitted to Council for information at least ten working days before the Start of Construction for a Stage of Work.
12.	**Stakeholder and Communication and Engagement Management Plan (SCEMP)** (a) A SCEMP shall be prepared prior to the Start of Construction for a Stage of Work. The objective of the SCEMP is to identify how the public and stakeholders (including directly affected and adjacent owners and occupiers of land) will be engaged communicated with throughout the Construction Works. To achieve the objective, the SCEMP shall include: (i) the contact details for the Project Liaison Person. These details shall be on the Project website, or equivalent virtual information source, and prominently displayed at the main entrance(s) to the site(s); (ii) the procedures for ensuring that there is a contact person available for the duration of Construction Works, for public enquiries or complaints about the Construction Works; (iii) methods for engaging with Mana Whenua, to be developed in consultation with Mana Whenua; (iv) a list of stakeholders, organisations (such as community facilities) and businesses and persons who will be engaged communicated with; (v) Identification of the properties whose owners will be engaged with; (vi) methods to communicate key project milestones and the proposed hours of construction activities including outside of normal working hours and on weekends and public holidays, to the parties identified in (iv) and (v) above; and surrounding businesses and residential communities; (vii) linkages and cross-references to communication and engagement methods set out in other conditions and management plans where relevant. (b) Any SCEMP prepared for a Stage of Work shall be submitted to Council for information ten working days prior to the Start of Construction for a Stage of Work.
13.	**Complaints Register** (a) At all times during Construction Works, a record of any complaints received about the Construction Works shall be maintained. The record shall include: (i) The date, time and nature of the complaint; (ii) The name, phone number and address of the complainant (unless the complainant wishes to remain anonymous); (iii) Measures taken to respond to the complaint (including a record of the response provided to the complainant) or confirmation of no action if deemed appropriate; (iv) The outcome of the investigation into the complaint;

<table>
<tr><th>No.</th><th>Condition</th></tr>
<tr><td></td><td>(v) Any other activities in the area, unrelated to the Project that may have contributed to the complaint, such as non-project construction, fires, traffic accidents or unusually dusty conditions generally.
(b) A copy of the Complaints Register required by this condition shall be made available to the Manager upon request as soon as practicable after the request is made.</td></tr>
<tr><td>14.</td><td>Cultural Monitoring Plan
(a) Prior to the start of Construction Works, a Cultural Monitoring Plan shall be prepared by a Suitably Qualified Person(s) identified in collaboration with Mana Whenua.
(b) The objective of the Cultural Monitoring Plan is to identify methods for undertaking cultural monitoring to assist with management of any cultural effects during Construction works.
(c) The Cultural Monitoring Plan shall include:
(i) Requirements for formal dedication or cultural interpretation to be undertaken prior to start of Construction Works in areas identified as having significance to Mana Whenua;
(ii) Requirements and protocols for cultural inductions for contractors and subcontractors;
(iii) Identification of activities, sites and areas where cultural monitoring is required during particular Construction Works;
(iv) Identification of personnel to undertake cultural monitoring, including any geographic definition of their responsibilities; and
(v) Details of personnel to assist with management of any cultural effects identified during cultural monitoring, including implementation of the Accidental Discovery Protocol
(d) If Enabling Works involving soil disturbance are undertaken prior to the start of Construction Works, an Enabling Works Cultural Monitoring Plan shall be prepared by a Suitably Qualified Person identified in collaboration with Mana Whenua. This plan may be prepared as a standalone Enabling Works Cultural Monitoring Plan or be included in the main Construction Works Cultural Monitoring Plan.

Advice Note: Where appropriate, the Cultural Monitoring Plan shall align with the requirements of other conditions of the designation and resource consents for the Project which require monitoring during Construction Works.</td></tr>
<tr><td>15.</td><td>Construction Traffic Management Plan (CTMP)
(a) A CTMP shall be prepared prior to the Start of Construction for a Stage of Work.
(b) The objective of the CTMP is to avoid, remedy or mitigate, as far as practicable, adverse construction traffic effects. To achieve this objective, the CTMP shall include:
(i) methods to manage the effects of temporary traffic management activities on traffic;
(ii) measures to ensure the safety of all transport users;
(iii) the estimated numbers, frequencies, routes and timing of traffic movements, including any specific non-working or non-movement hours to manage vehicular and pedestrian traffic near schools or to manage traffic congestion;
(iv) site access routes and access points for heavy vehicles, the size and location of parking areas for plant, construction vehicles and the vehicles of workers and visitors;
(v) identification of detour routes and other methods to ensure the safe management and maintenance of traffic flows, including pedestrians and cyclists, on existing roads;
(vi) methods to maintain vehicle access to property and/or private roads where practicable, or to provide alternative access arrangements when it will not be;
(vii) the management approach to loads on heavy vehicles, including covering loads of fine material, the use of wheel-wash facilities at site exit points and the timely removal of any material deposited or spilled on public roads;
(viii) methods that will be undertaken to communicate traffic management measures to affected road users (e.g. residents/public/stakeholders/emergency services);
(c) Any CTMP prepared for a Stage of Work shall be submitted to Council for information ten working days prior to the Start of Construction for a Stage of Work.</td></tr>
<tr><td>16.</td><td>Construction Noise Standards
(a) Construction noise shall be measured and assessed in accordance with NZS6803:1999 Acoustics – Construction Noise and shall comply with the noise standards set out in the following table as far as practicable:
Table 17.1: Construction noise standards
<table>
<tr><th>Day of week</th><th>Time period</th><th>$L_{Aeq(15min)}$</th><th>L_{AFmax}</th></tr>
</table>
</td></tr>
</table>

No.	Condition

Occupied activity sensitive to noise			
Weekday	0630h - 0730h 0730h - 1800h 1800h - 2000h 2000h - 0630h	55 dB 70 dB 65 dB 45 dB	75 dB 85 dB 80 dB 75 dB
Saturday	0630h - 0730h 0730h - 1800h 1800h - 2000h 2000h - 0630h	55 dB 70 dB 45 dB 45 dB	75 dB 85 dB 75 dB 75 dB
Sunday and Public Holidays	0630h - 0730h 0730h - 1800h 1800h - 2000h 2000h - 0630h	45 dB 55 dB 45 dB 45 dB	75 dB 85 dB 75 dB 75 dB
Other occupied buildings			
All	0730h – 1800h 1800h – 0730h	70 dB 75 dB	

(b) Where compliance with the noise standards set out in Table [above] is not practicable, and unless otherwise provided for in the CNVMP as required by Condition 18(c)(x), then the methodology in Condition 19 shall apply.

17.

Construction Vibration Standards

(a) Construction vibration shall be measured in accordance with ISO 4866:2010 Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures and shall comply with the vibration standards set out in the following table as far as practicable.

Table CNV2 Construction vibration criteria

Receiver	Details	Category A	Category B
Occupied Activities sensitive to noise	Night-time 2000h - 0630h	0.3mm/s ppv	2mm/s ppv
	Daytime 0630h - 2000h	2mm/s ppv	5mm/s ppv
Other occupied buildings	Daytime 0630h - 2000h	2mm/s ppv	5mm/s ppv
All other buildings	At all other times	Tables 1 and 3 of DIN4150-3:1999	

**Category A criteria adopted from Rule E25.6.30.1 of the AUP*

***Category B criteria based on DIN 4150-3:1999 building damage criteria for daytime*

(b) Where compliance with the vibration standards set out in Table [above] is not practicable, and unless otherwise provided for in the CNVMP as required by Condition 18(c)(x), then the methodology in Condition 19 shall apply

18.

Construction Noise and Vibration Management Plan (CNVMP)

(a) A CNVMP shall be prepared by a Suitably Qualified Person prior to the Start of Construction for a Stage of Work.
(b) A CNVMP shall be implemented during the Stage of Work to which it relates.
(c) The objective of the CNVMP is to provide a framework for the development and implementation of the Best Practicable Option for the management of construction noise and vibration effects to achieve the

No.	Condition
	construction noise and vibration standards set out in Conditions 16 and 17 to the extent practicable. To achieve this objective, the CNVMP shall be prepared in accordance with Annex E2 of the New Zealand Standard NZS6803:1999 *'Acoustics – Construction Noise'* (NZS6803:1999) and shall as a minimum, address the following: i. Description of the works and anticipated equipment/processes; ii. Hours of operation, including times and days when construction activities would occur; iii. The construction noise and vibration standards for the project; iv. Identification of receivers where noise and vibration standards apply; v. A hierarchy of management and mitigation options, including any requirements to limit night works and works during other sensitive times, including Sundays and public holidays as far practicable and identification of the Best Practicable Option; vi. Methods and frequency for monitoring and reporting on construction noise and vibration; vii. Procedures for communication and engagement with nearby residents and stakeholders, including notification of proposed construction activities, the period of construction activities, and management of noise and vibration complaints. viii. Contact details of the Project Liaison Person; ix. Procedures for the regular training of the operators of construction equipment to minimise noise and vibration as well as expected construction site behaviours for all workers; x. Identification of areas where compliance with the noise [Condition 16] and/or vibration standards [Condition 17 Category A or Category B] will not be practicable and the specific management controls to be implemented and consultation requirements with owners and occupiers of affected sites. xi. Procedures and requirements for the preparation of a Schedule to the CNVMP (Schedule) for those areas where compliance with the noise [Condition 16] and/or vibration standards [Condition 17 Category B] will not be practicable and where sufficient information is not available at the time of the CNVMP to determine the area specific management controls Condition 18(c)(x). xii. Procedures for: A. communicating with affected receivers, where measured or predicted vibration from construction activities exceeds the vibration criteria of Condition 17; B. assessing, mitigating and monitoring vibration where measured or predicted vibration from construction activities exceeds the Category AB vibration criteria of Condition 17, including the requirement to undertake building condition surveys before and after works to determine whether any damage has occurred as a result of construction vibration; and xiii. Requirements for review and update of the CNVMP
19.	**Schedule to a CNVMP** (a) An updated Schedule to the CNVMP (Schedule) shall be prepared prior to the start of the construction to which it relates by a Suitably Qualified Person, in consultation with the owners and occupiers of sites subject to the Schedule, when: (i) Construction noise is either predicted or measured to exceed the noise standards in Condition 16, except where the exceedance of the L_{Aeq} criteria is no greater than 5 decibels and does not exceed: A. 0630 – 2000: 2 period of up to 2 consecutive weeks in any 2 months, or B. 2000 - 0630: 1 period of up to 2 consecutive nights in any 10 days. (ii) Construction vibration is either predicted or measured to exceed the Category B standard at the receivers in Condition 17. (b) The objective of the Schedule is to set out the Best Practicable Option measures to manage for the management of noise and/or vibration effects of the construction activity beyond those measures set out in the CNVMP. The Schedule shall include details such as: (i) Construction activity location, start and finish dates; (ii) The nearest neighbours to the construction activity; (iii) The predicted noise and/or vibration level for all receivers where the levels are predicted or measured to exceed the applicable standards and predicted duration of the exceedance; (iv) The proposed mitigation options that have been selected, and the options that have been discounted as being impracticable and the reasons why;

No.	Condition
	(v) The consultation undertaken with owners and occupiers of sites subject to the Schedule, and how consultation has and has not been taken into account; and proposed communications with neighbours. (vi) Location, times and types of monitoring; (c) The Schedule shall be submitted to the Manager Council for certification at least 5 working days (except in unforeseen circumstances) in advance of Construction Works that are covered by the scope of the Schedule and shall form part of the CNVMP. (d) Where material changes are made to a Schedule required by this condition, the Requiring Authority shall consult the owners and/or occupiers of sites subject to the Schedule prior to submitting the amended Schedule to the Manager for certification in accordance with (c) above. The amended Schedule shall document the consultation undertaken with those owners and occupiers, and how consultation outcomes have and have not been taken into account.
Accidental Discoveries *Advice Note: The Requiring Authority is advised of the requirements of Rule E11.6.1 of the AUP for "Accidental Discovery" as they relate to both contaminated soils and heritage items.* *The requirements for accidental discoveries of heritage items are set out in Rule E11.6.1 of the AUP [and in the Waka Kotahi Minimum Standard P45 Accidental Archaeological Discovery Specification, or any subsequent version].*	
20.	**Tree Management Plan** (a) Prior to the Start of Construction for a Stage of Work, a Tree Management Plan shall be prepared. (b) The objective of the Tree Management Plan is to avoid, remedy or mitigate effects of construction activities on trees identified as protected or notable in the Auckland Unitary Plan. (c) The Tree Management Plan shall: (i) confirm the trees that will be affected by the project work and are identified as protected or notable in the Auckland Unitary Plan; and (ii) demonstrate how the design and location of project works has avoided, remedied or mitigated any effects on any tree identified in (i) above. This may include: A. planting to replace trees that require removal (with reference to the ULDMP planting design details in Condition 9); B. tree protection zones and tree protection measures such as protective fencing, ground protection and physical protection of roots, trunks and branches; and C. methods for work within the rootzone of trees that are to be retained in line with accepted arboricultural standards. (iii) demonstrate how the tree management measures (outlined in A – C above) are consistent with conditions of any resource consents granted for the project in relation to managing construction effects on trees.
Operational Conditions	
21.	**Low Noise Road Surface** (a) The following condition only applies where an upgrade or extension to an existing road is within or adjacent to urban zoning as identified in the nesting tables within the AUP OP. (b) Asphaltic concrete surfacing (or equivalent low noise road surface) shall be implemented within 12 months of Completion of Construction of the project. (c) Any future resurfacing works of the Project shall be undertaken in accordance with the Auckland Transport Reseal Guidelines, Asset Management and Systems 2013 or any updated version and asphaltic concrete surfacing (or equivalent low noise road surface) shall be implemented where: (i) The volume of traffic exceeds 10,000 vehicles per day; or (ii) The road is subject to high wear and tear (such as cul de sac heads, roundabouts and main road intersections); or (iii) It is in an industrial or commercial area where there is a high concentration of truck traffic; or (iv) It is subject to high usage by pedestrians, such as town centres, hospitals, shopping centres and schools. (d) Prior to commencing any future resurfacing works, the Requiring Authority shall advise the Manager if any of the triggers in Condition 21(c)(i) – (iv) are not met by the road or a section of it and therefore where the application of asphaltic concrete surfacing (or equivalent low noise road surface) is no longer required on the road or a section of it. Such advice shall also indicate when any resealing is to occur.

No.	Condition
22.	**Traffic Noise** For the purposes of Conditions 23 to 35: (a) Building-Modification Mitigation – has the same meaning as in NZS 6806; (b) Design year has the same meaning as in NZS 6806; (c) Detailed Mitigation Options – means the fully detailed design of the Selected Mitigation Options, with all practical issues addressed; (d) Habitable Space – has the same meaning as in NZS 6806; (e) Identified Noise Criteria Category – means the Noise Criteria Category for a PPF identified in *Schedule 2: Identified PPFs Noise Criteria Categories*; (f) Mitigation – has the same meaning as in NZS 6806:2010 Acoustics – Road-traffic noise – New and altered roads; (g) Noise Criteria Categories – means the groups of preference for sound levels established in accordance with NZS 6806 when determining the Best Practicable Option for noise mitigation (i.e. Categories A, B and C); (h) NZS 6806 – means New Zealand Standard NZS 6806:2010 Acoustics – Road-traffic noise – New and altered roads; (i) Protected Premises and Facilities (PPFs) – means only the premises and facilities identified in green, orange or red in *Schedule 2: PPFs Noise Criteria Categories*; (j) Selected Mitigation Options – means the preferred mitigation option resulting from a Best Practicable Option assessment undertaken in accordance with NZS 6806; and (k) Structural Mitigation – has the same meaning as in NZS 6806.
23.	The Noise Criteria Categories identified in Schedule 2: PPFs Noise Criteria Categories at each of the PPFs shall be achieved where practicable and subject to Conditions 23 to 35 (all traffic noise conditions). Achievement of the Noise Criteria Categories for PPFs shall be by reference to a traffic forecast for a high growth scenario in a design year at least 10 years after the programmed opening of the Project.
24.	As part of the detailed design of the Project, a Suitably Qualified Person shall determine the Selected Mitigation Options for the PPFs identified on *Schedule 2: PPFs Noise Criteria Categories.*
25.	Prior to construction of the Project, a Suitably Qualified Person shall develop the Detailed Mitigation Options for the PPFs identified in *Schedule 2: PPFs Noise Criteria Categories*, taking into account the Selected Mitigation Options.
26.	If the Detailed Mitigation Options would result in the Identified Noise Criteria Category changing to a less stringent Category, e.g. from Category A to B or Category B to C, at any relevant PPF, a Suitably Qualified Person shall provide confirmation to the Manager that the Detailed Mitigation Option would be consistent with adopting the Best Practicable Option in accordance with NZS 6806 prior to implementation.
27.	The Detailed Mitigation Options shall be implemented prior to completion of construction of the Project, with the exception of any low-noise road surfaces, which shall be implemented within twelve months of completion of construction.
28.	Prior to the Start of Construction, a Suitably Qualified Person shall identify those PPFs which, following implementation of all the Detailed Mitigation Options, will not be Noise Criteria Categories A or B and where Building-Modification Mitigation might be required to achieve 40 dB $L_{Aeq(24h)}$ inside Habitable Spaces ('Category C Buildings').
29.	Prior to the Start of Construction in the vicinity of each Category C Building, the Requiring Authority shall write to the owner of the Category C Building requesting entry to assess the noise reduction performance of the existing building envelope. If the building owner agrees to entry within three months of the date of the Requiring Authority's letter, the Requiring Authority shall instruct a Suitably Qualified Person to visit the building and assess the noise reduction performance of the existing building envelope.

No.	Condition
30.	For each Category C Building identified, the Requiring Authority is deemed to have complied with Condition 29 above if: (a) The Requiring Authority's Suitably Qualified Person has visited the building and assessed the noise reduction performance of the building envelope; or (b) The building owner agreed to entry, but the Requiring Authority could not gain entry for some reason (such as entry denied by a tenant); or (c) The building owner did not agree to entry within three of the date of the Requiring Authority's letter sent in accordance with Condition 29 above (including where the owner did not respond within that period); or (d) The building owner cannot, after reasonable enquiry, be found prior to completion of construction of the Project. If any of (b) to (d) above apply to a Category C Building, the Requiring Authority is not required to implement Building-Modification Mitigation to that building.
31.	Subject to Condition 30 above, within six months of the assessment undertaken in accordance with Conditions 29 and 30, the Requiring Authority shall write to the owner of each Category C Building advising: (a) If Building-Modification Mitigation is required to achieve 40 dB LAeq(24h) inside habitable spaces; and (b) The options available for Building-Modification Mitigation to the building, if required; and (c) That the owner has three months to decide whether to accept Building-Modification Mitigation to the building and to advise which option for Building-Modification Mitigation the owner prefers, if the Requiring Authority has advised that more than one option is available.
32.	Once an agreement on Building-Modification Mitigation is reached between the Requiring Authority and the owner of a Category C Building, the mitigation shall be implemented, including any third party authorisations required, in a reasonable and practical timeframe agreed between the Requiring Authority and the owner.
33.	Subject to Condition 29, where Building-Modification Mitigation is required, the Requiring Authority is deemed to have complied with Condition 31 if: (a) The Requiring Authority has completed Building Modification Mitigation to the building; or (b) An alternative agreement for mitigation is reached between the Requiring Authority and the building owner; or (c) The building owner did not accept the Requiring Authority's offer to implement Building-Modification Mitigation within three months of the date of the Requiring Authority's letter sent in accordance with Condition 31 (including where the owner did not respond within that period); or (d) The building owner cannot, after reasonable enquiry, be found prior to completion of construction of the Project.
34.	The Detailed Mitigation Options shall be maintained so they retain their noise reduction performance as far as practicable
35.	The Noise Criteria Categories at the PPFs identified in *Schedule 2: Identified PPFs Noise Criteria Categories* do not need to be complied with where: (a) the PPF no longer exists; or agreement of the landowner has been obtained confirming that the Noise Criteria Category level does not need to be met.

Schedule 1: General Accordance Plans and Information

Project Description

The proposed work is the construction, operation, and maintenance of a transport corridor on Trig Road in Whenuapai between State Highway 18 and Hobsonville Road, including active transport facilities and associated infrastructure. The proposed work is shown in the following Concept Plan and includes:

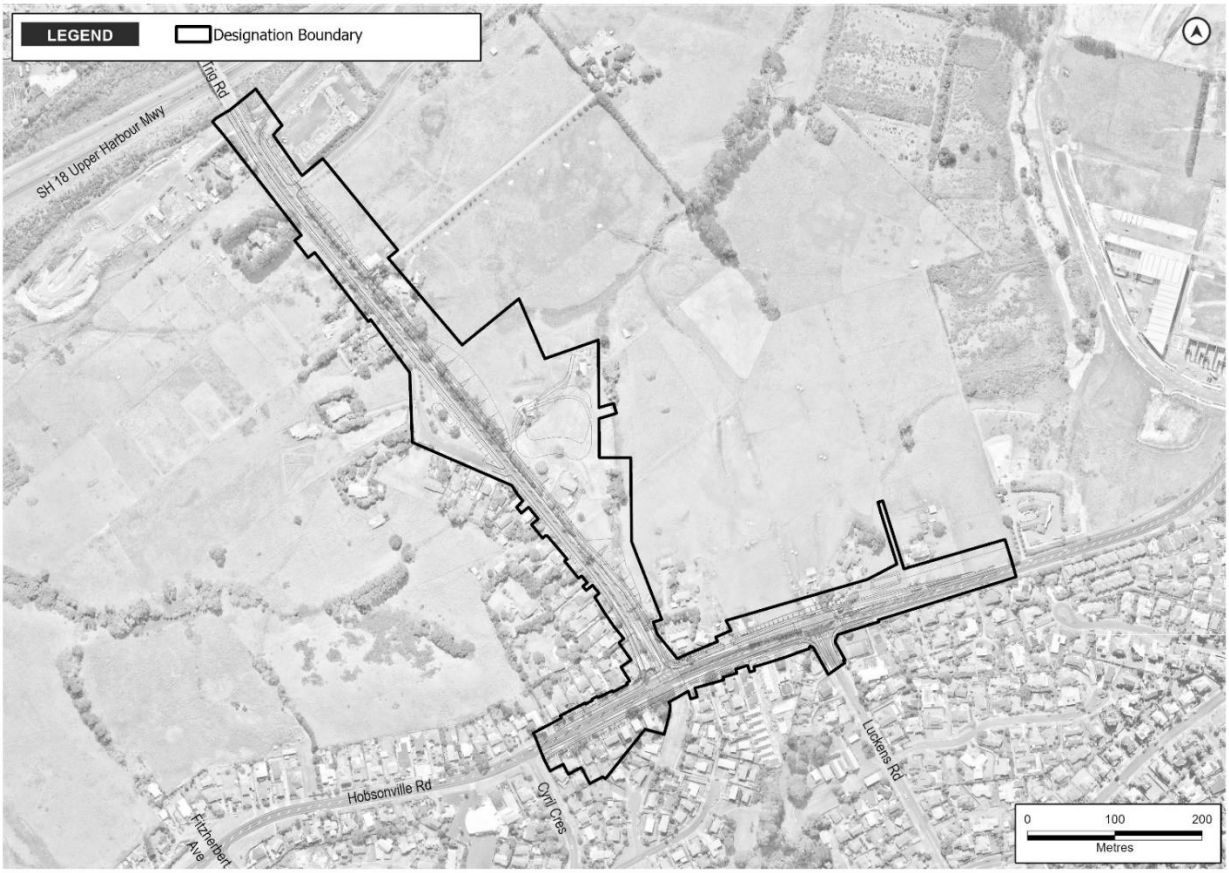
(a) An upgraded and new transport corridor, including public transport and active transport facilities;

(b) Associated works including intersections, bridges, embankments, retaining, culverts, stormwater management systems;

(c) Changes to local roads, where the proposed work intersects with local roads; and

(d) Construction activities, including vegetation removal, construction compounds, laydown areas, bridge works area, construction traffic management and the re-grade of driveways.

NOR Concept Plan



Schedule 2: Identified PPFs Noise Criteria Categories

Address	New or Altered Road	Noise Criteria Category
72 Hobsonville Road	Altered	Category C
26 Trig Road	Altered	Category C
64 Hobsonville Road	Altered	Category C
66 Hobsonville Road	Altered	Category C
40 Trig Road	Altered	Category C
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category B
16 Trig Road	Altered	Category B
97 Hobsonville Road	Altered	Category B
6 Trig Road	Altered	Category B
22 Trig Road	Altered	Category B
62 Hobsonville Road	Altered	Category B
18, 2 Luckens Road	Altered	Category B
72B Hobsonville Road	Altered	Category B
16 Luckens Road	Altered	Category B
8 Trig Road	Altered	Category A
12 Trig Road	Altered	Category A
60 Hobsonville Road	Altered	Category A
119 Hobsonville Road	Altered	Category A
10 Luckens Road	Altered	Category A
1B Luckens Road	Altered	Category A
28 Trig Road	Altered	Category A
70 Hobsonville Road	Altered	Category A
24 Belleaire Court	Altered	Category A
30 Trig Road	Altered	Category A
7 Trig Road	Altered	Category A
75 Hobsonville Road	Altered	Category A
32 Trig Road	Altered	Category A
56 Hobsonville Road	Altered	Category A
76 Hobsonville Road	Altered	Category A
1/111, 2/111 Hobsonville Road	Altered	Category A
133 Hobsonville Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
72A Hobsonville Road	Altered	Category A
8 Luckens Road	Altered	Category A
52 Hobsonville Road	Altered	Category A
127 Hobsonville Road	Altered	Category A
5 Luckens Road	Altered	Category A
34 Trig Road	Altered	Category A
50 Hobsonville Road	Altered	Category A

46 Trig Road	Altered	Category A
54 Hobsonville Road	Altered	Category A
26 Belleaire Court	Altered	Category A
48 Hobsonville Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
107 Hobsonville Road	Altered	Category A
79A Hobsonville Road	Altered	Category A
68 Hobsonville Road	Altered	Category A
58 Hobsonville Road	Altered	Category A
19 Luckens Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
80 Hobsonville Road	Altered	Category A
5 Louise Place	Altered	Category A
22A Trig Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
2/12, 1/12 Mona Vale	Altered	Category A
34A Trig Road	Altered	Category A
8A, 10, 8 Louise Place	Altered	Category A
8A, 10, 8 Louise Place	Altered	Category A
3A Louise Place	Altered	Category A
18 Trig Road	Altered	Category A
6 Louise Place	Altered	Category A
10 Mona Vale	Altered	Category A
78 Hobsonville Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
33 Cyril Crescent	Altered	Category A
70A Hobsonville Road	Altered	Category A
97 Hobsonville Road	Altered	Category A
10 Trig Road	Altered	Category A
22 Cyril Crescent	Altered	Category A
99 Hobsonville Road	Altered	Category A
147F Hobsonville Road	Altered	Category A
29 Cyril Crescent	Altered	Category A
8A, 10, 8 Louise Place	Altered	Category A
1A Luckens Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
3A Louise Place	Altered	Category A
131 Hobsonville Road	Altered	Category A
31 Cyril Crescent	Altered	Category A
145A Hobsonville Road	Altered	Category A

8 Bernleigh Terrace	Altered	Category A
4 Louise Place	Altered	Category A
127A Hobsonville Road	Altered	Category A
14 Luckens Road	Altered	Category A
121 Hobsonville Road	Altered	Category A
145B Hobsonville Road	Altered	Category A
2/95, 1/95, 95 Hobsonville Road	Altered	Category A
12 Luckens Road	Altered	Category A
123 Hobsonville Road	Altered	Category A
20 Belleaire Court	Altered	Category A
20A Belleaire Court	Altered	Category A
3A Luckens Road	Altered	Category A
3B Luckens Road	Altered	Category A
133A Hobsonville Road	Altered	Category A
131A Hobsonville Road	Altered	Category A
129 Hobsonville Road	Altered	Category A
129C Hobsonville Road	Altered	Category A
129B Hobsonville Road	Altered	Category A
22 Belleaire Court	Altered	Category A
121B Hobsonville Road	Altered	Category A
18 Belleaire Court	Altered	Category A
4 Bernleigh Terrace	Altered	Category A
133A Hobsonville Road	Altered	Category A
2/95, 1/95, 95 Hobsonville Road	Altered	Category A
121A Hobsonville Road	Altered	Category A
123A Hobsonville Road	Altered	Category A
123B Hobsonville Road	Altered	Category A
19 Belleaire Court	Altered	Category A

PPF Location Plans


Ryans Rd
Trig Rd
34A Trig Road
34 Trig Road
32 Trig Road
30 Trig Road
28 Trig Road
26 Trig Road
22 Trig Road
22A Trig Road
16 Trig Road
18 Trig Road
12 Trig Road
8 Trig Road
6 Trig Road
10 Trig Road
76 Hobsonville Road
70A Hobsonville Road
72A Hobsonville Road
Legend
NZS 6806 Assessment Area
Protected Premises and Facilities
This map contains data derived in part or wholly from sources other than those party to the Supporting Growth Alliance, and therefore, no representations or warranties are made by those party to the Supporting Growth Alliance as to the accuracy or completeness of this information.
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Legend information can be viewed on Auckland Council unitary plan viewer.
Linework shown on this plan is conceptual only.
Not to be used for construction.


Legend
NZS 6806 Assessment Area
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8 Trig Road
6 Trig Road
10 Trig Road
72B Hobsonville Road
72A Hobsonville Road
70A Hobsonville Road
70 Hobsonville Road
68 Hobsonville Road
66 Hobsonville Road
62 Hobsonville Road
60 Hobsonville Road
58 Hobsonville Road
56 Hobsonville Road
54 Hobsonville Road
52 Hobsonville Road
50 Hobsonville Road
48 Hobsonville Road
75 Hobsonville Road
79A Hobsonville Road
Trig Rd
Hobsonville Rd
Cyril Cres
Louise Pl
Mona Vale
5 Louise Place
8A, 10, 8 Louise Place
6 Louise Place
4 Louise Place
3A Louise Place
10 Mona Vale
2/12, 1/12 Mona Vale
33 Cyril Crescent
31 Cyril Crescent
29 Cyril Crescent
22 Cyril Crescent
97 Hobsonville Road
93 Hobsonville Road
95 Hobsonville Road
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road
2/95, 1/95, 95 Hobsonville Road
Esri Community Maps Contributors, HERE, Garmin, FAO, NOAA, USGS


Hobsonville Rd
Trig Rd
Luckens Rd
Bernleigh Ter
76 Hobsonville Road
78 Hobsonville Road
80 Hobsonville Road
72B Hobsonville Road
107 Hobsonville Road
97 Hobsonville Road
95 Hobsonville Road
119 Hobsonville Road
121 Hobsonville Road
123 Hobsonville Road
127 Hobsonville Road
127A Hobsonville Road
123A Hobsonville Road
129 Hobsonville Road
129C Hobsonville Road
121A Hobsonville Road
123B Hobsonville Road
129B Hobsonville Road
8 Luckens Road
12 Luckens Road
10 Luckens Road
14 Luckens Road
16 Luckens Road
18, 2 Luckens Road
19 Luckens Road
1A Luckens Road
1B Luckens Road
3A Luckens Road
3B Luckens Road
5 Luckens Road
8 Bernleigh Terrace
4 Bernleigh Terrace
Mona Vale Place
Legend
NZS 6806 Assessment Area
Protected Premises and Facilities


Legend
NZS 6806 Assessment Area
Protected Premises and Facilities
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Hobsonville Rd
80 Hobsonville Road
78 Hobsonville Road
133 Hobsonville Road
127 Hobsonville Road
119 Hobsonville Road
121 Hobsonville Road
123 Hobsonville Road
123A Hobsonville Road
129 Hobsonville Road
129C Hobsonville Road
129B Hobsonville Road
131 Hobsonville Road
131A Hobsonville Road
133A Hobsonville Road
127A Hobsonville Road
121A Hobsonville Road
121B Hobsonville Road
123B Hobsonville Road
147F Hobsonville Road
145A Hobsonville Road
145B Hobsonville Road
24 Belleaire Court
26 Belleaire Court
22 Belleaire Court
20A Belleaire Court
20 Belleaire Court
18 Belleaire Court
19 Belleaire Court
Belleaire Ct
8 Luckens Road
12 Luckens Road
10 Luckens Road
8 Bernleigh Terrace

ATTACHMENT 04

TRIG ROAD CORRIDOR UPGRADE
ASSESSMENT OF EFFECTS
ON THE ENVIRONMENT

Supporting Growth

North West

Assessment of Effects on the Environment – Trig Road Corridor Upgrade

Volume 2

December 2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Document Status

Version No.	Responsibility	Name
2020 Draft	Author	Matthew Kerr Ridge Nicolai Berry
	Reviewer	Bryce Julyan Diana Bell Jill Gregory Andrew Beatson
1.0	Author	Bridget O'Leary
	Reviewer	Andrew Beatson
	Approver	Tracey Grant

Revision Status

Version	Date	Reason for Issue
1.0	December 2022	Final

The Assessment of Effects on the Environment report and supporting documents are structured as set out in the table below:

Volume	Title	Contents
1	Form 18	• Attachment A: Designation plans • Attachment B: Schedule of Directly Affected Property • Attachment C: Proposed NoR Conditions
2	AEE (this report)	• Appendix A: Assessment of Alternatives Report • Appendix B: Statutory Assessment • Appendix C: Rules Assessment • Appendix D: Matters of discretion and assessment criteria • Appendix E: Proposed NoR Conditions • Appendix F: Proposed Regional Consent Conditions
3	Design and Designation Boundaries	Designation and Indicative Design Drawings
4	Supporting Technical Reports	• Appendix A: Assessment of Transport Effects • Appencix B: Assessment of Construction Noise and Vibration • Appendix C: Assessment of Traffic Noise and Vibration • Appendix D: Assessment of Historic Heritage Effects • Appendix E: Assessment of Landscape and Visual Effects • Appendix F: Assessment of Ecological Effects • Appendix G: Assessment of Stormwater Effects • Appendix H: Draft Erosion and Sediment Control Plan • Appendix I: Preliminary Site Investigation • Appendix J: Geotechnical Reports (Factual and Interpretive)

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Appendix B. Statutory Assessment

Appendix C. Rules Assessment

Appendix D. Matters of Discretion and Assessment Criteria

Appendix E. Proposed NoR Conditions

Appendix F. Proposed Regional Consent Conditions

Acronyms

Acronym/Term	Description
AC DBC	Auckland Council Housing Infrastructure Fund Detailed Business Case
ACNV	Assessment of Construction Noise and Vibration
ADR	AUP:OIP Accidental Discovery Protocol
AEP	Annual Exceedance Probability (Stormwater)
AEcE	Assessment of Ecological Effects
AEE	Assessment of Effects on the Environment (this report)
AHHE	Assessment of Historic Heritage Effects
ALVE	Assessment of Landscape and Visual Effects
ATNV	Assessment of Traffic Noise and Vibration
ASE	Assessment of Stormwater Effects
AT	Auckland Transport
ATAP	Auckland Transport Alignment Project
ATE	Assessment of Transport Effects
AUP:OIP	Auckland Unitary Plan Operative in Part 2016
BPO	Best Practicable Option (Noise and Vibration)
CEMP	Construction Environmental Management Plan
CIA	Cultural Impact Assessment
CNVMP	Construction Noise and Vibration Management Plan
CNVMS	Construction Noise and Vibration Management Schedule
CTMP	Construction Traffic Management Plan
DBC	Detailed Business Case
dB LA_{eq}	Decibels equivalent continuous sound level (Noise and Vibration)
DSI	Detailed Site Investigation (Contaminated Land)
ESCP	Erosion and Sediment Control Plan
FULSS	Future Urban Land Supply Strategy (2017)
FUZ	Future Urban Zone
GD01	GD01: Stormwater Management Devices Guide
HAIL	Hazardous Industries and Activities List
HGMPA	The Hauraki Gulf Marine Park Act 2000
HIF	Housing Infrastructure Fund
HNZPTA	Heritage New Zealand Pouhere Taonga Act 2014
IBC	Indicative Business Case
LGA	Local Government (Auckland Council) Act 2009
MCA	Multi Criteria Analysis

MHU	Residential – Mixed Housing Urban Zone
NES: Soil	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
NES: FW	Resource Management (National Environmental Standards for Freshwater) Regulations 2020
NoR	Notice of Requirement
NPS	National Policy Statement
NPS: FM	National Policy Statement for Freshwater 2020
NZS 6806	New Zealand Standard 6806:2010 'Acoustics – Road-traffic noise – New and altered roads
PBC	Programme Business Case
PPC5	Proposed Plan Change 5
PPF	Protected Premises and Facilities (Noise & Vibration)
PSI	Preliminary Site Investigation (Contaminated Land)
RMA	Resource Management Act 1991
RPS	Regional Policy Statement
SG DBC	Supporting Growth North West Housing Infrastructure Fund Detailed Business Case 2019
SH16	State Highway 16
SH18	State Highway 18
TDM	Transport Design Manual
THAB	Residential – Terrace Housing and Apartment Zone
The Council	Auckland Council
The Design Framework	Te Tupu Ngātahi Design Framework
The Programme	The Supporting Growth Programme
Waka Kotahi	Waka Kotahi NZ Transport Agency

1 Introduction

This Assessment of Effects on the Environment (**AEE**) has been prepared for the Trig Road Corridor Upgrade Project (**the Project**), and includes a Notice of Requirement (**NoR**) and resource consent applications sought by Auckland Transport (**AT**) as the requiring authority and applicant under the Resource Management Act 1991 (**RMA**).

The Project forms part of the Supporting Growth Programme (**the Programme**) to enable the future construction, operation and maintenance of transport infrastructure in the North West area of Auckland. The Project consists of an upgrade of Trig Road, Whenuapai, to form an urban arterial corridor to support the anticipated urban development in Whenuapai. To achieve a logical transport connection into the existing urban network it also includes the upgrade of approximately 500 metres of Hobsonville Road at the southern extent of the Project area. This includes signalisation of the existing intersections of Hobsonville Road with Trig Road and Luckens Road. Figure 1 provides an illustration of the Project context and extent.

The purpose of the proposed designation is for the “Construction, operation and maintenance of a transport corridor”.

A lapse period of 15 years is proposed in respect to the NoR, with appropriate conditions to enable the proposed work and to manage potential adverse effects on the environment (provided in Appendix E).

Resource consents are also being sought under the Auckland Unitary Plan Operative in Part 2016 (**AUP:OIP**), the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (**NES: Soil**) and the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (**NES:FW**) to enable those activities required for the construction, operation and maintenance of the Project which are not otherwise enabled by the proposed designation. The applications for resource consent are made pursuant to sections 9, 13, 14, and 15 of the RMA. Overall, the activity status of the resource consents being sought is **discretionary**. A detailed list of the reasons for consent is provided in Section 4.4 and a full description of the permitted activities which form part of the proposal is provided in Appendix C, in accordance with Clause 3(a) of Schedule 4 of the RMA.

A lapse period of 15 years is proposed in respect of the resource consents, with appropriate conditions to enable the proposed work and to manage potential adverse effects on the environment (provided in Appendix F).

This AEE has been prepared in accordance with section 168A and Schedule 4 of the RMA in such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

Figure 1: The Project context and extent

1.1 Supporting Growth Programme

The Programme is a collaboration between AT and the Waka Kotahi NZ Transport Agency (**Waka Kotahi**) to plan and identify the required transport network to support Auckland's future urban growth areas over the next 30 years.

AT and Waka Kotahi have worked in close alignment with Auckland Council (the **Council**), Manawhenua and KiwiRail Holdings Limited and are working closely with stakeholders and the community to develop the strategic transport network to support Auckland's growth areas.

The key objective of the Programme is to identify and protect land for future implementation of the required strategic transport corridors / infrastructure.

The Programme has identified the North West Preferred Transport Network in the North West Growth Area (Figure 2) which includes the Project.

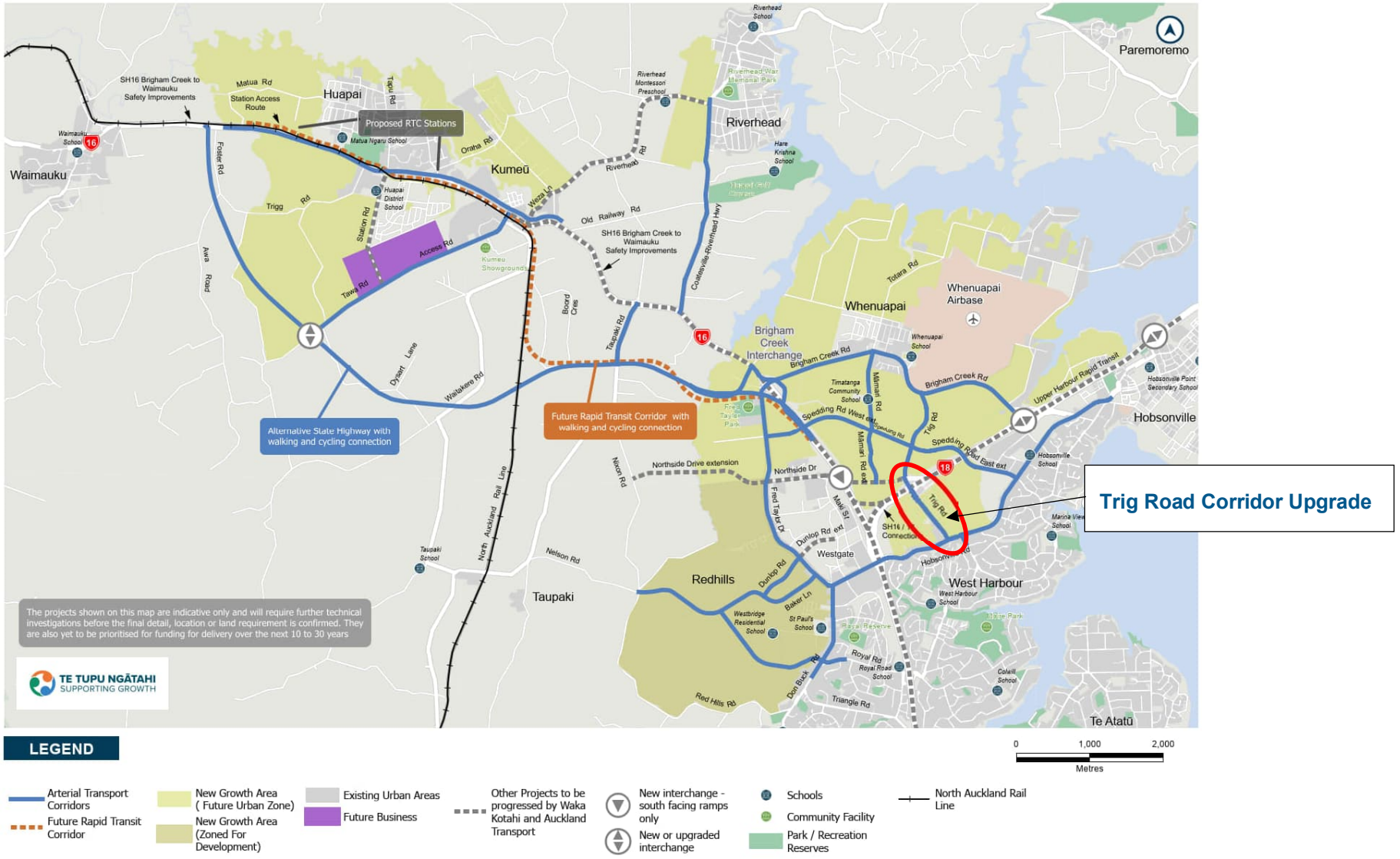


Figure 2: North West Preferred Transport Network – North West Growth Area

1.2 Housing Infrastructure Fund

The Housing Infrastructure Fund (**HIF**) was established by the Crown in 2016 to help address the funding constraints of high-growth councils, with the purpose of providing Crown loans to fund bulk infrastructure (water and transport) which enables housing development. The Council made an application for funds from the HIF to accelerate the development of houses in greenfield areas identified in the Future Urban Land Supply Strategy 2017 (**FULSS**). In July 2017 the Crown announced its recommendation (in principle) to provide a $300 million loan through the HIF for bulk infrastructure in North West Auckland, estimated at the time to support the early construction of at least 10,500 new homes in North West Auckland.

Between 2017 and 2019, two business cases were developed to determine how the HIF could be used for the delivery of bulk infrastructure to support housing development in the North West, including the Project.

Firstly, the *Auckland Council Housing Infrastructure Fund Detailed Business Case 2018* (**AC DBC**) considered the extent to which the HIF could be used to fund investment in all infrastructure required to support accelerated development. The AC DBC concluded that as Whenuapai was identified in the FULSS for Decade 1 housing development and was subject to a plan change to rezone the area for urban land uses (refer to Section 5.2.2 for further detail), the upgrade of Trig Road between SH18 and Hobsonville Road would be a key transport project to support housing development to occur in this area. As such the AC DBC recommended HIF funding for the construction of the Project.

The *Supporting Growth North West Housing Infrastructure Fund Detailed Business Case 2019* (**SG DBC**) further developed the transport network identified in the AC DBC resulting in identification of the Project.

As the HIF funding provides for construction, the necessary resource consents to enable construction are sought in conjunction with the NoR.

2 Background and Context

2.1 Need for the Supporting Growth Programme

Auckland is New Zealand's largest city, home to approximately 1.65 million people. In 2017, Auckland attracted 36,800 new residents; more than the rest of the country combined. The Auckland Plan 2050 – Development Strategy signals that Auckland could grow by 720,000 people to reach 2.4 million over the next 30 years. This will generate demand for more than 400,000 additional homes and require land for 270,000 more jobs [1]. Most of this growth will go into existing urban areas. However, around a third will go into future urban zoned (**FUZ**) areas (greenfields) as identified in the AUP:OIP.

In July 2017, the FULSS was updated in line with AUP:OIP zonings, with 15,000 hectares of land allocated for future urbanisation. The FULSS provides for sequenced and accelerated greenfield growth in ten areas of Auckland.

The significant growth anticipated will pose a number of future transport challenges for the region. Given the scale and duration of the growth proposed, the early route protection of critical transport corridors provides the required certainty for AT, Waka Kotahi, stakeholders and the community. The implementation of the strategic transport network required to support the growth will be staged over the next 30 years. A key part of this integrated approach is collaborating with the Council as it develops Structure Plans and works towards progressing subsequent plan changes to rezone land in the future urban areas.

The required transport networks will play a vital role in the success of new neighbourhoods by providing safe, accessible and sustainable travel choices that connect communities and encourage a transformational shift from private vehicles to public transport, walking and cycling. The early protection of these strategic transport corridors will provide for the following outcomes at a Programme-wide level:

Supporting and enabling growth: Protecting improved and new transport corridors will support Council's growth aspirations for the growth areas of Auckland, including intensification or density of growth, resulting in more efficient urban land development.

Improved access to economic and social opportunities and resilience of the strategic transport network: Protecting improved and new transport corridors will improve travel choices and access to the critical economic and social needs of the existing and future communities, reduce an over-reliance on existing strategic transport corridors, and better align the form and function of existing transport corridors with the planned urban form. Key to this is achieving a transformational mode shift from private vehicles to public transport, walking and cycling – which will provide for greater people moving capacity and greater travel choice for all people as the city grows.

Land use and transport integration: Integrating transport solutions with Council's aspirations for land use and urban form can provide for growth in a way that delivers high quality urban outcomes,

[1] Draft Auckland Plan 2050 Development Strategy: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/auckland-plan/development-strategy/future-auckland/Pages/what-auckland-look-like-future.aspx

placemaking and enhanced liveability – including the desire for a quality, connected urban environment

Improved safety: Protecting improved and new transport corridors will help to address existing and increasing safety risks on transport corridors as growth areas urbanise, including:

- improved safety for all transport modes;
- provision of dedicated space for cyclists and pedestrians to safely accommodate these modes;
- specific safety improvement projects, such as improvements to existing road and rail corridors; and
- a reduction in private vehicle travel as a result of mode shift towards public transport and walking and cycling.

Sustainable outcomes: Protecting improved and new transport corridors will support the Government's policy shift towards more sustainable outcomes. This includes a reduction in greenhouse gas emissions and improved climate change resilience – through effective land use and transport integration and supporting mode shift towards more sustainable travel choices such as public transport and walking and cycling.

Infrastructure integration: Integrating the transport response with the needs and opportunities of network utility providers to provide a better whole of system outcome.

2.2 Reasons for the Project

Two key transport problems were identified in the AC DBC and SG DBC when considering housing development and the provision of infrastructure in the Whenuapai area:

Problem 1: Uncertainty in the provision of infrastructure coupled with fragmented land ownership in North West Auckland creates risk aversion and leads to delays in the delivery of houses.

Problem 2: Lack of an appropriate, integrated multi-modal transport system for Whenuapai is limiting travel choice, quality community outcomes and efficient access to jobs, education, and core services for our customers.

Derived from these problems, the following more specific issues have been identified for the Project area:

Whenuapai is within close proximity of the existing strategic transport network (State Highway (SH18) and Hobsonville Road), but Trig Road currently provides limited ability to enable the connection of surrounding growth areas to the strategic network.

Trig Road is currently a rural road corridor with limited pedestrian, cycling or public transport facilities.

The current mode share for private vehicles is at least 85%, highlighting a lack of viable alternatives.

The forecast vehicle trip demand is projected to at least double for the North West by 2048, which will significantly increase existing congestion on key linkages if action is not taken.

As noted in Section 1.2 and further discussed in Section 5.2.2, the Project is needed to support future housing development in Whenuapai, as this area of Future Urban zoned land is expected to be

subject to private development initiatives in the near future. The purpose of the Project is to provide an urban standard transport corridor that will support urbanisation of the surrounding land.

It is critical that the Project and wider transport network supports and shapes the growth proposed. If the Project corridor is not protected and constructed in the near future this may result in a combination of more expensive acquisition costs, a lack of certainty around public infrastructure investment, and a loss in ability to influence good urban form.

To assist with assessing the relative strengths or weaknesses of alternate corridor options for the Project, investment objectives were developed as part of the AC DBC and further refined in the SG DBC. The investment objectives are an important tool for informing decisions on funding which were developed from the key transport problems identified above.

The RMA Project Objectives for the Project were then developed from the investment objectives once the required route was confirmed. The diagram below (Figure 3) shows how the investment objectives have evolved through the business case options assessment process into the current Project Objectives.

2.3 Project timeframes

Investigation and reporting of this Project commenced in 2015 as part of Supporting Growth Programme Business Case 2016 (**PBC**). This was progressed through to 2020 when the NoR was first prepared. Due to funding constraints, the Project was placed on hold, until 2022 when work recommenced.

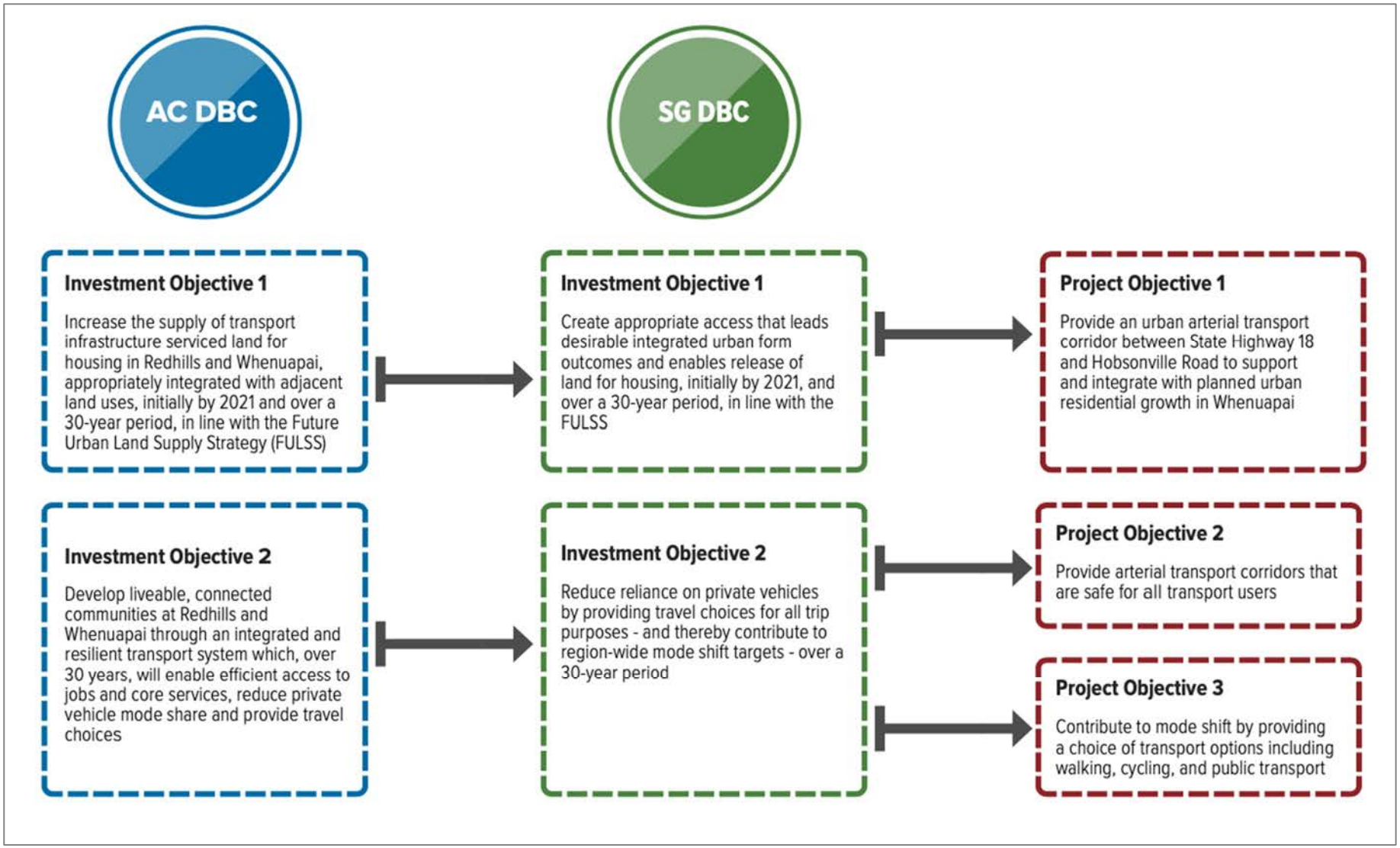


Figure 3: Development Process for Project Objectives

3 The Trig Road Project

The Project provides for the widening and upgrade of the existing Trig Road transport corridor from a 20m wide, two-lane rural road to a 24m wide, two-lane arterial standard transport corridor between the SH18 off-ramps and Hobsonville Road. The widening of the transport corridor will provide for an urban standard arterial which includes walking, cycling and public transport provisions. The Project includes signalisation of the intersections at Trig Road/Hobsonville Road and Luckens Road/Hobsonville Road and a similar upgrade of Hobsonville Road between these intersections. The Project will also include changes to the SH18 bridge layout to accommodate walking and cycling facility upgrades and tie in works within the existing road reserve north of SH18.

An overview of the upgrades along the corridor is provided in Volume 3, with indicative cross-sections of the Project shown in Figure 4, Figure 5 and Figure 6. The full set of indicative design drawings for the Project are provided in Volume 3.

The information provided throughout this report and accompanying documentation (including design drawings), describes the indicative alignment of the proposed Trig Road corridor and other ancillary permanent works. Any numbers, areas or dimensions outlined in this section are approximate and may change as a result of detailed design. The final alignment for the Project (including the design and location of ancillary components, such as stormwater treatment devices and soil disposal sites), will be refined and confirmed at the detailed design stage.

Figure 4: Trig Road Corridor Upgrade

3.1 Road Layout

3.1.1 Trig Road (South of SH18)

The Project will provide for the widening and upgrading of a 900m length of the existing Trig Road corridor to an urban arterial road standard. This involves widening its general width from the existing 20m to a corridor cross-section of 24m wide. This road widening is proposed to be undertaken to the east to minimise impacts on the existing residential properties on the west side of Trig Road.

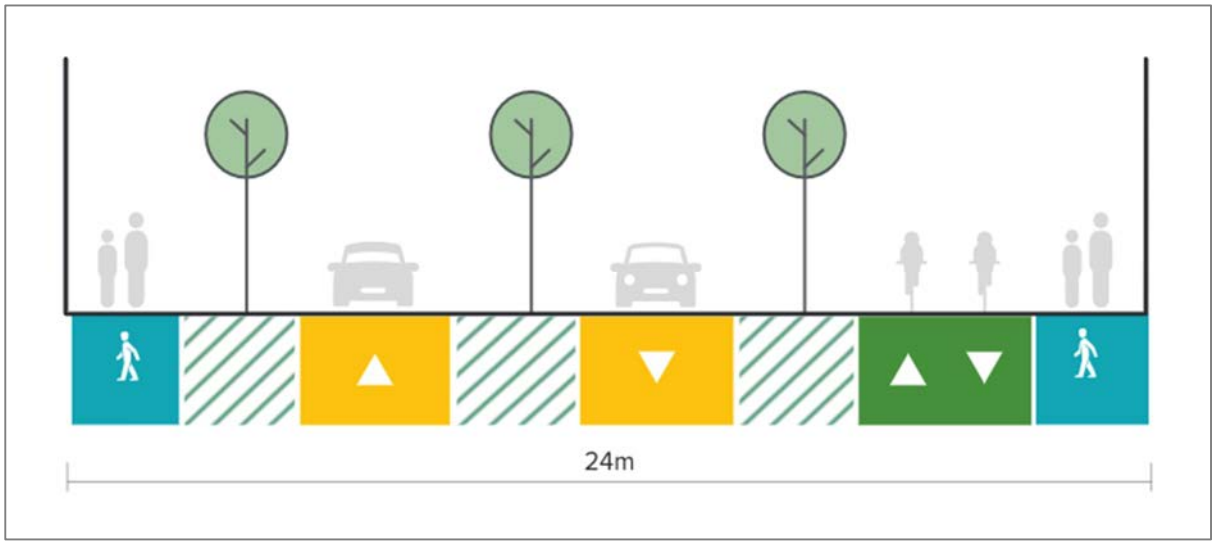


Figure 4: Trig Road Corridor Upgrade Indicative Typical Cross-section

The corridor will be in the form of a two-lane carriageway suitable for all traffic movements including freight on an arterial road. The proposed speed environment will be 50kph throughout, with no on-street parking and the inclusion of a flush or solid median. A 4m wide, dedicated, bi-directional cycleway is indicatively proposed on the eastern side of the Trig Road corridor as well as 1.8m wide footpaths on either side of the corridor.

Changes to the geometry of the Trig Road corridor include:

The southern end of Trig Road will be straightened slightly at the intersection with Hobsonville Road to improve the intersection geometry.

The vertical alignment will follow the existing steep alignment (8% for 150m) with only minor changes to smooth out irregularities in the existing road.

The existing minor Ryans Road cul-de-sac located on the west side of the road will remain, with a slightly realigned connection to Trig Road.

Trig Road currently facilitates access to approximately 25 private properties largely concentrated on the south-western portion of the road. As Trig Road will provide an important arterial connection it is assumed that the corridor will be classified as a 'Limited Access Road' under section 346C of the Local Government Act 1974. Consequently, while current existing accesses will be maintained, intensification of access will generally be discouraged as the area urbanises, with future collector roads required to provide access to developed land.

3.1.2 Trig Road (North of SH18)

The Project involves minor upgrades of Trig Road north of SH18 (including the SH18 bridge). Widening of Trig Road will finish at the southern side of the motorway bridge over SH18, with only non-structural footpath and cycle path improvements proposed on the north side of the bridge to safely tie in the new facilities to the existing environment.

The SH18 eastbound on-ramp and westbound off-ramps are located on the eastern side of Trig Road. The Project provides for an indicative bi-directional cycleway within the SH18 bridge corridor along the western side of the existing Trig Road bridge, and a crossing point from the otherwise eastern side cycleway along the remainder of Trig Road. The facilities on the bridge will be provided through the reallocation of space on the existing bridge, and indicatively result in the cross-section shown below in Figure 5. This space is sufficient to allow for reallocation for uni-directional cycling facilities if required.

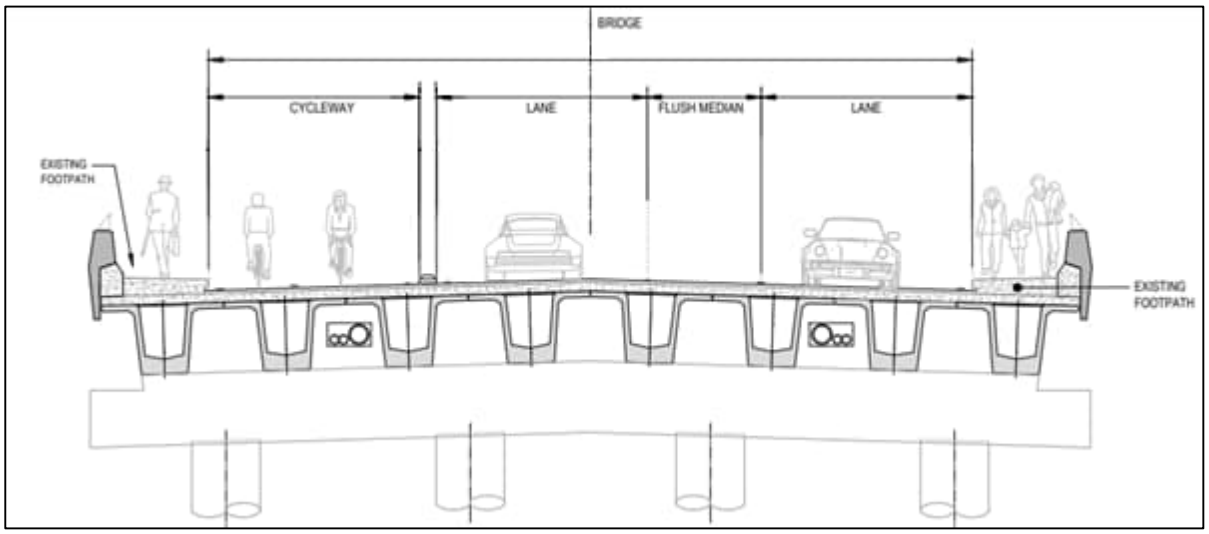


Figure 5: Indicative Proposed Cross-section on Trig Road Bridge

North of the SH18 bridge, the Project will provide for the continuation and tie-in of the new cycleway into the existing road layout. All permanent works will be located within the existing road reserve.

3.1.3 Hobsonville Road

The Project provides for the upgrade of Hobsonville Road along a 450m length generally between Cyril Crescent and Luckens Road. As Hobsonville Road is currently a mix of both two-lane and four-lane sections, localised widening will be required. The existing Hobsonville Road follows a ridgeline and within the Project area has existing housing on both sides, so widening will result in permanent property acquisition, earthworks and driveway modifications. While the widened corridor will require less land on the southern side of the road, due to the steeper terrain of these properties it may require substantial driveway regrading and modifications to maintain vehicle access to these properties.

The Hobsonville Road widening will provide a four-lane corridor which is generally 25m in width and includes 2m wide separated cycle paths and 1.8m wide footpaths on both sides of the corridor.

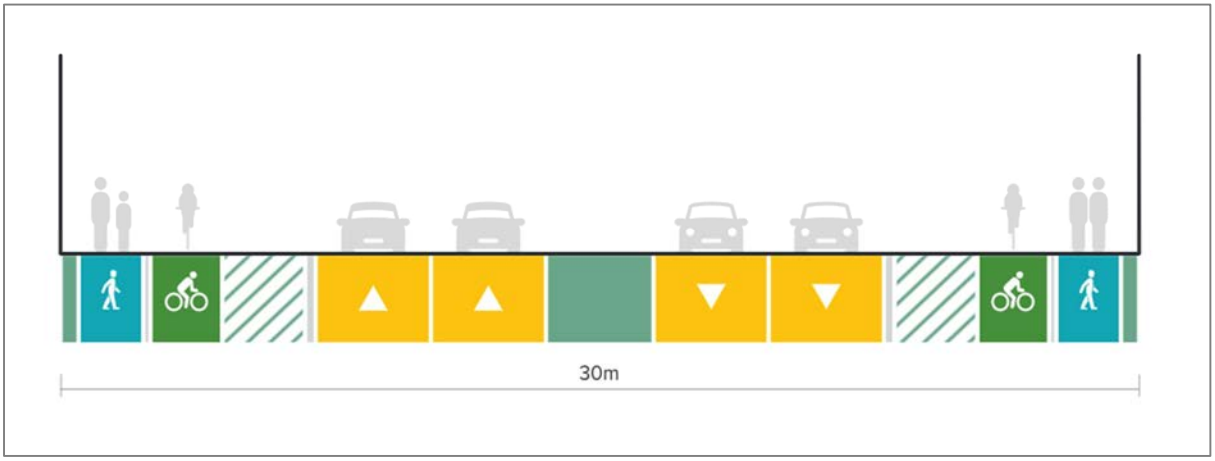


Figure 6: Hobsonville Road Arterial Upgrade Indicative Typical Cross-section

3.1.3.1 Intersection Layout

As the Trig Road/Hobsonville Road intersection and Luckens Road/Hobsonville intersection are located in close proximity to each other (approximately 150m), the configurations of these intersections are closely inter-related. As such, two staggered signalised T-intersections are proposed at Trig Road and Luckens Road intersections (Figure 8).

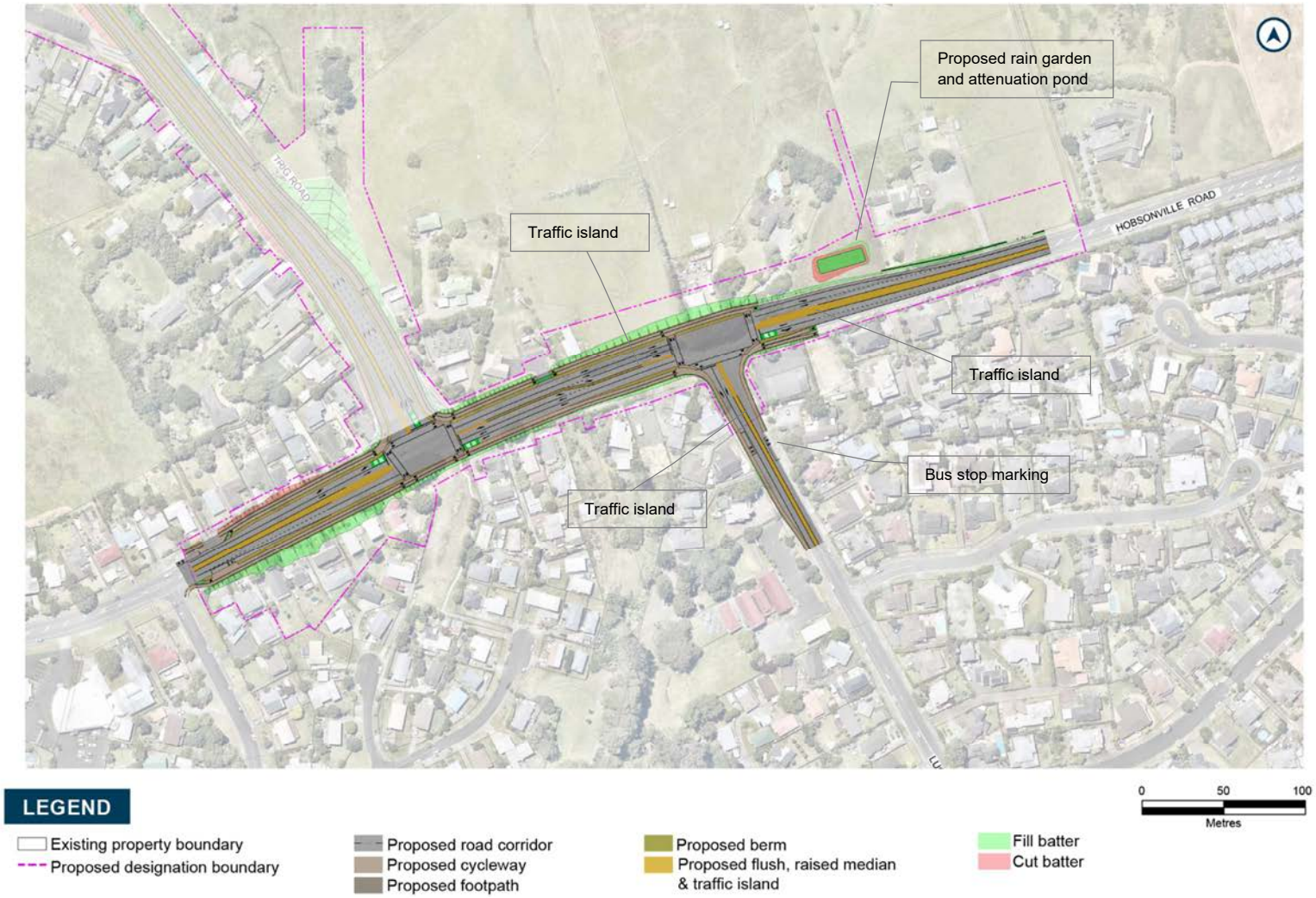


Figure 7: Hobsonville Road Intersection Layout

The proposed intersections will provide:

- Bus priority on all approaches to the Trig Road intersection, and on the eastern approach to Luckens Road;
- Safe and accessible walking and cycling facilities at both intersections and along Trig Road;
- Solid medians on all approaches; and
- Solid medians with right turn bays between the intersections.

Localised widening is required around the intersections to accommodate vehicle stacking and tie-ins to the existing road corridor, as well as walking and cycling facilities/crossings.

3.1.3.2 Public Transport

The Project proposes to improve bus travel time and reliability through the following infrastructure:

- Providing for 'bus only' through movements in the left-turn lanes on Hobsonville Road at the intersections of Luckens Road and Trig Road;
- Providing a dedicated kerb-side lane on both sides of Hobsonville Road; and
- Providing a right-turn bus advance lane on Trig Road.

This infrastructure will allow buses travelling on Hobsonville Road to avoid intersection queuing, reducing delay at intersections and improving travel time reliability.

The Project also proposes to remove the indented bus bays on Hobsonville Road, west of Trig Road and remark them in the same location. Where the buses will stop in the traffic lane, such as Hobsonville Road to the west of Trig Road, this will provide buses with increased reliability and improved ability to re-enter the traffic flow with minimal impact on general traffic.

The bus stop on Hobsonville Road east of Luckens Road will be relocated to be centrally located between the two signalised intersections (within the bus lanes). These will support safe crossing for pedestrians at the signalised intersections.

In terms of new bus stops on Trig Road or potentially the relocation of stops on Hobsonville Road, the proposed road berm in the indicative corridor cross section can accommodate potential new bus shelters.

It is expected that the final location of bus stops will be confirmed when there is more certainty in the adjacent land uses and the location of the collector network.

3.1.4 Stormwater

The stormwater proposal includes upgrades to the existing stormwater culverts which cross beneath Trig Road and the provision of new stormwater management devices. Each of these works is described in the following subsections. Further detail is provided in the *Trig Road Corridor Upgrade: Assessment of Stormwater Effects* (Volume 4) (**ASE**) and Stormwater Layout Plans within the Indicative Design Drawings (Volume 3).

3.1.4.1 Pipe and Culvert Upgrades

The two existing stormwater culverts and one stormwater pipe which cross beneath Trig Road (illustrated in Figure 14) are of insufficient size to cater for pre or post development flows. Upgrading these (as well as the associated inlets and outfall) as part of the Project will enhance the current drainage of the flood prone areas. In addition, extensions of assets are also required to allow for the widening of the road corridor.

The pipe and culvert upgrades are as follows:

- Upgrade and extension of pipeline at chainage 150 by approximately 40m;
- Upgrade of culvert at chainage 430, no extension will be required for this culvert as this pipe already extends beyond the proposed road corridor width; and
- Upgrade and extension of culvert at chainage 640 by approximately 18m.

It is noted that inlets and outfall for both the culverts (chainage 430 and 640) drain and discharge from overland flow paths/ephemeral streams, while the pipe outfall (chainage 150) discharges into a wetland (see Figure 12).

3.1.4.1.1 Groundwater seepage

As identified in Section 5.1.2, groundwater seepage was encountered just off the eastern side of Trig Road at the upper branch of Trig Stream, near the existing outfall for the pipeline at chainage 150. The proposed corridor widening requires fill embankment over this seepage area. Appropriate groundwater management to capture and convey the constant groundwater feed out of the fill embankment footprint will be achieved by the following (to be further specified at detailed design stage and approved by geotechnical engineer):

- In-situ slope drainage using herringbone counterfort drains, daylighting at proposed new headwall;
- Mid-height lateral sand drainage blanket laid within new fill embankment.

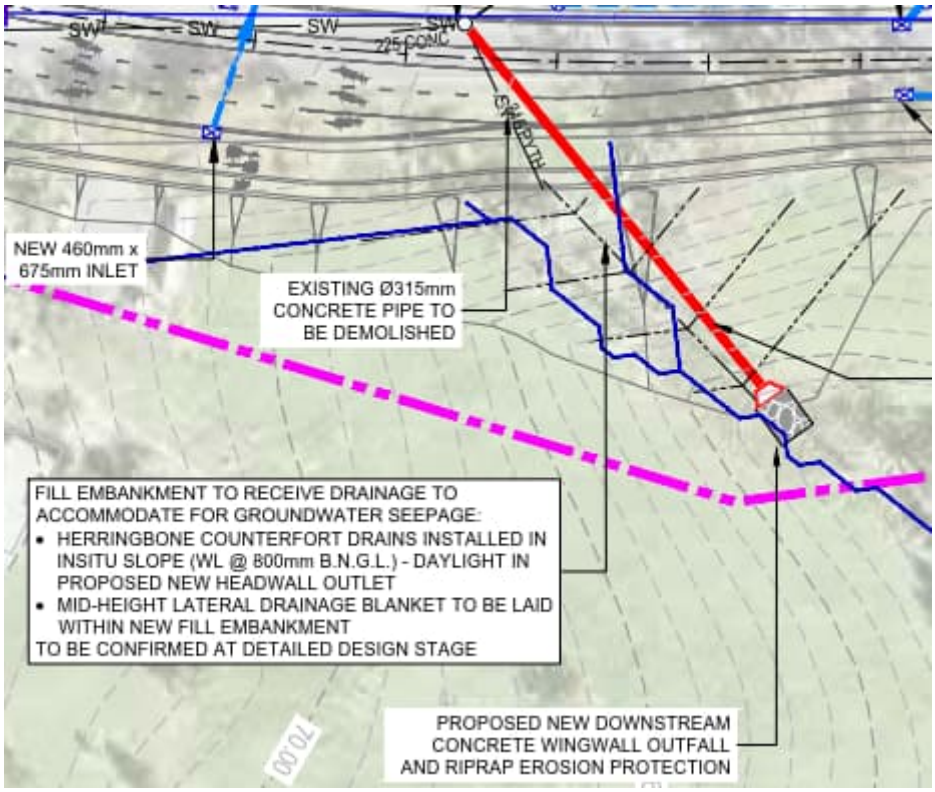


Figure 8: Trig Stream (Wetland) fill embankment

3.1.4.2 Stormwater Management

Through catchment delineation based on topographical information and the proposed vertical alignment of the roads, four major drainage catchments and their drainage low-points were identified for calculation of post-development runoff and comparison to pre-development runoff. Refer Figure 9 below.

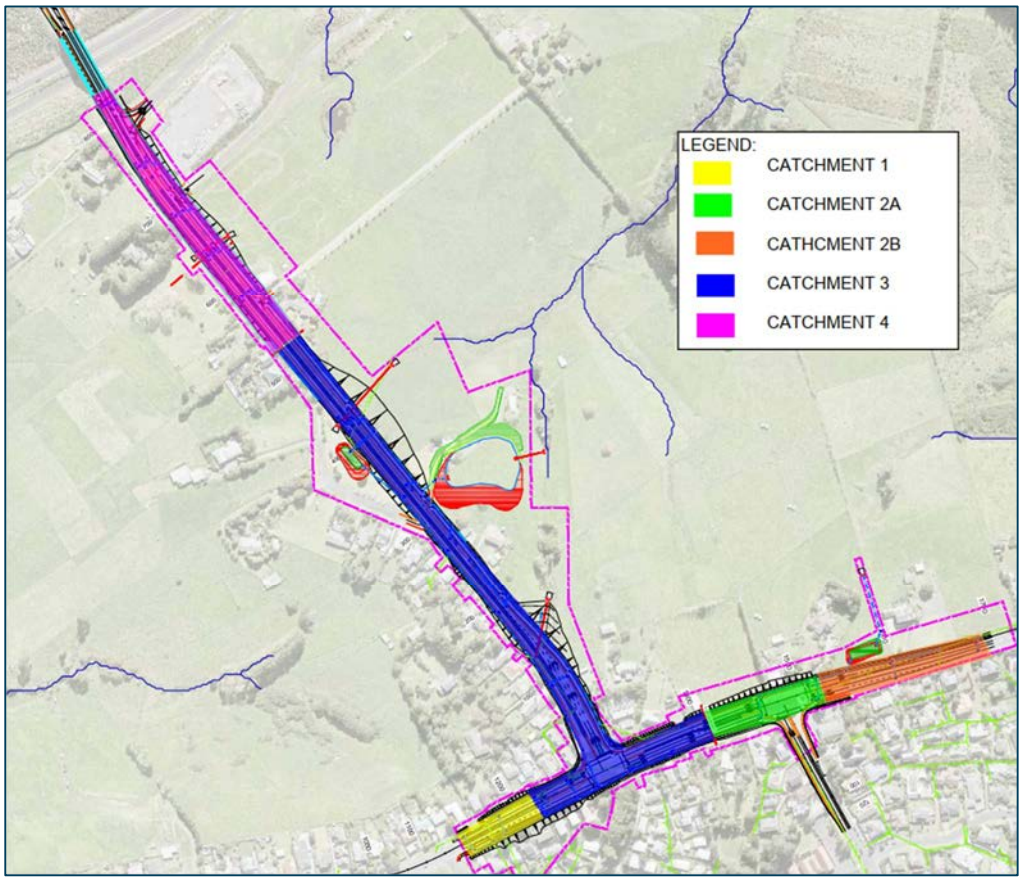


Figure 9: Project Stormwater Catchments

Changes to impervious area have been calculated based on the increased width of corridor, inclusion of footpaths, cycleways, medians and vehicle stacking lanes. Table 1 below provides an overview of the catchment sizes and stormwater management approach for each drainage catchment for the proposed impervious areas of the Project.

Table 1: Catchment Overview

Catchment Description	Area (m²)	Stormwater Management
Catchment 1: Hobsonville Road (West)	2154	Tie into existing underground stormwater network.
Catchment 2.A: Hobsonville Road (East)	3383	Piped stormwater runoff diverted into raingarden/detention pond for treatment and attenuation north of Hobsonville Road, prior to discharge into Rawiri Stream overland flow path.
Catchment 2.B: Hobsonville Road (East)	2013	Tie into existing underground stormwater network.
Catchment 3: Portion of Hobsonville Road Trig Road (South)	13318	Underground stormwater network to discharge into raingarden at low point west of Trig Road (unless treated within berm raingarden) and into dry-pond east of Trig Road for attenuation, prior to discharge into Trig Stream (wetland).

Catchment 4: Trig Road (North)	7497	Treatment by raingardens within the berm, diverted to Catchment 3 low point for discharge into dry-pond for attenuation, prior to discharge into Trig Stream overland flow path.

3.1.4.2.1 Dry Pond

In accordance with GD01: Stormwater Management Devices Guide (**GD01**) and stormwater pond design constraints relating to bird strike risk at the Whenuapai Airbase, a dry pond has been selected for attenuation of additional post-development peak flows and to meet the water sensitive design requirements (refer Figure 11). The minimum design requirements of the stormwater pond for mitigation of bird strike risk are as follows:

- Fully drain down within 48 hours of a 2 per cent AEP storm event; and
- Have side slopes at least as steep as 4 vertical to 1 horizontal (4:1) except for:
- any side slope treated with rock armouring; or
- any area required for vehicle access, provided that such vehicle access has a gradient of at least 1 vertical to 8 horizontal (1:8).

The dry pond caters for a total peak storage volume for the post-development – pre-development 1% AEP rainfall event, with a discharge allowance at the outfall to match pre-development peak flows into a tributary of Trig Stream.

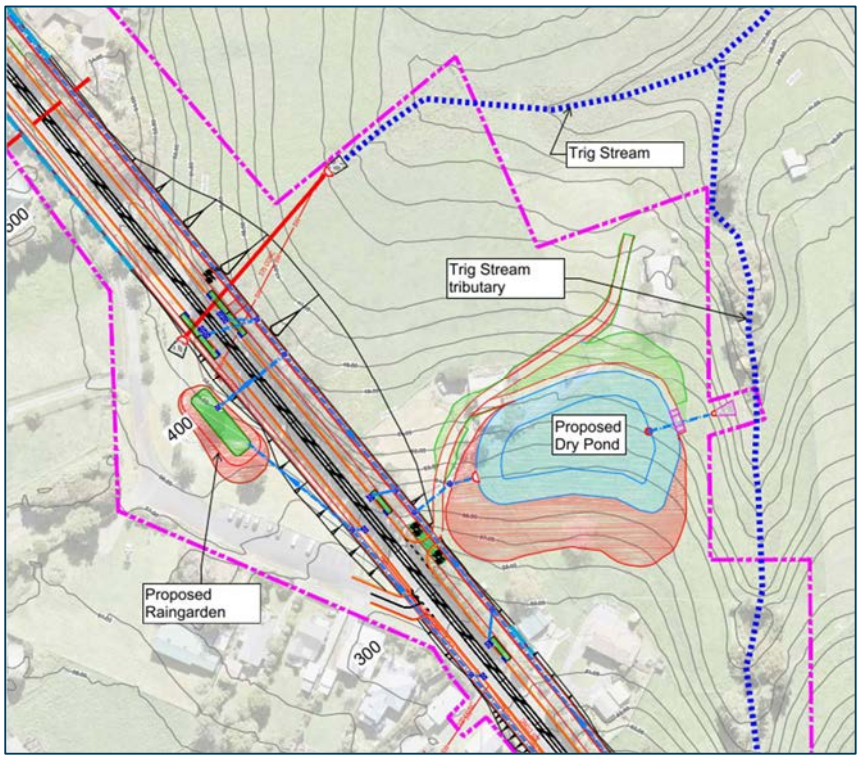


Figure 10: Dry Pond location

3.1.4.2.2 Raingardens

Raingardens are proposed to provide stormwater treatment and retention for Catchment 2A, 3 and 4. These raingardens are located within the berm or outside of the road corridor dependent on the constraints/limitations for sizing and location of each catchment.

Bioretention raingardens were selected for “at source” treatment within the berms along the carriageway as well as “end of pipe” treatment in larger raingardens. Raingardens will also provide for hydrological mitigation requirements for retention and provide for 95th percentile attenuation for Catchment 2A.

3.1.5 Other Utilities

The existing utility infrastructure and proposed changes to utilities within the Project area are discussed in Section 5.1.7.

The following changes to utilities are expected as a result of the permanent works associated with the Project:

- The Watercare trunk watermains are expected to be protected during construction and will not need to be relocated as part of the Project works; however, some of the local watermains may need to be relocated.
- The proposed Project cross-sections include space for a utility/communications duct. Vector overhead power infrastructure can be relocated into this duct if required and will be determined at the detailed design stage. The Project works will have minimal impact on the substation with only a small section of land within the berm of the site required for the Project.
- Some of the existing communications infrastructure will need to be relocated and/or protected as part of the works. New communication ducts will be installed to incorporate all relevant utilities if existing ducts are removed.

4 Overview of NoR and Resource Consents

Auckland Transport are seeking a designation corridor and relevant resource consents for the proposed road corridor and associated works.

A designation provides for activities relating to Section 9(3) of the RMA (refer section 4.1 below). Table 2 below provides an overview of the NORs sought. Other activities are necessary for the construction, operation and maintenance of the Project that cannot be provided for by a designation. As such, AT is seeking regional resource consents under the AUP:OIP and resource consent under the NES: Soil and NES: FW for the activities in Table 3 below.

4.1 Auckland Transport

AT is responsible for Auckland's transport projects and services (excluding state highways), including roads, footpaths, cycling, parking and public transport services such as rail. AT is a Council Controlled Organisation under the Local Government (Auckland Council) Act 2009 (**LGA**), which states that AT's purpose is to "contribute to an effective, efficient and safe Auckland land transport system in the public interest".

AT's functions are identified in section 45 of the LGA and include managing and controlling the AT system in accordance with the LGA, including by performing the statutory functions and exercising the statutory powers set out in section 46 of the LGA as if AT were a local authority or other statutory body, and acting as a requiring authority under section 167 of the RMA.

Under section 47(1) of the LGA, AT is deemed to be approved as a requiring authority, as a network utility operator, under section 167 of the RMA. This is for the purpose of "constructing or operating or proposing to construct or operate roads in relation to the Auckland transport system" and "the carrying out of an activity or a proposed activity ... in relation to the Auckland transport system for which it or the Auckland Council has financial responsibility". Subsequently, AT may designate land under the RMA to construct, operate and maintain roads and to carry out activities which relate to the transport system.

4.2 NoR Summary

The NoR, if confirmed and subject to any conditions, will designate land in the AUP:OIP for the purpose of the construction, operation and maintenance of the Project. The designation authorises the works to be undertaken within the footprint, without further consents under the district plan provisions of the AUP:OIP. Table 2 provides an overview of the key details associated with the NoR.

Table 2: NoR Overview

NoR Overview	
Project Name	Trig Road Corridor Upgrade
Purpose	Construction, operation and maintenance of a transport corridor
Project Objectives	• **Project Objective 1**: Provide an urban arterial transport corridor between State Highway 18 and Hobsonville Road to support and integrate with the planned urban residential growth of Whenuapai.

	• **Project Objective 2**: Provide arterial transport corridors that are safe for all transport users. • **Project Objective 3**: Contribute to mode shift by providing a choice of transport options including walking, cycling and public transport.
Extent	The NoR submitted proposes a designation footprint that comprises: • Approximately 0.8 km of Trig Road generally between Hobsonville Road and SH18, providing for a 24m wide cross section; • Approximately 0.5 km of Hobsonville Road generally between Cyril Crescent and Luckens Road, providing for a 30m wide cross-section; and • Additional land for ancillary works including construction, mitigation and ongoing operations and maintenance.
Lapse Period	15 years
Overview of Properties	66 properties are directly affected by the Project.

4.3 Lapse period for NOR

In accordance with section 184 of the RMA, a designation lapses five years after it is included in the district plan unless:

a. It has been given effect to; or
b. Upon application within three months of the designation lapsing, the territorial authority determines that substantial progress or effort has been and continues to be made towards giving effect to the designation and fixes a longer lapse period; or
c. The designation specifies a different lapse period.

A key objective of the Te Tupu Ngātahi Supporting Growth Programme is to identify and protect land now for future transport networks. We consider that an extended lapse period of 15 years is a method that is reasonably necessary to achieve this key objective as it provides statutory protection of the future transport corridors in a manner that enables a flexible and efficient infrastructure response to land use.

As enabled by section 184(c) of the RMA, a lapse period of 15 years is required for the NoR.

4.4 Notification – NOR

Auckland Transport requests that the NOR associated with the Project is publicly notified.

4.5 Reasons for Resource Consent

A designation provides for activities relating to Section 9(3) of the RMA. However, other activities are necessary for the construction, operation and maintenance of the Project that cannot be provided for by a designation. As such, AT is seeking regional resource consents under the AUP:OIP and resource consent under the NES: Soil and NES: FW for the activities in Table 3 below.

A full description of the permitted activities that form part of the proposal is provided in Appendix C, in accordance with Clause 3(a) of Schedule 4 of the RMA. The relevant AUP:OIP standards, matters of

discretion and assessment criteria are provided in Appendix D. For the avoidance of doubt, AT seeks all necessary resource consents for the Project.

Table 3: Project Resource Consent Triggers

Consent	Rule	Activity	Status	Assessment Matters
AUP:OIP Regional Resource Consents				
Works on structures lawfully existing on or before 30 September 2013 and the associated bed disturbance or depositing of any substance, diversion of water and incidental temporary damming of water– Sections 13 and 14 RMA	E3.4.1 (A26)	The Project involves batterslope and culvert extension within the wetland resulting in a loss of approximately 0.078ha (780m2) of natural wetland. As the total length of the extended culvert exceeds 30m, this does not comply with the permitted activity standard (E3.6.1.12).	**Discretionary**	N/A
New structures and the associated bed disturbance or depositing of any substance, reclamation, diversion of water and incidental temporary damming of water – Sections 13 and 14 RMA	E3.4.1 (A44)	TR-W1 – The Project involves earthworks and batterslopes within the wetland resulting in a loss of approximately 0.1ha (1000m2) of natural wetland. TR-W4 – The Project involves batterslope and culvert extension within the wetland resulting in a loss of approximately 0.078ha (780m2) of natural wetland.	**Discretionary**	N/A
Land use (vegetation removal) – Section 9(2) RMA	E26.3.3.1 (A77)	Trees which are greater than 6 m in height and located within the riparian yard setback of Trig Stream (wetland) require removal.	**Restricted Discretionary**	E26.3.7.1. Matters of discretion E26.3.7.2. Assessment Criteria
Land use (earthworks) – Section 9(2) RMA	E26.5.3.2 (A107)	The total earthworks area is estimated to be 61,000m^2, resulting in greater than 2,500m^2 within the Sediment Control Protection Area.	**Restricted Discretionary**	E26.5.7.1. Matters of discretion
Discharge of contaminants (contaminated land) – Section 15 RMA	E30.4.1(A7)	Soil materials scheduled for land disturbance as part of the Project may have been impacted by contaminants. As a precautionary measure it is assumed that these soils are contaminated. A Detailed Site Investigation (**DSI**) has not yet been undertaken for the Project (to be completed as part of detailed design).	**Discretionary**	N/A
NES: Soil				

Disturbing the soil of a piece of land – Section 5(4) and 11 NES: Soil	11	Soil materials scheduled for land disturbance as part of the Project may have been impacted by contaminants. As a precautionary measure it is assumed that the works may encounter soils that are contaminated. A DSI has not yet been undertaken for the Project (to be completed as part of detailed design) and provided as a condition of consent.	**Discretionary**	N/A
NES: FW				
Regulation 45 Construction of specified infrastructure	45	The Project will result in earthworks, vegetation clearance and land disturbance for specified infrastructure, within and within 100m of natural wetlands (as defined by NES:FW).	**Discretionary**	N/A
Regulation 57 Reclamation	57	The Project involves the partial reclamation of two watercourses connected to wetlands.	**Discretionary**	N/A
Regulation 71 **Culvert/Piping Wetland and associated disturbance**	71	The Project involves extension of culverts and associated structures and disturbance, within two wetlands.	**Discretionary**	N/A

Overall, resource consent is sought from the Council as a **discretionary** activity. Therefore, in accordance with section 104B of the RMA, the Council is not restricted in its discretion when assessing the actual or potential effects associated with the Project.

4.6 Lapse period for Regional Consents

In accordance with section 125 of the Resource Management Act, a resource consent lapses on the date specified in the consent or, if no date is specified, —

a. 5 years after the date of commencement of the consent, if the consent does not authorise aquaculture activities to be undertaken in the coastal marine area; or
b. 3 years after the date of commencement if the consent does authorise aquaculture activities to be undertaken in the coastal marine area.

As noted above, a key objective of the Te Tupu Ngātahi Supporting Growth Programme is to identify and protect land now for future transport networks. We consider that an extended lapse period of 15 years is required to achieve this key objective for the regional resource consents. A 15 year lapse period provides sufficient time to undertake detailed design of the works, procure the necessary properties, undertake the investigations required to complete the necessary management plans, and seek Council certification on the regional consent management plans. It also enables the regional consents to tie in with the 15 year lapse period for the proposed designation.

4.7 Expiry dates for Regional Consents

Auckland Transport is seeking a 10 year expiry date for regional consents for earthworks, streamworks and discharge of contaminants to land in accordance with the RMA. This is in reflection of the size of the overall project, and the need to provide flexibility in staging.

For the reclamation consent, an unlimited consent duration is sought, in accordance with the RMA.

4.8 Notification – Regional Resource Consents

Auckland Transport is requesting full notification of the regional consent applications, in accordance with section 95A(3)(a) of the RMA.

5 Existing and Likely Future Environment

5.1 Existing Environment

This section provides an overview of the existing natural, built and social environment in which the Project will be located.

5.1.1 Site and Context Overview

The Project is located in Whenuapai, approximately 13km north-west of the Auckland CBD. Whenuapai is a transitional landscape on the periphery of the existing built urban environment of North West Auckland. Reflecting this position, the area is generally characterised by a range of rural and urban land uses, including large areas of developing or recently developed urban land use.

The Project is located along parts of the existing alignments of Trig Road and Hobsonville Road in Whenuapai, Auckland (Figure 11). The extent of the Project area along Trig Road is from just north of the SH18 over-bridge and Hobsonville Road in the south. For Hobsonville Road the Project extends between Cyril Crescent in the west and just east of Luckens Road to the east.

Key features within and surrounding the Project area include:

- SH18 is located in the northern extent of the Project area and was opened in 2007. SH18 provides a connection to the North Shore in the east and to State Highway 16 (SH16), approximately 1km west of the Project area.
- Westgate metropolitan centre is approximately 1km west of the Project area providing a range of commercial and retail land uses as well as community facilities and open space.
- Hobsonville Point is approximately 3km north-east of the Project area and consists of medium-high density residential land uses and the Hobsonville town centre, providing commercial and retail land uses, largely servicing the local area.
- West Harbour is immediately south of the Project area and is characterised by suburban residential land use in the form of single detached housing.
- Whenuapai Airbase (Royal New Zealand Air Force Base Auckland) is approximately 1.2km north of the Project area. Established in the 1930s and 1940s, Whenuapai Airbase is operated by Royal New Zealand Air Force and is the largest Royal New Zealand Air Force Base in New Zealand operating a range of defence aircraft.

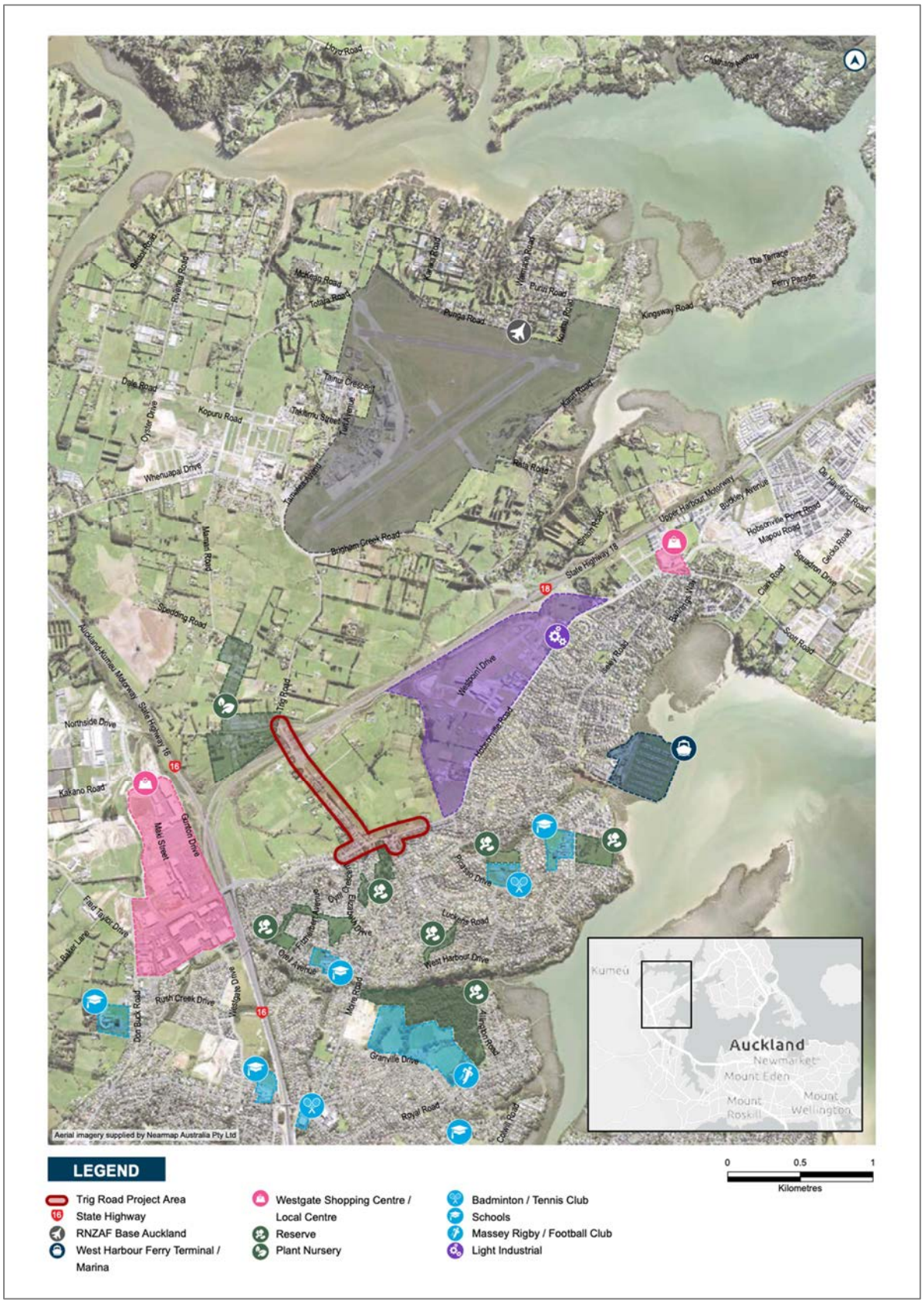


Figure 11: Trig Road Arterial Corridor Upgrade Surrounding Context

The land use immediately surrounding the Project area is characterised by a combination of residential, lifestyle block and rural properties with agricultural activities and groupings of plant nurseries.

The south-western section of Trig Road is currently residential with predominantly single detached housing on larger (quarter acre) sections. Land use along most of the remainder of Trig Road is rural with a range of pastoral and horticultural land uses – including three plant nurseries around the northern extent of the Project area. The property at 15 Trig Road is designated for Primary School and Early Childhood Education Centre. It is understood that the first stage of the Primary School is intended to open in 2023.

Land use along Hobsonville Road is generally more urban, characterised by predominantly single detached housing development along the southern side of Hobsonville Road and northern side of Hobsonville Road west of Trig Road. There are also pockets of commercial and retail development along Hobsonville Road, including a vet clinic, day care, dental clinic, cattery, and real-estate companies adjacent to or within the Project area. The northern side of Hobsonville Road west of Trig Road is largely rural and characterised by pastoral grazing and lifestyle blocks.

5.1.2 Topography and Hydrology

Both Hobsonville Road and Trig Road are generally aligned along natural ridgelines forming the highpoints of the surrounding landscape. The landform within the surrounding area is gently undulating, with higher terrain in the west and slopes down in a north-east and south-west direction. Hobsonville Road follows a primary east-west orientated ridge, with the residential land to the south moderately sloped and falling away to the south.

Figure 12 indicates the nearby hydrology and topography. Figure 12: Project Topography and HydrologyThe Project corridor interacts with three watercourses. The Auckland Council Geomaps ‘catchments and hydrology’ layer shows the location of three streams (two tributaries of Trig Stream and a tributary of Waiarohia Stream) within the Project area. The Project ecologist has undertaken Field surveys of the Project area and determined that no streams are directly impacted by the Project. In the Project Area, streams are associated with wetland complexes (and the hydrology is mainly wetland) (further detail provided in Section 5.1.3). Groundwater seepage has also been identified just off the eastern side of Trig Road at the upper branch of Trig Stream.

There is generally a low risk for flooding within Trig Road and surrounding catchments at a 1% Annual Exceedance Probability (**AEP**) (1 in 100-year) extreme rainfall event. There are two flood prone areas at the localised low points along Trig Road. The Whenuapai 3 Precinct Stormwater Management Plan prepared by Auckland Council Healthy Waters has identified the streams and coastal waters within the Project area are of poor quality, degraded and sensitive to change in land use (and therefore stormwater flow as urbanisation occurs).

Figure 12: Project Topography and Hydrology

The Project area is underlain by two main geological units (Figure 13): the Puketoka Formation of the Tauranga Group, comprised of "pumiceous mud, sand and gravel"; and overlying Waitemata Group (East Coast Bays Formation) material comprised of "alternating sandstone and mudstone". Indicative groundwater levels in the Project area have been measured at two boreholes at 3.0m and 2.5m below ground level.

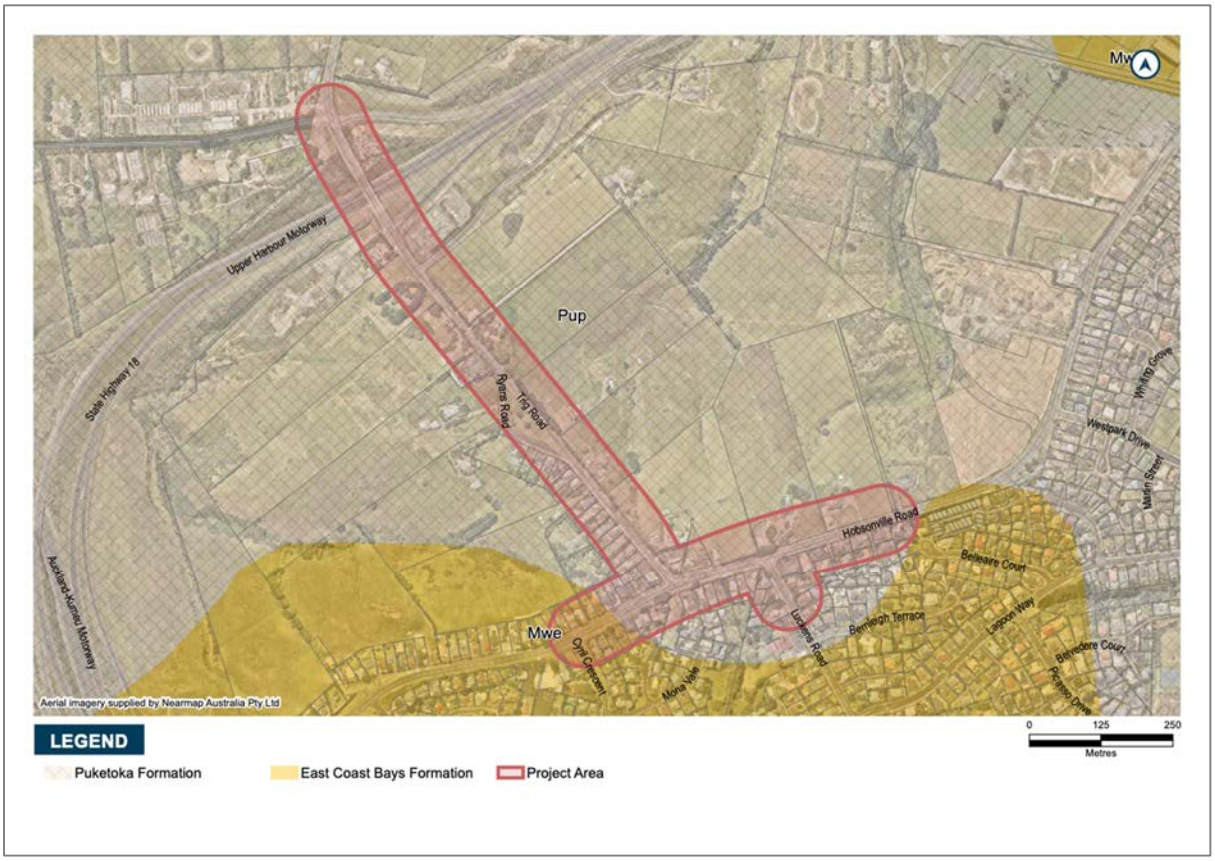


Figure 13: Project Geology (QMaps, 2019)

5.1.3 Ecological Environment

The Project lies within the Tamaki Ecological District, which has a warm humid climate and is characterised by volcanic cones, isthmus, harbours and volcanic terrain (McEwen, 1987). Historically, the Project area would have been forested; including pūriri (*Vitex lucens*), tōtara (*Podocarpus totara*), mataī (*Prumnopitys taxifolia*), kahikatea (*Dacrycarpus dacrydioides*) and tītoki (*Alectryon excelsus* subsp. *excelsus*), kōwhai (*Sophora* sp.) and taraire (Auckland Council, 2017).

The Project area is currently dominated by hard stand (existing roads and footpaths), grazed exotic grasses, planted native and exotic trees consisting of mostly mature pines (*Pinus radiata*) and exotic garden species.

There are no Significant Ecological Areas within the Project area, however there are three within 2 km of the Project area:

- SEA_T_2040, which is 1 km southwest of the Project area.
- SEA_T_4661, which is 0.98 km south of the Project area.

- SEA_T_4733, which is located within the wider stream catchment, approximately 2 km northeast of the Project area, adjacent to the Waiarohia Stream. Tributaries to the Waiarohia Stream flow through from the Project area.

Project ecologists initially undertook a desktop investigation to identify all potential wetlands within 100m of the Project designation. All wetlands potentially affected by the project activities were then investigated and delineated in the field. Seven wetlands potentially affected by the project have been identified, five within the project area (TR-W1, TR-W2, TR-W3, TR-W4, and TR-W5) and two directly adjacent (TR-W6 and TR-W7) to the Project Area. All the wetland areas have a dominance of exotic plant species, but are classified as natural wetlands because they do not meet the exclusions of the NPS:FM. The wetland habitats are all largely modified, and dominated by exotic plant species, artificial drainage, and grazing and pugging from livestock.

5.1.4 Transport Environment

The existing transport environment includes two key arterial corridors (Waka Kotahi One Network Road Classification); Hobsonville Road that travels east-west, and Trig Road that travels north-south towards Whenuapai. These corridors both provide direct connections to SH16 and SH18.

Trig Road is currently two lanes wide, with a footpath on one side. The posted speed limit on Trig Road from Hobsonville Road to Ryans Road is 50kph, increasing to 80kph beyond Ryans Road. There are currently no cycle facilities provided and the corridor can be characterised as generally rural in standard. The intersection with Hobsonville Road is a priority-controlled intersection with acceleration and deceleration lanes provided for vehicles turning left into and out of Trig Road.

Hobsonville Road in the Project area is currently two lanes wide, with footpaths on both sides. There are no cycle facilities on either side of the road. Luckens Road intersects with Hobsonville Road with a priority-controlled intersection. This intersection provides acceleration and deceleration lanes for left turning vehicles on to and from Luckens Road.

Other than bus stops, there are no dedicated public transport facilities on Trig Road or Hobsonville Road. Bus services currently run on both Hobsonville Road and Trig Road.

Existing traffic volumes on Trig Road and Hobsonville Road have been counted by AT in December 2020, December 2021 and February 2022. The results of these surveys are shown in Table 4 below.

Table 4: Existing Traffic Volumes on Trig Road and Hobsonville Road

Location of Count	Survey Date	5 Day ADT*	7-day ADT	AM Peak Volumes	PM Peak Volumes
Trig Road between Spedding Road and Brigham Creek Road	December 2020	4,160	4,180	430	490
Trig Road between Ryan's Road and Motorway Overbridge	December 2021	6,890	6,460	590	690
Hobsonville Road between Luckens Road and Westpark Drive	February 2022	14,170	13,300	1,220	1,380
Hobsonville Road between Fitzherbert Avenue and Cyril Crescent	November 2020	18,720	17,830	1,400	1,760

* Average Daily Traffic

5.1.5 Cultural and Heritage Environment

There are no archaeological sites recorded within or in close proximity to the Project area, and the nearest known sites (mainly shell midden relating to Māori occupation) are over 1.5km to the west along the coast and approximately 1km to the south along the Manutewhau inlet and stream. Similarly, there are no identified Sites of Significance to Manawhenua identified under the AUP:OIP within or in close proximity to the Project area.

5.1.6 Community and Recreational Facilities

Community and recreational facilities within or in proximity to the Project area include:

- Hobsonville Kindergarten (34 Trig Road) adjacent to Ryans Road Reserve servicing the small residential and rural-residential catchment;
- Cool Kids Castle Early Learning (5 Luckens Road) south of Luckens Road/Hobsonville Road intersection providing early childcare facilities;
- Westgate Baptist Church (67 Hobsonville Road) providing religious facilities and early childcare facilities;
- Te Piringatahi O Te Maungaarongo Marae (Luckens Road) affiliated with Ngapuhi; and
- Hilda Griffin Reserve (opposite the intersection of Trig Road and Hobsonville Road) providing a largely vegetated open space with pedestrian thoroughfare to surrounding residential streets and to Louise Place Reserve.

5.1.7 Utilities

The existing utilities within the Project area are summarised in Table 5 below.

Table 5: Existing utilities in the Project area

Utility Type	Details
Watercare Services Limited Watermains	• Trig Road: Local watermains on both sides – size and type vary • Hobsonville Road contains watermains including trunk watermain, local watermains on both sides of the road and local watermain connections to dwellings. Watercare also owns 74 Hobsonville Road that contains a large pump station with cross connections to the trunk watermains • Luckens Road contains a trunk watermain and local watermains
Power Network	• Trig Road, Hobsonville Road and Luckens Road all contain Vector overhead power infrastructure • Vector operates a substation at 1 Trig Road (corner of Trig Road and Hobsonville Road)
Communications	• All existing road corridors will contain communication ducts, chambers and cables (copper and fibre)
Stormwater	• Existing stormwater infrastructure is illustrated in Figure 14 and further discussed in the Trig Road Corridor Upgrade: Assessment of Stormwater Effects (Volume 4).

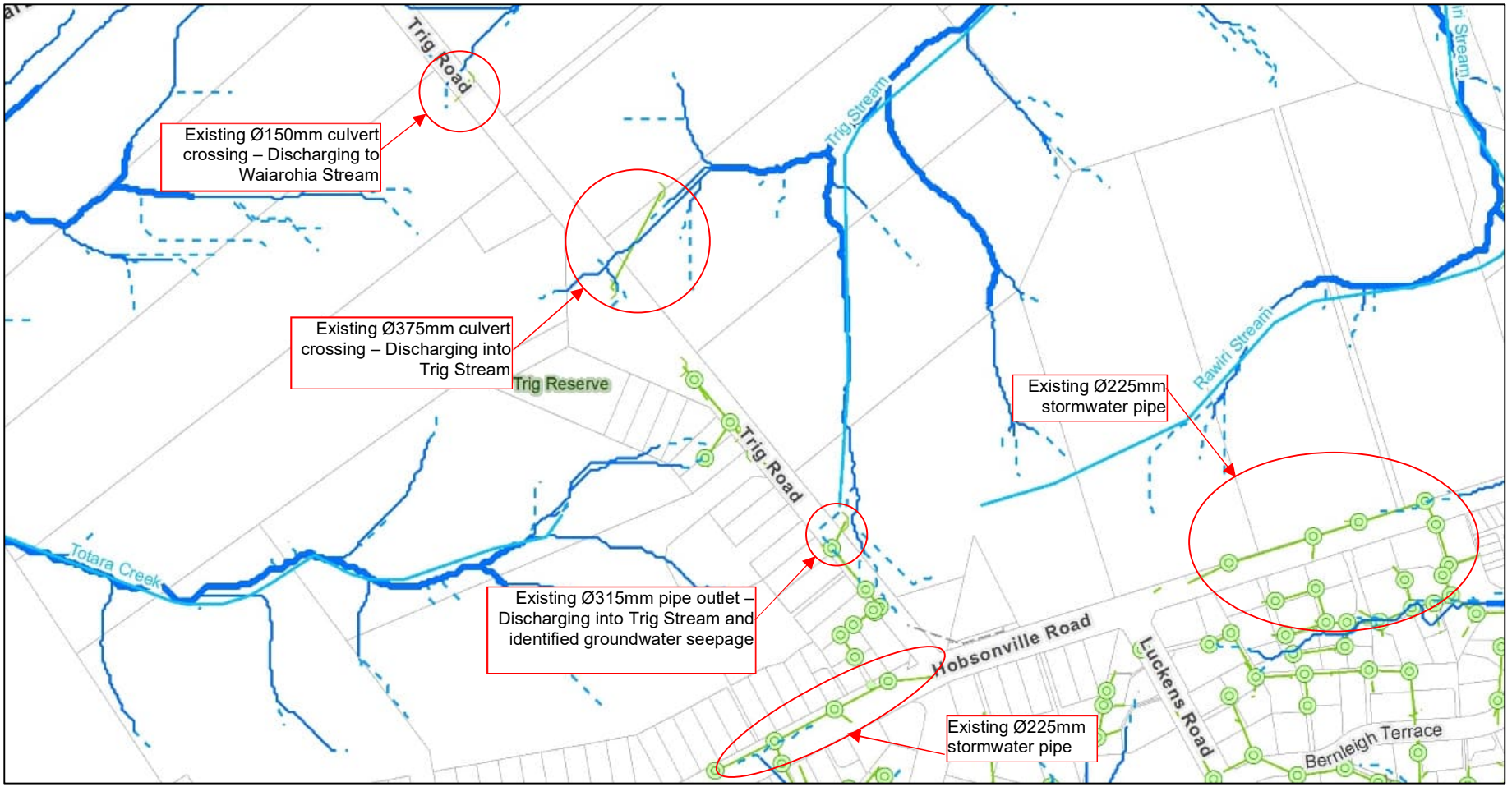


Figure 14: Existing Trig Road Corridor/Hobsonville Road Stormwater Infrastructure (AC-GEOMAPS)

5.2 Planning Context

Table 6 details the relevant planning context as specified by the AUP:OIP and Auckland Council GeoMaps, with the current AUP:OIP land use zoning shown in Figure 15. The key elements of the planning context for the Project are as follows:

- The existing corridor for Trig Road is generally 20m wide and zoned 'Road' under the AUP:OIP.
- Residential properties adjacent to the existing road corridor are zoned 'Future Urban Zone' (FUZ) and 'Residential – Mixed Housing Urban' (MHU) under the AUP:OIP.
- AT is the requiring authority for an existing designation which provides for the existing Hobsonville Road Corridor including the intersection with Trig Road (Des. Ref: 1437).
- Waka Kotahi is the requiring authority for an existing designation (Des. Ref: 6741) which provides for the existing SH18 Corridor including the Trig Road motorway on/off ramps, SH18 laydown area and surrounding land. The land use zoning for this area (including part of Trig Road) is a 'Strategic Transport Corridor' Zone.
- Vector is the requiring authority for an existing designation (Des. Ref: 8856) which provides for a substation at the corner of Trig Road and Hobsonville Road (1 Trig Road).
- Watercare is the requiring authority for an existing designation (Des. Ref: 9377) which provides for the Northern Interceptor Shared Corridor which bisects Trig Road, adjacent to the SH18 corridor.
- Minister of Education is the requiring authority for an existing designation (Des. Ref: 4667) which provides for a School and Early Childhood Education facility at 13-15 Trig Road.
- Three notable trees as identified in the AUP:OIP (ID 1974) are located within the front yard of the property at 8 Luckens Road, West Harbour. The trees are not located within the proposed designation boundary.

Written approval will be sought from these requiring authorities with existing designations in the Project area prior to construction in accordance with section 177 of the RMA.

Table 6: AUP:OIP Planning Context

AUP:OIP Planning Context: Trig Road Corridor Upgrade	
Zones	Road Zone Strategic Transport Corridor Zone Future Urban Zone Residential – Mixed Housing Urban Zone
Precincts	N/A
Overlays	High-Use Aquifer Management Areas Overlay [rp] – Kumeu Waitemata Aquifer
Controls	Arterial Roads Vehicle Access Restriction Control – Motorway Interchange Control Macroinvertebrate Community Index – Rural Macroinvertebrate Community Index – Urban Stormwater Management Area Control – MASSEY, Flow 2
Transport Designations	1437, Road – Hobsonville Road Transport Corridor, AT

	6741, State Highway 16 and 18 – Westgate to Whenuapai and Hobsonville, Waka Kotahi
Other Designations	4311, Air Space Restriction Designation, Defence purposes – protection of approach and departure paths (Whenuapai Air Base), Minister of Defence 8856, Electricity supply purposes – substation, Vector 9377, Northern Interceptor Shared Corridor, Watercare 4667, Educational Purposes - Primary School (Years 0-8) and Early Childhood Education (Pre-School) - Whenuapai, Minister of Education
Non-Statutory Features	Trig Stream (River Number: 78970) Overland Flow Paths Flood Prone Areas Flood Plains

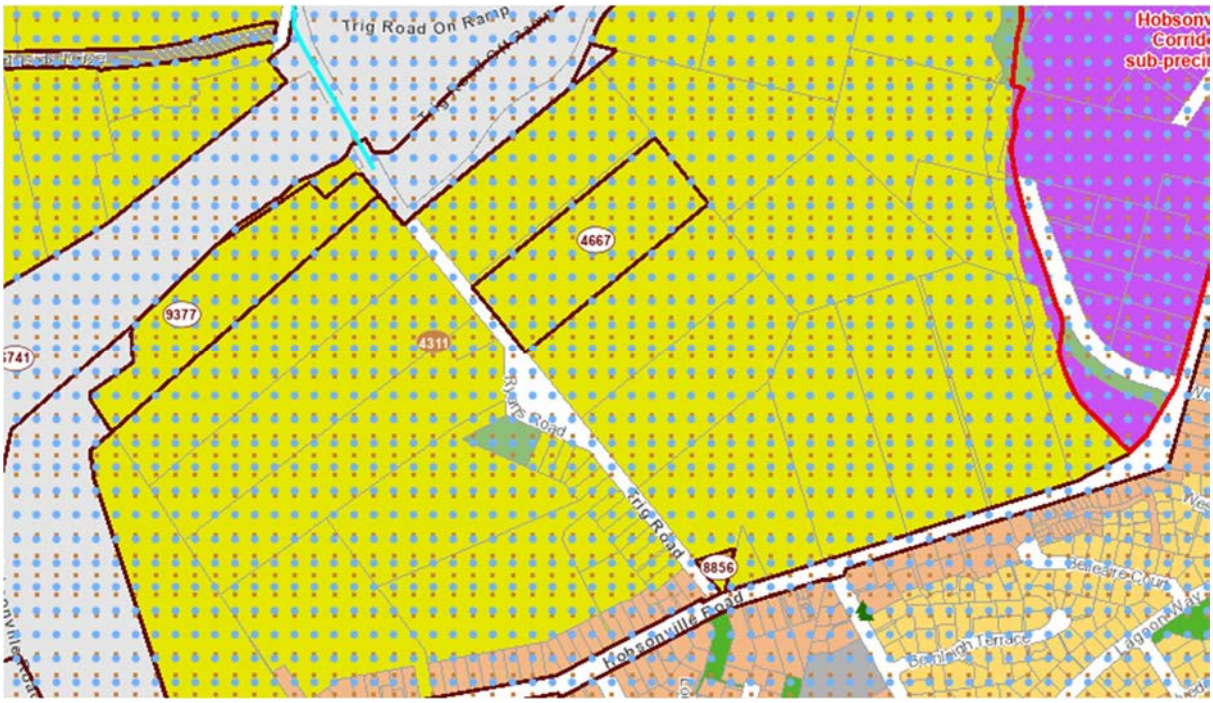


Figure 15: AUP:OIP Zoning

5.2.1 Whenuapai Structure Plan

The Whenuapai Structure Plan was completed in 2016 by the Council and sets out the framework for transforming Whenuapai from a semi-rural environment to an urbanised community over the next 10 to 20 years. The structure plan will be implemented through a statutory plan change process to the AUP:OIP to rezone land within the area from FUZ to different urban zones (the structure plan outcome is shown in Figure 16).

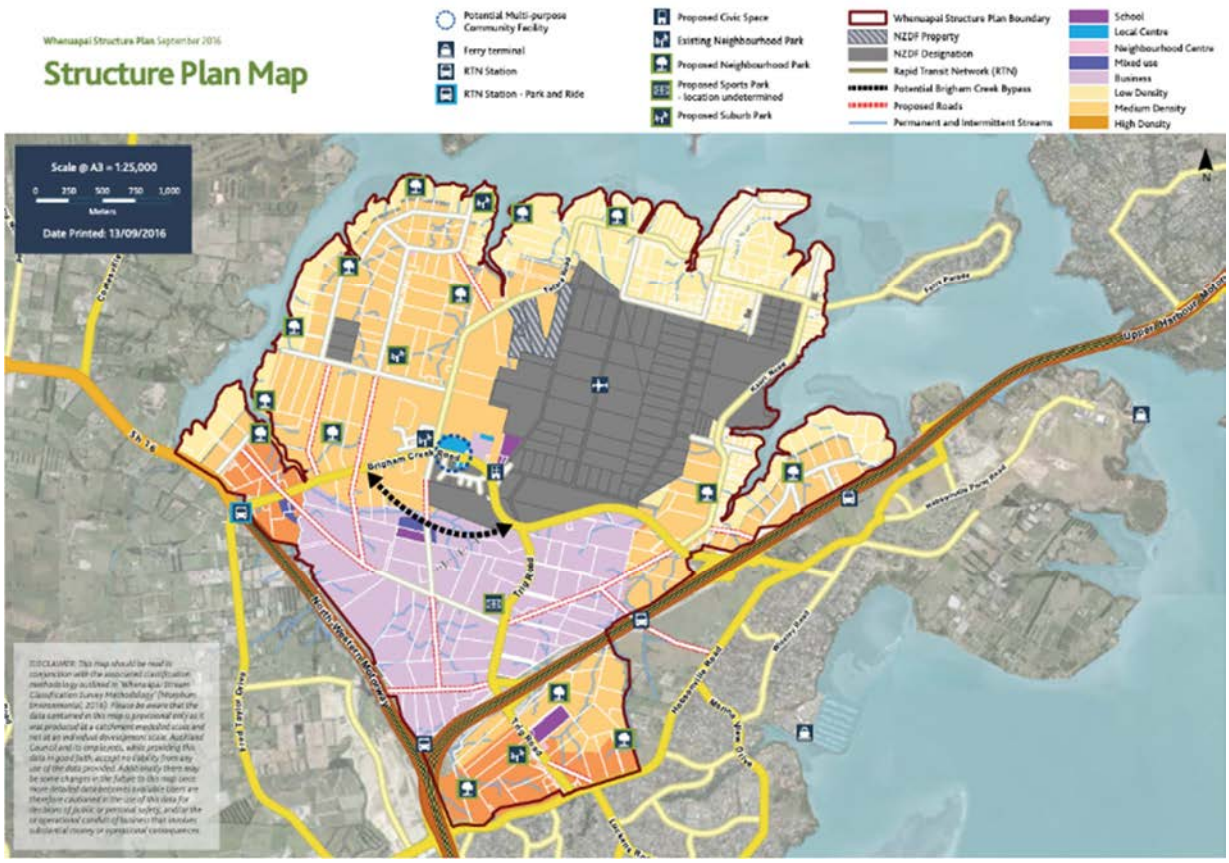


Figure 16: Whenuapai Structure Plan 2016 (AC)

5.2.2 PPC5: Whenuapai Plan Change

Proposed Plan Change 5 (**PPC5**) was a Council led proposed plan change to the AUP:OIP, notified on 21 September 2017, with the intent of rezoning the Whenuapai Structure Plan Stage 1 area adjacent to Trig Road. PPC5 was withdrawn on 16 June 2022, however given the proximity to the existing urban area along Hobsonville Road this area of FUZ land is expected to be subject to private development initiatives in the near future.

5.2.3 Proposed Plan Change 78

Proposed Plan Change 78 (Intensification) is in response to the NPS-UD and requirements of the RMA to enable more intensive development in and around neighbourhood, local, town and city centres and rapid transit stops and incorporate Medium Density Residential Standards into the AUP:OIP.

A handful of properties within the Project area, along Hobsonville Road and Luckens Road, are proposed to be up-zoned from Mixed Housing Suburban to Mixed Housing Urban Zoned, and Mixed Housing Urban Zone to Terrace Housing and Apartment Building Zone.

5.3 Likely Future Environment

The largely existing rural character of the Project area and current FUZ land under the AUP:OIP, coupled with development pressure, indicate a high likelihood of land use change in the Project area. It is anticipated that the Project will be constructed within a transitional environment (where increased urban activities start to occur) and will be operated within an urban or rapidly urbanising environment. Accordingly, when considering the environmental context of the Project, it is important to consider the likely future environment as well as the existing environment. The following sub-sections outline the key land use features that will comprise the likely future environment (as guided by the Structure Plan).

5.3.1 Approach to Likely Future Environment

Within the AUP:OIP, the Project area contains a range of existing and future urban zones which influence the existing and likely future land use patterns for assessment purposes (refer Figure 18). Areas with existing urban zoning or rural zoning that are not identified for future urban growth are not likely to materially change in the future. Conversely, those areas that are currently rural in character, but are zoned future urban are highly likely to experience material change.

Table 7 sets out our understanding of the current land use zoning, its likelihood of change and its potential future environment.

Table 7: Existing and Future Environment Likelihood of Change

Project area	Environment today	Current Zoning	Likelihood of Change	Likely Future Environment
Context A	Rural	Future Urban	High	Urban
Context B	Urban – Low Density	Future Urban	High	Urban
Context C	Urban – Medium Density	Urban	Moderate	Urban
Context D	Urban	Urban	Moderate	Urban

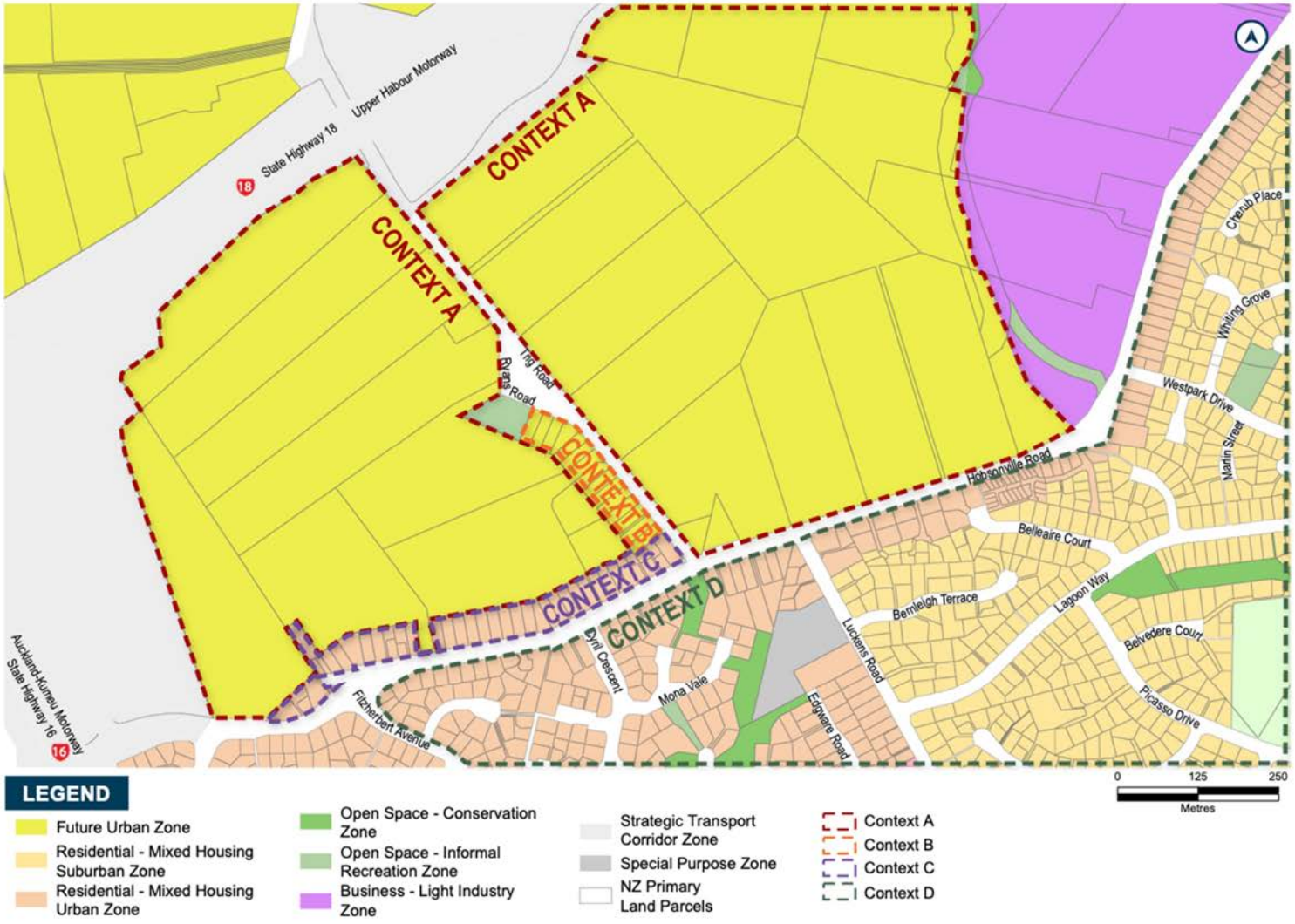


Figure 17: Existing Zoning / Likely Future Environment

The Project seeks to provide for an urban standard transport corridor that will support urbanisation of the surrounding land. As such, assessing the effects on the environment solely as it exists today (i.e. at the time of this assessment) will not provide an accurate reflection of the environment in which the effects of the construction and/or operation of the transport corridor will be experienced. Whilst it is likely that construction of the Project will take place in the existing (mostly rural) environment, it will be when the area is transitioning into an urban environment.

Accordingly, when considering the environment within which the effects of the operation of the transport corridor are likely to occur, this assessment considers the likely future environment as well as the existing environment.

5.3.2 Future Residential and Business Zoned Areas

Most of the current FUZ area surrounding the Project area is likely to be rezoned for medium and high density residential use, with some provision for business land use (as indicated by the Whenuapai Structure Plan). The land use outcomes based on the signalled AUP:OIP zoning are summarised in Table 8.

Table 8: AUP:OIP Zoning Potential Urban Form

Zone	Anticipated Outcomes
Mixed Housing Suburban	Development is typically two storey detached and attached housing in a variety of types and sizes.
Mixed Housing Urban	Development typically up to three storeys in a variety of sizes and forms, including detached dwellings, terrace housing and low-rise apartments.
Terraced Housing and Apartment Building	Provides for urban residential living in the form of terrace housing and apartments. Buildings are enabled up to five, six or seven storeys.
Business – Neighbourhood Centre	Provides for buildings up to three storeys high with mixed use residential on upper floors. Development generally in keeping with nearby residential character. This land use is generally characterised by single corner stores and small shopping strips.

5.3.3 Existing Residential Zoned Areas

The existing residential area adjacent to the Project area, along both sides of Hobsonville Road, is currently zoned MHU under the AUP:OIP.

The current residential form can be largely characterised as low-density, single detached dwellings. There is evidence of some subdivision and subsequent infill housing; however, the majority of these dwellings are still single or double storey and largely detached.

The MHU zone allows greater intensity for the residential area along Hobsonville Road, enabling development of detached, terraced and low-rise apartment housing up to three storeys (refer Table 8 above).

5.3.4 Future Transport Network

The transport corridors within Whenuapai and the surrounding area will be delivered as part of the wider urbanisation that is scheduled to occur in the North West of Auckland.

To understand the future transport network an indicative transport network for the North West has been developed to support Auckland Council's planned urban growth. Refer to Figure 2: North West Preferred Transport Network – North West Growth Area.

Through the AC DBC and SG DBC it was established that Trig Road will continue to facilitate key movements, including providing access to SH18 and will be an important north-south connection as Whenuapai urbanises. There are future urban areas immediately adjacent to Trig Road, and future developments will be able to connect to this key corridor via future developer delivered collector roads.

Once the area around Trig Road is urbanised, the road will need to serve a variety of movement needs, including:

- Access to and from the east facing motorway ramps to SH18
- Facilitating north-south non-motorway movement between business and residential land in Whenuapai, and the existing residential areas around West Harbour and Hobsonville
- Provide opportunities for future developments to deliver connections for collector road access to the surrounding residential land
- Provide access from Whenuapai to wider destinations such as the Westgate Shopping Mall and the ferry terminals at West Harbour and Hobsonville.

Trig Road will therefore serve a range of local and strategic uses across a range of modes and consequently needs to provide the appropriate facilities associated with an urban arterial.

Hobsonville Road will play an increasingly important public transport role and will facilitate local east-west movements between Westgate and Hobsonville.

5.3.4.1 Future Walking and Cycling Network

The Whenuapai Structure Plan indicates that Trig Road and Hobsonville Road will form part of the cycling network for Whenuapai and notes that this would include the provision of dedicated cycle facilities.

5.3.4.2 Future Local Public Transport

In the longer term, there will be changes to the supporting local network to deliver an integrated public transport network. These changes have been identified through discussions with AT public transport network developers and reflect the outcomes sought by the Whenuapai Structure Plan.

The changes include:

- Local services on Trig Road connecting to Hobsonville Road, Moire Road and Wisely Road
- Local services along Hobsonville will become a frequent route, which is defined as having a service at least every 10 minutes from 7am to 7pm, 7 days per week.

The longer term future public transport network has been developed on the basis of significant public sector investment including a rapid transit network on SH18 with associated interchanges, an additional road crossing of SH18 between Brigham Creek and Trig Road, a Northside Drive connection over SH16 to Westgate and connections between SH16 and SH18 to facilitate movements from Westgate to Whenuapai.

In the interim period between these investments and the investment of rapid transit to the North West, Trig Road and Hobsonville Road will play a critical part in the delivery of a public transport network to support the developing more intensive urban form in Whenuapai.

The Regional Public Transport Plan (RPTP) provides a 10-year indication of public transport provisions. In terms of the two existing services on Trig Road and Hobsonville Road, Table 9 summarises the proposed changes to these services over the next 10 years.

Table 9: Bus Services as proposed in RPTP 2018/2028

	2018	2021	2028
Route 114	30 minute services in weekday peak, 60 minute in interpeak, no evening service	30 minute services in weekday peak, 60 minute in interpeak, no evening service	20 minute services weekday peak, 20 minute interpeak, 30 minute evening service
Route 120	30 minute services in weekday peak, 30 minute in interpeak, 60 minute evening service	15 minute services in weekday peak, 20 minute in interpeak, 20 minute evening service	10 minute services weekday peak, 15 minute interpeak, 15 minute evening service

5.3.4.3 Traffic Growth

Considerable growth in traffic volumes is forecast between now and 2038. The current and forecast traffic volumes for Trig Road and Hobsonville Road are shown in Table 10.

Table 10: Trig Road and Hobsonville Road – Traffic Volumes to 2048+

	Current	2028	2038	2048+
Trig Road (forecast)	7,500	11,100	15,700	17,700
% growth on previous decade	-	**48%**	**41%**	**12%**
Hobsonville Road (forecast)	10,700	14,400	18,400	20,400
% growth on previous year	-	**35%**	**28%**	**11%**

5.3.5 Open Space and Waterways

As identified in the Whenuapai Structure Plan, a network of public open space, esplanade reserves and walking and cycling connections are proposed to be protected and enhanced as development proceeds. Within the environment surrounding the Project, it is anticipated that there will be a suburban park between 3-5 hectares in size on the current location of the properties at 38 and 40 Trig Road, and a neighbourhood park of 0.3-0.5 hectares in size on the current location of 17, 19 and 21 Trig Road. There is also an 'Open Space – Informal Recreation' Zone at 34A Trig Road that is anticipated to remain. Furthermore, an esplanade reserve is indicated along Trig Stream to the east of Trig Road. This esplanade reserve, in conjunction with other permanent and intermittent watercourses and wetlands may contain native riparian planting along the edge of streams for a width of 10m when development consents are obtained and implemented.

[2] Based on the SATURN modelling based year, calibrated against 2015 surveyed traffic volumes.

6 Approach to Design

As noted, the proposed designation for the Project, if confirmed, will identify and protect the Project corridor in the AUP:OIP and provide approval for the construction, operation and maintenance of the Project. The design information is indicative for the Project and has been prepared to a level sufficient to inform the proposed designation footprint and to assess an envelope of effects that includes operational and maintenance requirements, potential construction areas, and areas required to mitigate any adverse effects.

The key transport elements which will be provided by the Project are described in Section 3. The final design details for the Project will be refined and confirmed before construction as part of the Outline Plan (or Plans if the Outline Plans are staged to reflect Project phases or construction sequencing) which will be submitted to Council as set out in section 176A of the RMA.

The drawing set for the Project is contained in Volume 3 of this suite of documents and includes the following:

- Indicative alignment general arrangement layout plan, including the proposed designation footprint
- Indicative stormwater design.

6.1 Design Philosophy and Standards

The following section outlines the design philosophy and key design standards that have been adopted for the Project.

The Project will upgrade the existing Trig Road corridor and part of Hobsonville Road to provide for its intended function as part of a wider regional arterial network. As specified in the Project Objectives (Section 2.2) there is a need for the Project to provide for safe and efficient connections between key destinations (or other components of the wider network), integrate with the new or planned communities at Whenuapai and improved access to transport modes and provide choice in mobility.

Overall, the key design outcomes sought are:

- Compatibility with planned urbanisation of adjacent land in the AUP:OIP;
- Separated/dedicated off road cycle paths;
- Separated footpaths;
- Bus priority at intersections;
- Improved urban design and amenity outcomes; and
- Improved safety for all road users.

6.2 Arterial Corridor Design

The Project has been investigated, designed and assessed in accordance with the Auckland Transport Design Manual (**TDM**) design guidelines and relevant national standards. The design standards are as follows:

A design speed of 60km/h has been adopted for Trig Road and Hobsonville Road with a posted speed of 50km/h for all the future and interconnecting roading network.

A maximum vertical gradient of 8.0% has been adopted for the alignment. Vertical gradients have been set as low as practically possible to mitigate potential problems arising from:

- Engineering costs related to working on steep gradients, providing an economic balance between cut and fill quantities, and long-term road maintenance costs
- Vehicle speeds and other road safety concerns attributed to steep gradients
- Consideration for active modes using the road corridor.

A generic arterial cross-section has been developed for the transport corridors within the Project (Trig Road and Hobsonville Road), and generally incorporates the following elements:

- Berm
- Footpath
- Cycleway
- Traffic lanes
- Solid or flush median
- Communications duct for utilities
- Street lighting on both sides of the transport corridor, providing for cyclist and pedestrian path lighting in accordance with TDM and national lighting standards
- Appropriate delineation with standard road pavement markings and advance guidance/warning signage in accordance with relevant national standards
- All batter slopes designed to 3H:1V in accordance with TDM minimum design standards.

Final cross-sections will be produced at the detailed design stage and will be submitted as part of the Outline Plan(s).

Active mode mobility is a key desired design outcome, therefore walking and cycling have been prioritised in the Project design and will be provided in all arterial corridors.

Flexibility to enable future public transport by providing sufficient berm space where possible to allow bus stop facilities at a nominal spacing of approximately 400m.

The standard arterial road pavement design, and in particular the surfacing details, will be refined during future design phases.

The future collector road network adjacent to Trig Road has not been designed. Therefore the standards outlined above provide enough flexibility in relation to the location of where collector roads can connect in to Trig Road.

6.3 Stormwater Design and Management

Designs for stormwater management have been developed with consideration of existing stormwater infrastructure and existing stormwater management requirements, stormwater discharge and diversion, stormwater runoff quality, and natural flooding hazards. The AUP:OIP and other standards, regulations and guidelines have been utilised and adopted, including specific consideration of Water Sensitive Design requirements under the AUP:OIP. Key design requirements include:

- Flood modelling has been undertaken to identify and quantify the existing overland flow paths, focusing on the 10-year and 100-year average recurrence interval.

- All new roads will be kerbed to contain and convey the 10% AEP rainfall event, discharged into standard TDM approved stormwater catch pits with filtration and litter traps, and collected via a primary stormwater network for subsequent on-site water quality volume treatment and discharge into on-site attenuation ponds catering for up to the 1% AEP rainfall event.
- All existing overland flow paths will be maintained via upgrades to existing culvert crossings to enhance existing drainage conditions and prevent disturbance to the natural watercourses.
- Stormwater ponds will be located at the optimal engineering low point where possible within the Project corridor. These will also be as close as practicable to both a suitable outlet location and the road corridor.

6.4 Geotechnical

Desktop assessments have been carried out based on published geological and geomorphological conditions to enable the generalised topography and geology of the areas to be identified. Based on the desktop assessment, further geotechnical investigations in the form of boreholes, test-pits and hand augers were conducted to inform the preliminary design of the Project. These reports are contained withing Volume 4. The investigations informed the indicative design elements, as follows:

- The key geotechnical risks for the Project include property boundary constraints, ground conditions, cut-fill material balance and the presence of existing services.
- As discussed in Section 4.1.1.1 above, 3H:1V cut and fill slopes have been used in all arterial designs, and for determining earthworks quantities and potential impacts on existing features and property boundaries. No additional geotechnical or engineering strengthening has been assumed for the cut and/or fill batters, and this will be investigated during the later design stages.
- The site subsoil has been determined as having low susceptibility to liquefaction.

6.5 Urban Design Input

6.5.1 Overview

Land use and transport integration, through the placement and interrelationship of movement networks and the areas they pass through, has the potential to contribute to high quality liveable places. The Programme has the potential to have a meaningful, and positive impact on the liveability and quality of future urban areas, including Whenuapai.

In recognition of this, the *Te Tupu Ngātahi Design Framework* (the **Design Framework**) was established for the Programme. The Design Framework provides measurable guidance for outcomes-based decisions throughout each phase of the Programme delivery. The design principles that make up the Design Framework ensure that transport networks contribute positively to new or planned communities, the environments and the social and economic vitality of Auckland. The design principles are:

- Environment
- Support and enhance ecological corridors and biodiversity
- Support water conservation and enhance water quality in a watershed

- Minimise land disturbance, conserve resources and materials
- Adapt to a changing climate and respond to the microclimatic factors of each area
- Social
- Identity and place
- Respect culturally significant sites and landscapes
- Adaptive corridors
- Social cohesion
- Safe corridors
- Built form
- Align corridors with density
- Corridor scaled to the surrounding context and urban structure
- Facilitate an appropriate interface between place and movement
- Movement
- Connect nodes
- Connect modes
- Support access to employment and industry
- Prioritise active modes and public transport
- Support inter-regional connections and strategic infrastructure
- Support legible corridor function
- Land use
- Public transport directed and integrated into centres
- Strategic corridors as urban edges

The Design Framework sits within the context of a range of established strategic plans, policies and design guidance at the Auckland level (Auckland Plan 2050, ATAP, Auckland Roads and Streets Framework, AUP:OIP), national level (Government Policy Statement on Land Transport, Waka Kotahi Bridging the Gap) and at a global level (UN 17 Sustainability Goals). These documents have informed the Design Framework content and are referenced in general terms as they relate to healthy, connected and sustainable communities.

6.5.2 Trig Road Corridor Context

The Trig Road corridor follows a gently undulating alignment that generally rises from north to south, it has few distinguishing urban form characteristics in its current semi-rural setting. Natural drainage lines and ecological features will all be subject to changes in relation to future development activity with no noted or significant existing vegetation.

The Trig Road corridor is physically constrained by the SH18 corridor to the north-west, limiting future built form continuity and connectivity with other future growth areas within Whenuapai. The corridor demonstrates a closer urban form relationship and integration with established mixed urban and suburban mixed housing in West Harbour and Hobsonville.

Changes signalled by the Whenuapai Structure Plan will likely result in the land adjacent to Trig Road containing new medium density housing, and higher density terraced and apartment housing to the west and southern half of Trig Road. A small Business – Neighbourhood Centre zone is proposed on the Eastern side of Trig Road.

The indicative cross section for Trig Road inherently supports the Environment principles by providing opportunities for integrated ecological and stormwater outcomes based on enhancement of the wetland and use of raingardens. From a social perspective, the Project will contribute positively to the sense of belonging and participation of the new urban residents, as well as community resilience by supporting access to the proposed local centre on Hobsonville Road and connecting (via signalised intersections) to the open space network of West Harbour e.g. Midgley Park.

The Project is aligned to service planned higher density residential development, as well as business and employment opportunities in north and west Whenuapai. The corridor cross section provides clear and flexible allocation of street space between competing uses by allowing for separated modes. Vehicular access is not generally accommodated however a pedestrian permeable interface or active frontage interface is supported, especially where adjacent to higher density housing.

In relation to Movement, the Project provides tangible and direct connectivity for all modes between complementary destinations, for example the local urban centre at Hobsonville Road and open space networks within West Harbour.

At detailed design stage, the Project's design should provide:

- Re-integration of any residual land required for the Project;
- Integration with the character of adjacent development;
- Connections between open space areas;
- Integration with the commercial activities along Hobsonville Road;
- Logical pedestrian and cycle crossing points;
- Safe movement, orientation and way-finding; and
- Integration of any bus stops.

7 Construction Works

7.1 General Approach

While it is anticipated that construction may not occur for some time (and therefore the construction techniques may change), an indicative construction methodology has been developed based on the level of design undertaken to date and the current land use / land form in which the corridor is located and with the knowledge that a contractor is yet to be confirmed. As such, there is a preference to retain some flexibility in construction methodologies, and the construction will be guided through the management plan process. The conditions for the proposed designation and resource consents will be in place to manage the effects of the construction activities.

Should the contractors wish to undertake construction activities in a manner which is not within the scope of the proposed designations, or resource consents, additional authorisations will need to be obtained at that time.

Management Plans form an integral part of the construction methodology for the Project setting out how specific matters will be managed. A suite of Management Plans is proposed for the Project. These include the following:

- Construction Environmental Management Plan (CEMP);
- Stakeholder and Communication Engagement Management Plan (SCEMP);
- Cultural Management Plan (CMP);
- Construction Traffic Management Plan (CTMP);
- Construction Noise and Vibration Management Plan (CNVMP);
- Tree Management Plan (TMP).

The Management Plans required for the proposed designations and resource consents, and future Outline Plan will be submitted to Auckland Council prior to the commencement of construction.

Following the Completion of Construction, the designation boundary will be reviewed and any land that is not required for the permanent work or for the on-going operation, maintenance or mitigation of the Project will be reinstated in coordination with directly affected landowners or occupiers.

Typical offsets for construction areas of various construction work have been adopted to inform the proposed designation boundaries. These offsets and typical construction areas have been based on similar transport infrastructure projects of this size and nature.

An indicative construction methodology has been developed for the Project to allow an assessment of the likely construction effects. This methodology has been developed based on an indicative concept design only. It is expected that as the design develops, further information will be required to inform the final construction method.

The key components of this construction methodology are outlined in the following sub-sections.

7.2 Indicative Construction Zones and Programme

The total construction phase of the Project is expected to take approximately 18 to 24 months. It is anticipated that the works will be broken down into separate construction zones based on the type of works required and the nature of the work environment. These anticipated zones are:

- Zone 1: Trig Road North of the SH18 bridge
- Zone 2: Trig Road South including the SH18 bridge

- Zone 3: Hobsonville Road.

Figure 18 provides an illustration of the indicative construction zones and Table 11 outlines the typical construction activities and construction durations associated with each zone.

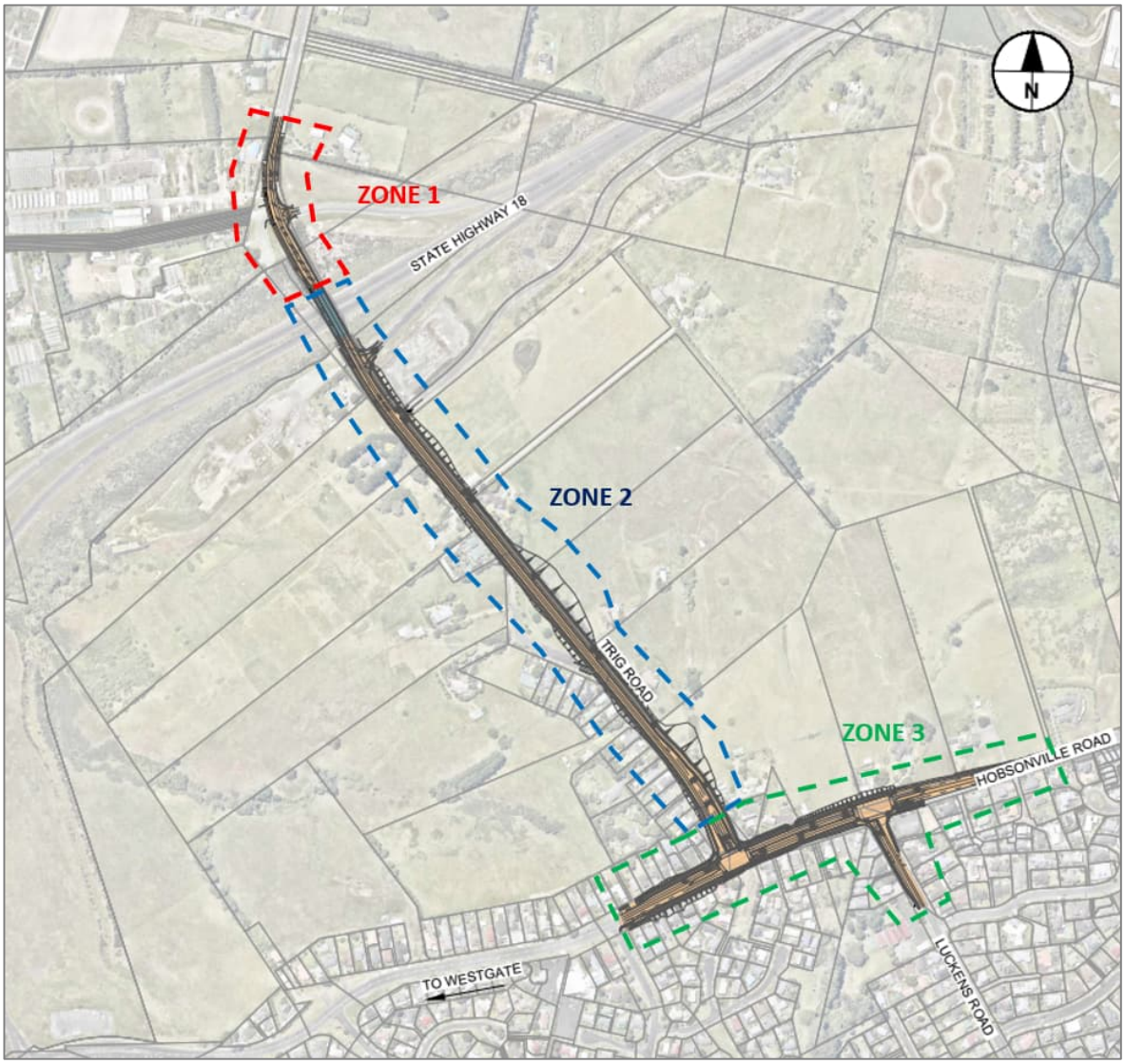


Figure 18: Indicative Construction Zones

Table 11: Trig Road Corridor Upgrade Indicative Construction Works Summary

Zone	Works Overview	Construction Activity	Estimated Duration
1	Construction of indicative cycle path and footpath and remarking of the existing road and bridge.	• Remarking of existing road and bridge deck • New cycleway and footpath construction on west side (As discussed the location is indicative) • Minor earthworks to enable construction of the new cycleway and footpath	Approximately 3 months.

	Note: All works in Zone 1 are within the existing road corridor.		
2	The main construction activities consist of bulk earthworks, stormwater drainage and pond, and corridor construction. Most of the works are on the east side of Trig Road and involve fill to provide for corridor widening.	• Site clearance • Divert existing services • Approx. 28,500m^3 of earthworks cut/fill • Construct three new drainage culverts • Construct new stormwater dry pond • Construct new rain gardens • Construct new retaining wall to the front of properties on the west of Trig Road • Construct new traffic lanes, berm, footpath and cycleway • New road surface and line marking • Lighting and road furniture • Driveway regrading	Approximately 14-16 months.
3	The main construction activities on Hobsonville Road involve road widening to accommodate the intersection layouts and cycleway, with most of the widening achieved by gaining area on the north side of Hobsonville Road.	• Site clearance • Divert existing services • Approx. 6,000m^3 of earthworks cut/fill • Construct new raingardens • Construct new traffic lanes, berm, footpath and cycleway • New road surface and median • Lighting and road furniture • Driveway regrading	Approximately 11-13 months.

7.3 Construction Laydowns and Work Areas

A number of indicative construction laydown areas have been provided for within the proposed designation footprint. The location of the indicative laydown areas is provided in Volume 3

7.4 Construction Activities

7.4.1 Site Establishment and Clearance

A draft Erosion and Sediment Control Plan (**ESCP**) (Volume 4) has been prepared for the Project in accordance with the Council's Guidance for Erosion & Sediment Control (**GD05**). All environmental management controls are to be set up prior to construction works occurring. General controls to be applied across the Project area include clean water diversion, silt fences/silt socks, and site stabilisation. Specific erosion and sediment control measures related to particular construction activities are identified as appropriate in the following sub-sections.

In preparation for the works, the Project area will need to be cleared of all impediments to construction such as buildings, structures and vegetation. Where possible, impacts on private property from site clearance works will be minimised or avoided. However, where existing structures cannot be avoided these will either require removal or relocation outside the Project area. This includes potential removal/relocation of fences, dwellings, garages, and farm structures.

The existing vegetation within the Project area will require removal. This is mostly comprised of planted wind breaks along Trig Road and the northern side of Hobsonville Road. The three notable trees located at 8 Luckens Road, West Harbour (refer section 5.2 above) will not be affected by tie-in works to be undertaken within the adjacent road corridor, as they will comprise line marking only.

Vegeation to be removed also includes a limited area of riparian vegetation around Trig Stream (wetland). The draft ESCP includes specific watercourse protection measures. All environmental/management controls related to watercourses will be set up prior to the removal of any riparian vegetation.

7.4.2 Earthworks

The Project includes bulk earthworks to provide for widening of the corridor, regrading of the road alignment and construction of stormwater management devices.

Prior to commencing bulk earthworks, all soft and/or unsuitable soils will be removed from the site before placing any fill material or construction of structures.

The largest volume of earthworks activity will be the filling of the eastern side of Trig Road and excavation of the stormwater dry pond. Approximately 35,000m^3 of fill is required, which is likely to be sourced from material cut from the western side of Trig Road and imported fill.

Table 12: Project Earthworks Summary

	Approx. Cut	Approx. Fill	Approx. Area
Site Clearance	17,000m^3	17,000m^3	61,000m^2
Corridor Earthworks	3,000m^3	35,000m^3	45,000m^2

In addition, the bulk earthworks will be undertaken in a staged approach to minimise the area of disturbed earth, stockpiling and potential for sediment laden runoff at any given time.

Road widening will be achieved by excavating the northern verge along Hobsonville Road, with some cut required to construct the road base, reshape the verge and construct new retaining walls. Works along the southern side of Hobsonville Road will generally occur within the existing road corridor.

Driveway tie-in requirements will potentially require local reshaping on private driveways and may require additional localised relocation of services. This may also include additional drainage, resurfacing, and localised retaining structures within private property. These retaining walls will likely be constructed using conventional plant.

To mitigate the very limited potential for unidentified archaeological remains to be exposed during construction, the conditions include an advice note referring to the AUP:OIP Accidental Discovery Rule (ADR) (E12.6.1). Likewise, contamination protocol has been established, in the event that contaminated soils are encountered. Refer to Section 9.11.

7.4.3 Drainage and Stormwater

Works to install the stormwater network will involve typical shallow drain laying, involving excavation and trench shields, with existing services likely to drive the depth of the stormwater pipes.

These will likely be constructed upon completion of the bulk earthworks, with the western side of Trig Road constructed first. These works are anticipated to be in shallow excavations with simple batters or trench shields to provide ground support. Where road crossings are required, construction will be through excavation in stages with single lane closure traffic management.

The three culverts will be constructed in a similar method to the connection pipework.

7.4.4 Watercourses

Construction works within Zone 2 consist of activities directly within the upper gullies leading to the existing watercourses (catchment 1 – Waiarohia Stream, catchment 2 – Trig Stream (wetland), catchment 3 – Trig Stream (wetland) upper branch) with potential to cause adverse effects to the ecological health of the watercourses.

All three stormwater pipe crossing upgrades/extensions under Trig Road can be completed offline therefore typical control measures such as bunds/silt/sand logs should be used to prevent loose soil runoff into the adjacent watercourse.

Outlets will be constructed in approximately similar positions downstream as the existing structures. Some water diversion from existing outlets may be required with the use of sandbags to allow for a dry working space while the existing outlets remain functional. Silt fences will be used around the downstream perimeter of outlet construction areas. Water diversion and sediment control measures are to be used progressively as required and adapted to suit changes to conditions on-site.

Earthworks operations in the vicinity of streams will be handled with controls as described above. Vegetation removal will be required on the Trig Stream upper branch to accommodate the embankment fill.

Measures will be taken to minimise disturbance to surrounding vegetation and soils, followed by compaction and temporary stabilisation of the area to cater for the period prior to continuance of earthworks.

A desktop review was undertaken on the potential of the habitats within the Project Area to support native fish. The review identified six native fish species potentially within 2km of the project area.

7.4.5 Utilities

Several services along Hobsonville Road will require relocation as described earlier in Section 3.1.5, including the overhead lines crossing Hobsonville Road and the associated power pole, numerous streetlights and underground water services coming from the pump station on the corner of Hobsonville and Trig Road. Further service identification and location will be required prior to works commencing.

The overhead lines along the western edge of Trig Road may be reinstalled as overheads (if sufficient room is available in the construction corridor) or installed as underground services through the utility ducts provided within the Project corridor cross-section. The exact form and location of the existing overhead utilities will be determined at the later detailed design stage.

7.4.6 Pavement and Surfacing

Pavement and surfacing will commence once earthworks and drainage works are complete. This will be likely be staged in two halves to maintain traffic flow in the adjacent lane, with the intersections requiring further staging.

Resealing will need to be carried out in stages and night works will likely be required to complete marking and tie-ins to the motorway on-ramp.

New street lighting will be installed once the bulk earthworks and drainage are complete.

7.4.7 Construction Remediation

Construction of the Project will require temporary impacts to private properties along the Project corridor. This includes temporary changes to property access, impacts on private outdoor space (including fences, gardens and vegetation and lawns) and in localised instances impacts to dwellings and other private structures.

Reinstatement is to be addressed on a case-by-case basis through discussion with individual landowners and will follow the provisions under the Public Works Act 1981, which is a process separate from the requirements of the RMA.

7.4.8 Typical Plant and Equipment

A list of typical plant and equipment which may be required for construction has been developed (Table 13).

Table 13: Typical Plant and Equipment Summary

Construction Type	Typical Plant
Typical across all works	• Main site compound • Satellite site compounds • Light vehicles • Hiab truck • Small tools and plant
Clearing	• 20T excavator • Mulcher
Overhead line relocation	• Line crew • Elevated work platform or cherry picker • Directional drilling equipment
Earthworks	• Excavator (>20T) • Excavator (<15T) • Compactor/sheepsfoot roller • Water cart • Articulated Dump Trucks (ADT) • Road tip trucks (6 wh or tandem tipper)
Drainage	• Excavator • Trench shields • Tandem tipper • Loader • Plate compactor

Pavement construction	• Grader • Smooth drum roller • Tandem tippers • Kerbing machine • Plate compactor • Paver

8 Assessment of Alternatives

When considering a NoR by a requiring authority, a territorial authority is required under section 171(1)(b) of the RMA to have particular regard to whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work if either:

a. The requiring authority does not have an interest in the land sufficient for undertaking the work; or
b. It is likely the work will have a significant adverse effect on the environment.

In this instance, AT does not currently have an interest in all of the land through which the Project will be constructed and operated.

The development of alternatives for the Project was completed through a sequential options development process in the Supporting Growth Programme Business Case 2016 (**PBC**), AC DBC, SG DBC and development of this NoR application and the Project as described in Section 3.

Figure 19 provides a summary of the options development process in relation to each of the steps. Once problems, issues and objectives had been established, a list of corridor options were developed to achieve the outcomes. These were refined into a range of alignment options with the preferred options further refined to develop the Project as it is described in Section 3.

A comprehensive assessment of alternatives was undertaken and is provided in Appendix A. This includes the key decisions made during the assessment of corridor options, alignment options, design refinement and statutory methods. It also outlines the further review of AC DBC and SG DBC options that was subsequently undertaken due to the introduction of the National Policy Statement for Freshwater Management 2020 (NPS:FM), which affords additional protection to natural wetlands. Please refer to Appendix A for these assessments.

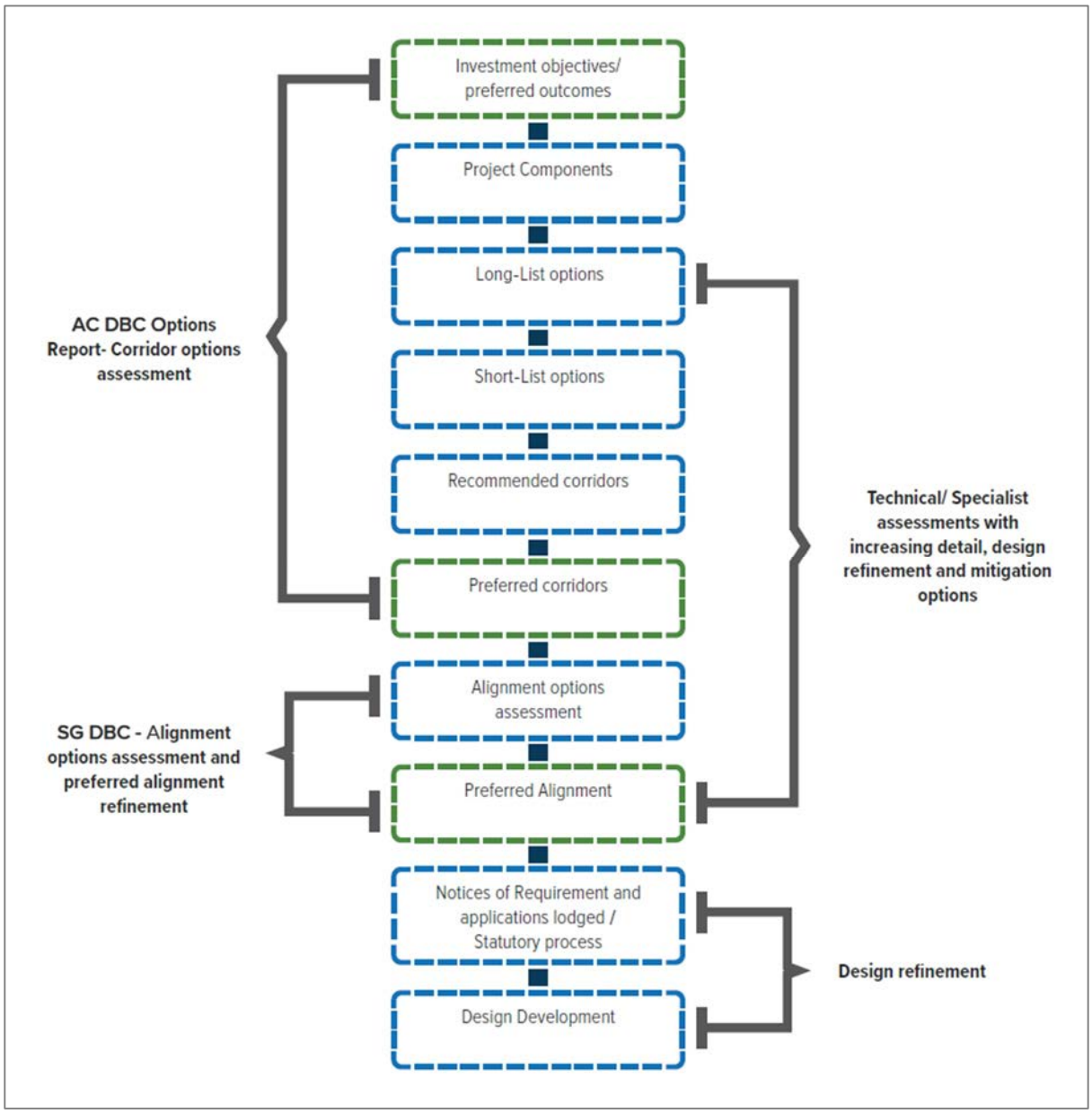


Figure 19: Summary of Options Development Process

8.1 Summary of Alternatives Assessment

A wide range of alternatives have been investigated for addressing the transport needs for the Project area. A key driver for the assessment of alternatives was to avoid adverse effects where practicable. That evaluation confirmed that the upgrade of Trig Road and Hobsonville Road (between the intersections at Trig Road and Luckens Road) would provide a balance of strong transport and urban outcomes while minimising potential adverse effects.

A further review of AC DBC and SG DBC options was undertaken in response to introduction of the National Policy Statement for Freshwater Management 2020 (NPS-FM). It confirmed that all options considered during the business case process would result in wetland impacts, and that the rationale for discarding the other options remained valid. The alignment being progressed in this NoR remained the preferred option.

The Project supports the future development of land in Whenuapai. Its location and design represent the most appropriate approach to the changing local environment, providing a high-quality urban corridor for the urbanisation and development of the surrounding area and connecting to the future and existing transport network.

An assessment of the various alternative methods for achieving the Project was undertaken, and it was concluded that a designation is considered the most appropriate mechanism to provide for the Project.

The conclusion reached in the assessment of alternatives has been based on a comprehensive and replicable optioneering process. As such it is concluded that adequate consideration has been given to alternative sites, routes, or methods for undertaking the work, satisfying the requirements of section 171(1)(b) of the RMA.

9 Assessment of Effects on the Environment

Section 171 of the RMA requires that when considering a NoR, a territorial authority must consider the effects on the environment of allowing the requirement. Furthermore, in accordance with Schedule 4 of the RMA, an application for resource consent must include an assessment of the actual or potential effects on the environment of the activity.

This section provides a summary of the actual and potential effects of the construction, operation and maintenance of the Project, including whether these effects are positive or adverse and the scale, duration and locality of effects.

As set out in Section 8, the avoidance of adverse effects has been a key driver for the assessment of alternatives, identification of the proposed designation corridor and the subsequent refinement of the corridor. Where effects cannot be avoided, measures to remedy or mitigate significant adverse effects have been proposed. Details of these are included in section 10 and are reflected in the proposed designation and resource consent conditions.

Positive effects are summarised in Section 9.1, and adverse effects on the environment are described in Sections 9.2 to 9.11.

9.1 Positive Effects

The Project Objectives (Section 2.2) have been developed to address the key problems and issues identified in Section 2.2. In achieving these objectives, the Project will deliver a range of positive effects for the Whenuapai area.

Significant growth is anticipated in Whenuapai (as set out in the FULSS) which will require a range of infrastructure, including transport infrastructure, to achieve the growth figures sought under the Auckland Plan. The Project supports the ongoing urbanisation of the area, by providing improved accessibility to the FUZ surrounding the Project area through an upgraded urban transport corridor and greater connectivity between SH18 and Hobsonville Road.

The current layout of Trig Road provides limited or no pedestrian, cycle and public transport facilities. The Project will provide pedestrian, cycle and public transport facilities along Trig Road, which will enable greater choice of mode and provide improved safety outcomes for transport users.

Currently the potentially affected wetlands in the project area, are dominated by exotic plant species, with effects of grazing and pugging from livestock. The proposal includes planting and fencing and protection of two wetlands in perpetuity.

Overall, the Project will provide significant benefits to the local community and wider North West area, supporting the Council's growth strategy. In providing an urban transport corridor that responds to the growth demand in the area, the Project will improve transport network functions and contribute to a high-quality urban environment for local residents, businesses and road users.

9.1.1 Walking and Cycling

There are currently no dedicated cycle facilities on Hobsonville Road or Trig Road and limited pedestrian facilities. The current road environment, including the intersections of Trig Road and

Luckens Road, support higher vehicle speeds, which further results in reduced attractiveness for walking and cycling.

The proposed walking and cycling facilities for Hobsonville Road and Trig Road (described in Section 3) have been designed to indicatively provide separated protected walking and cycling facilities and all intersections within the Project have been provided with signalised pedestrian/cycle crossing facilities. This provides a significant improvement to the existing walking and cycling network and is a positive effect of the Project.

Dedicated walking and cycling facilities have been provided on both sides of Hobsonville Road. This reflects the higher strategic importance of Hobsonville Road within the primary cycle network.

Trig Road is close to several key trip attractors, including Westgate shopping centre and public transport interchange (1km west of Trig Road), and business land planned in Whenuapai (1 to 3km north and east of Trig Road). West Harbour ferry terminal is 2.6km east of Trig Road on the current road network. The proposed separated cycle lane and footpaths will provide safe alternative transport options and encourage a mode shift for these local movements.

Overall, the Project will create an improved and safer walking and cycling network that encourages and promotes alternative modes of transport. The proposed walking and cycling improvements will integrate with existing networks and the likely future environment.

9.1.2 Public Transport Network

As described in Section 3, the Project involves the replacement of existing bus stops and provides sufficient corridor width to locate new bus stops in the berm along the corridors as they may be needed to respond to the future public transport network.

The upgrades to the road network will improve bus travel time and reliability by providing for bus only through movements along Hobsonville Road at Luckens Road and Trig Road intersections, a dedicated bus lane on Hobsonville Road between Luckens Road and Trig Road and a right turn bus advance lane on Trig Road. These upgrades will allow buses travelling on Hobsonville Road to avoid potential queuing delays at intersections and improve travel time reliability thereby increasing the efficiency and attractiveness of public transport travel.

Overall, the Project will enable an efficient public transport network which will support the existing and the likely future environment in the Project area and wider Whenuapai.

9.1.3 Road Safety

The design of the Project has been undertaken to reflect AT's commitment to Vision Zero, which aims for no deaths or serious injuries on Auckland's transport system by 2050. The Project supports this approach by:

- Providing for protected walking and cycling facilities on all corridors, where necessary, supporting facilities for vulnerable road users
- Safe intersection design based on AT standards and provision of crossing facilities for vulnerable users, where necessary.
- Vehicle lane widths and corridor widths minimised, as much as practicable, to support a lower speed environment.

The current intersection forms at Trig Road and Luckens Road with Hobsonville Road were designed for a low-volume rural environment. While these intersections may have been appropriate in the past, these will be less appropriate as urbanisation occurs. A speed environment of 50kph is more appropriate in an urban context and consequently there is a need to reform these intersections in a way that supports walking and cycling and encourages a slower speed environment. The Project will achieve this by providing a slower speed environment and improved intersections with dedicated cycling and pedestrian facilities.

Overall, the Project is well aligned with the principles of AT's Vision Zero and will improve the existing transport corridor to provide high levels of road safety in the Project area. Detailed design investigations will be completed to further support safety outcomes.

9.2 Transportation Effects

This section provides an assessment of the actual and potential adverse transportation effects that will result from the construction, operation and maintenance of the Project. The assessment is informed by the *Trig Road Corridor Upgrade: Assessment of Transport Effects* (**ATE**) contained within Volume 4.

9.2.1 Construction Transport Effects

The assessment of expected construction traffic has been developed based on the indicative construction methodology (outlined in Section 7).

Given the construction timing and staging of the package has yet to be determined, there is a degree of uncertainty associated with any predicted construction methodology and associated traffic routes. This means:

- The routes that will be used by construction vehicles will depend on the location of quarries and disposal sites which are not yet certain
- The exact location and extent of compound sites/lay down areas has yet to be determined
- The timing of construction of other projects could impact on likely construction vehicle routes

Notwithstanding this, it is considered that with available connectivity to the strategic network and available capacity in the network, construction traffic will be able to be readily accommodated.

Overall, the ATE does not identify any significant adverse impacts on the wider transport network as a result of the construction traffic; however, it does identify the potential for localised changes to traffic movement and property access. Measures to mitigate these potential effects will be secured through a designation condition requiring preparation and implementation of a CTMP, such that the adverse effects are no more than minor. These measures are summarised below.

9.2.1.1 Construction Traffic Management

As discussed above, the potential adverse effects of construction traffic will be managed through a CTMP. The purpose of the CTMP is to ensure the construction of each Project is managed in such a way that enables safe and efficient movement of local traffic throughout the construction period and to minimise disruption to road users, particularly the adjacent residential properties and local activities.

Localised transport effects will be managed through appropriate construction management protocols, including:

- Measures to provide for the safety of all road users is maintained throughout construction; for instance, temporary speed limits.
- Identification of detour routes and other methods to provide for the safe management and maintenance of traffic flows, including pedestrians and cyclists, on existing roads;
- Methods to provide ongoing vehicle and pedestrian access to private and adjacent properties; and
- Methods for communicating and timing construction activities to minimise the effects of temporary traffic and access restrictions.

9.2.2 Operational Transport Effects

The assessment of operational effects provided in the transport assessment was completed using a mix of quantitative transport modelling and qualitative assessment measures relating to the following transport functions:

- Walking and cycling
- Public transport
- Road user safety
- Property access
- General traffic.

The positive transport effects as a result of the Project are described in Section 9.1 of this report. The following sub-sections provide a summary of the adverse operational effects with respect to each of these transport functions.

9.2.2.1 Walking and Cycling

The proposed walking and cycling facilities are described in Section 3. While cycling facilities would typically be provided on both sides of the corridor, a two-way cycle facility on the eastern side of Trig Road has been proposed due to the high number of existing vehicle crossings on the western side of the corridor. Once the land is urbanised on the north eastern and western side, it is expected that these properties will be accessed via future collector roads from Trig Road, rather than driveways directly on to Trig Road. Locating the cycleway on the eastern side of Trig Road means that cycle facility users will not have to cross multiple vehicle crossings, reducing the potential for conflict and accidents.

It is noted however, that should the urban context or environment along Trig Road change, there may be a desire to implement typical one way cycle facilities on each side of the corridor. The proposed corridor width would be capable of achieving these reconfigured cycle facilities in the future if required.

The cycle facility will also connect into future intentions for a strategic shared path on the southern side of SH18 and the proposed cycle provisions along Hobsonville Road.

For pedestrians, the proposed corridor provides for a significant increase in the level of service provided to pedestrians crossing Hobsonville Road, compared to the existing environment.

Overall, the Project will create an improved and safer walking and cycling network that encourages and promotes alternative modes of transport. The proposed walking and cycling improvements will integrate with existing networks and the likely future environment.

9.2.2.2 Access

9.2.2.2.1 Driveways

Hobsonville Road is classified as an 'Arterial' corridor under the AUP:OIP and Trig Road is proposed to also have an arterial function although it is not identified as an arterial in the AUP:OIP. Arterial roads classification in the AUP:OIP means that new direct property access is limited by the AUP:OIP.

In terms of existing properties, the overarching design philosophy for the Project has been to maintain driveway access where practicable and minimise impacting land other than where necessary to re-instate driveways.

There are several existing properties where it has been identified that a replacement driveway will not be possible to implement with the Project in place, primarily due to changes to road levels and incursion of the corridor into the front of properties. These properties have been included within the proposed designation boundary.

9.2.2.2.2 Access Movements

As part of the design of the signalised intersections, a raised island has been proposed to separate traffic at the intersection approaches. The provision of the raised island has been provided as a safety measure to prevent crashes between vehicles at the intersection. The implication of the raised islands is that several existing property accesses will no longer be able to turn right and will in effect be a left-in left-out access. This directly impacts the existing property accesses between 72 to 78 Hobsonville Road and 87 to 111 Hobsonville Road.

The ATE provides an evaluation of this change and how the restriction to right-turn movements is likely to affect vehicle access to these properties. This evaluation has concluded that there are sufficient alternative routes within the local transport network to mitigate the restriction on right-turn movements on these properties. The local transport network provides a range of alternative route options (regardless of destination or direction of approach) which work for left-in left-out movements. Accordingly, any additional travel time to complete these manoeuvres are considered to be minimal.

9.2.2.3 General Traffic

9.2.2.3.1 Network Performance

The Project will change the local transport environment, which has the potential to impact network performance through greater travel times.

There is expected to be a minor increase to travel time along Trig Road as a result of a speed reduction from 80km/h to 50km/h resulting from the Project. However, this speed reduction is required to provide an urban arterial transport corridor and safe walking and cycling facilities. Overall, a reduced speed limit over approximately 600 m of corridor may result in an increased travel time of some 10 seconds.

The provision of these signalised intersections along Hobsonville Road will result in delay to vehicles travelling on Hobsonville Road in comparison to the existing intersection arrangements, which provide priority to through movements on Hobsonville Road. However, this delay is considered to be typical of travelling by vehicle in an urban environment and would, therefore, not be unexpected within the context of a rapidly urbanising surrounding area. Moreover, as discussed previously, public transport (i.e. bus services) will be less restricted due to the bus advance lanes, and the dedicated walking and cycling facility improvements will provide enhanced alternatives for travel.

Overall, whilst the signalisation of the intersections on Hobsonville Road may result in some minor delays for private vehicles, this is balanced by increased efficiency for public transport such that the effect on network performance is considered to be negligible.

9.2.2.3.2 Surrounding Network Connections

A collector road network is not provided for by the Project as the alignment and delivery of these will be the responsibility of developers at the time of urbanisation. The design does not preclude these intersections being provided by developers at a later time. Additional land that may be necessary to deliver the intersections for collector roads will be vested by developers at the time of development. The median will also facilitate the opportunity for future pedestrian/cycle crossing points along Trig Road, as urbanisation occurs on both sides of the corridor.

The location of these collector intersections will also need to be integrated with the bus stop locations and pedestrian crossing facilities. The Project does not preclude these facilities being provided at a future stage of design or after construction by other parties.

Overall, while the future collector and local transport network is yet to be determined, the Project design provides sufficient flexibility to enable these connections to be formed as the surrounding land is developed. As such, the Project will have no adverse effects on the future network connectivity.

9.2.3 Summary of Transport Effects

Considering both the positive transport effects in Section 9.1 and the actual and potential adverse transport effects described above, overall, the Project will provide an improved transport environment that includes:

- Improved walking and cycling facilities with increased safety that will provide for the urbanisation of the local walking and cycle catchment.
- Improved public transport efficiency and reliability through the provision of bus priority and sufficient space to accommodate the development of future public transport network.
- Improved road safety through transport design which is better suited for an urban environment.
- Improved network performance through upgraded intersection design and traffic signalling.

To provide these benefits, the construction of the Project will require some temporary and localised disruption to traffic movements and property access. These construction effects can be appropriately managed through the implementation of a CTMP.

Additionally, a small number of properties will require changes to their existing vehicle access. A detailed access assessment will be completed by a suitably qualified traffic engineer and/or transport

planner as part of the Outline Plan of Works to identify appropriate means to mitigate these effects in consultation with the landowners.

Overall, the Project will have positive effects for the local and wider transport network. Any adverse effects will be temporary and localised, such that they will be no more than minor.

9.3 Noise and Vibration Effects

This section identifies and assesses the actual and potential effects of noise and vibration associated with the construction, operation and maintenance of the Project. The assessment is informed by the *Trig Road Corridor Upgrade: Assessment of Construction Noise and Vibration* (**ACNV**) and the *Trig Road Corridor Upgrade: Assessment of Traffic Noise and Vibration* (**ATNV**) contained within Volume 4, respectively.

9.3.1 Construction Noise and Vibration Effects

The indicative construction methodology (Section 7) has been assessed for construction noise and vibration against the relevant standards. The proposed designation boundary has been assumed as the construction boundary, and noise predictions were based on reasonable worst-case assumptions which included:

- The majority of noisy works will be carried out between 7am-6pm on weekdays with limited night-time and weekend works for the pavement and surfacing stage when required.
- Equipment and construction activity sound power levels for dominant noise sources were identified.
- Minimum set back distances from receivers were calculated to comply with day-time noise criterion of 70 decibels equivalent continuous sound level (dB LAeq) without mitigation.

The vibration effects associated with construction have been assessed in relation to potential building damage. The effect of vibration on amenity has not been assessed and has only been discussed to the extent that it is relevant to mitigation.

Indicative vibration emission radii distances have been predicted for the most vibratory equipment. Actual vibration levels are highly dependent on local conditions and the selection of machinery, which is currently unknown. To account for inaccuracies, the likely worst-case vibration has been calculated based on the equipment and hard ground geology to provide offset distances.

The predicted results were then assessed against the relevant criteria to determine if there would be any potential construction noise and vibration exceedances for any of the existing receivers along the Project.

9.3.1.1 Construction Noise Effects

The ACNV identifies that the closest properties outside the designation boundary and adjacent to the Project area could experience worst-case noise levels up to 90 decibels equivalent continuous sound level (**dB LA_{eq}**,) with mitigation, which does not comply with the AUP:OIP day-time noise criterion. This has the potential to result in noise disturbance effects (e.g. loss of concentration, annoyance, a reduction in speech intelligibility and reduced productivity) without appropriate mitigation.

Operation of construction equipment will be intermittent in nature. Construction will be linear so as the equipment moves away from the receiver noise levels will reduce. The worst-case situations, where mitigated noise levels could reach 90 dB LAeq at the closest receivers, are not expected to be frequent, due to the setback distances to the majority of the proposed works and the use of equipment with lower source noise levels for large portions of the works. Mitigated noise levels are expected to comply with the 70 dB LAeq daytime noise criterion for most of the construction works.

The ACNV sets out a hierarchy of mitigation measures which will be adopted through a Construction Noise and Vibration Management Plan (CNVMP) and any Schedules produced for the works (refer to section 9.3.1.3 for details). The preparation and implementation of CNVMP and Schedules will be secured through a designation condition.

The ACNV concludes that by following this hierarchy the Best Practicable Option (BPO) for mitigation will be implemented, whilst avoiding undue disruption to the community.

Overall, construction noise will be temporary and construction noise levels can be significantly reduced through the implementation of the hierarchy of mitigation measures. Accordingly, by providing appropriate mitigation and construction management the potential construction noise effects will be no more than minor.

9.3.1.2 Construction Vibration Effects

The ACNV identifies that, in worst case circumstances (without mitigation), 36 existing residential dwellings adjacent to the Project area may experience vibration levels of 5 mm/s or above, exceeding the criteria for residential properties. 5mm/s is the threshold above which cosmetic building damage may occur, such as cracking.

The vibration amenity criteria (vibration levels of 0.3mm/s for night time and 2 mm/s during the day) could be exceeded in existing or future buildings if they are occupied during the works and within 21m of the roller compactor (high vibratory equipment) or within the emission radii identified for the other vibration generating equipment (refer to Volume 4 for details).

In addition to cosmetic building damage, the potential adverse effects associated with excessive vibration may range from annoyance to loss of amenity or inability to carry out work. It is noted the structural damage is not expected. These vibration effects will reduce with distance from the source and the level of vibration transmission into a building will depend on a number of factors, such as the foundation type and building construction. Vibration can typically be tolerated inside buildings if it occurs intermittently during the day, is of limited duration and where there is effective prior engagement.

The ACNV sets out a hierarchy of mitigation measures which will be adopted through a Construction Noise and Vibration Management Plan (CNVMP) and any Schedules produced for the works (refer to section 9.3.1.3 for details). The preparation and implementation of CNVMP and Schedules will be secured through a designation condition.

Additionally, to manage the potential for cosmetic damage to buildings, a building condition survey will be offered to be carried out before and after construction works at properties where predictions indicate the relevant building damage criteria may be exceeded, to determine if any damage has been caused. Any damage confirmed to be caused by the Project will then be repaired.

Overall, construction vibration will be temporary and through the implementation of the hierarchy of mitigation measures, the risk of significant adverse effects associated with excessive construction vibration levels can be avoided. Accordingly, by providing appropriate mitigation and construction management, the potential construction vibration effects will be no more than minor.

9.3.1.3 Construction Noise and Vibration Management Plan

A Construction Noise and Vibration Management Plan (**CNVMP**) is proposed as the most effective way to control noise and vibration impacts. The objective of the CNVMP will be to provide a framework for the development and implementation of best practicable options for the management of construction noise and vibration effects.

The CNVMP will include a comprehensive suite of measures, which are set out in detail in the ACNV in Volume 4 and the proposed designation conditions in Volume 4.

Where noise and/or vibration limits are predicted to be exceeded for a more sustained period or by a large margin, a Site Specific or Activity Specific Construction Noise and Vibration Management Schedules ("Schedule") will be produced. Any Schedule will include details such as:

- Construction activity location, start and finish dates;
- The nearest neighbours to the construction activity;
- The predicted noise and/or vibration level for all receivers where the levels are predicted or measured to exceed the applicable standards and predicted duration of the exceedance;
- The proposed mitigation options that have been selected, and the options that have been discounted as being impracticable and the reasons why;
- The consultation undertaken with owners and occupiers of sites subject to the Schedule, and how consultation has and has not been taken into account; and proposed communications with neighbours.
- Location, times and types of monitoring.

Where measured or predicted vibration from construction exceeds Category A, then there is also a requirement to undertake building condition surveys.

Night works may potentially be required during pavement construction stages. Where there is no practicable alternative, night works can be managed through increasing the frequency of communication with stakeholders, carrying out regular monitoring to ensure criteria are being met and, as a last resort, offering alternative accommodation.

As set out above, where necessary, pre-condition surveys by a suitably qualified engineer will be offered to be undertaken at all buildings where the Project building damage criteria is identified as likely be exceeded. A post-construction condition survey of the same buildings will be conducted when construction is completed, and any damage shown to have been caused by the Project construction rectified by Auckland Transport.

9.3.2 Traffic Noise and Vibration Effects

This section identifies and assesses the actual and potential effects of traffic noise and vibration associated with the Project.

The Assessment of Traffic Noise and Vibration Effects report for Trig Road, in Volume 4, contains predictions of road traffic noise carried out using the method recommended in NZS 6806: Acoustics – Road traffic noise – New and altered roads (NZS 6806) in accordance with the AUP:OIP.

The assessment of effects undertaken in the report is two-fold: in accordance with NZS 6806 and in relation to the predicted noise level changes comparing the future traffic noise levels with and without the extended and / or upgraded transport corridors. The summary below should be read in conjunction with this report.

9.3.2.1 Assessment Methodology

As required by NZS 6806, the assessment methodology included the prediction of existing and future traffic noise levels, both without (Existing and Do Nothing scenarios) and with the proposed transport corridors (Do Minimum scenario). The scenarios are explained below:

- The Existing scenario represents the current road network with current traffic volumes, i.e. the existing environment as it is experienced now
- The Do Nothing scenario represents the current road network with future traffic volumes, assuming a full build out of the area
- The Do Minimum scenario represents the proposed future road network, incorporating the proposed or upgraded transport corridors and other planned transport projects in the area. This scenario assumes a full build out of the area, and the transport infrastructure to enable the development. This is a realistic scenario at a point in time when all proposed designations are operational.

Noise effects of road traffic on existing noise sensitive locations, referred to as Protected Premises and Facilities (PPFs) within NZS 6806, have been assessed. PPFs within a 100m radius of the urban transport corridors have been included.

Where transport corridors are considered ‘Altered Roads’, these have been assessed by comparing the predicted noise levels in the design year without the projects (Do Nothing) with the predicted noise levels in the design year with the projects (Do Minimum).

Transport corridors considered to be ‘New Roads’ have been assessed by comparing the predicted existing noise levels with the Do Minimum predictions.

9.3.2.2 Potential Adverse Traffic Noise and Vibration Effects

Adverse noise effects as a result of high levels of traffic noise may include sleep disturbance, loss of concentration, annoyance, a reduction in speech intelligibility and reduced productivity. The effects are not restricted to PPFs but also future residential and other noise-sensitive developments. The effects on future residential and other noise-sensitive developments are not included in the NZS 6806 definition of PPF. Where new noise sensitive developments are established in the vicinity of a road, their design should take account of the potential noise effects and care should be taken to avoid or minimise the effects.

The magnitude of effects will largely depend on noise levels received in noise-sensitive spaces within buildings, although there are also potential annoyance effects associated with a loss of amenity when high noise levels are received in outdoor living or recreation spaces.

Traffic from new or upgraded roading projects is not generally expected to create any vibration issues. The smooth and even surface typical of new urban roads would likely generate no more than negligible traffic vibration impacts. Therefore, traffic vibration has not been assessed for the transport corridors.

9.3.2.3 Assessment of Adverse Traffic Noise Effects

As identified in the Traffic Noise and Vibration report, the use of a low noise road surface was found to provide the best practicable solution in terms of traffic noise reduction and is the mitigation option recommended. Following implementation of the recommended mitigation measures outlined in Section 9.3.2.4, the Category A criteria will be achieved at 104 out of 106 PPFs, with the remaining two PPFs achieving the Category B criteria. There are no PPFs which are predicted to receive noise levels in Category C.

For 2 PFFs, noise levels are predicted to increase by a perceptible amount (3-4dB). This is as a result of the known demolition of dwellings which would otherwise provide screening from the road, resulting in a slight adverse effect. Noise barriers were investigated but not considered practical due to the gap that would be required to maintain access to the properties, compromising the performance of the barriers.

All predictions are based on traffic flow along 'Altered Roads' at the design year (2048). These traffic volumes are predicated based on the anticipated urbanisation of the area and implementation of surrounding infrastructure projects. Development of the surrounding areas will likely increase activity and associated noise levels. Therefore, any changes predicted for the traffic noise effects related to these projects are not likely to represent such a significant change at the time of construction due to the change in environment.

The results of the noise assessment will be confirmed at detailed design stage including confirmation of the road traffic noise at current PPFs. The review, confirmation and refinement of the BPO shall aim to achieve the same noise criteria categories as determined with the current BPO.

Nevertheless, the predictions show that most PPFs (with the exception of two Category B PPFs) will receive levels within the Category A criterion, which is the most stringent Category and represents the lowest design noise levels. Therefore, resulting noise levels will be reasonable in a residential context at the majority of PPFs assessed and no further noise mitigation is deemed necessary at this stage.

9.3.2.4 Recommended measures to avoid, remedy or mitigate potential adverse effects

There are broadly three mitigation options that can be applied to manage road traffic noise, and are discussed in NZS6806:

- The choice of road surface material, a mitigation option that reduces noise at the source. Road surface material has the largest influence on the generation of road traffic noise.
- The installation of noise barriers either on the roadside or on the property boundary.
- Building Modification measures (e.g., mechanical ventilation to enable windows and doors to remain closed, or upgrade or replacement of windows, wall linings, floors and ceiling linings.

NZS 6806 states:

> *The noise criteria are intended to address the adverse effects of road-traffic noise on people. Land-use planning is the preferred method of avoiding these effects. Where this is impracticable, the Standard sets out procedures and methods of the prediction, measurement and assessment, and guidelines for mitigation of road-traffic noise in accordance with the duty to adopt the best practicable option.*[8]

This indicates that NZS6806 deals with the residual noise effects after land-use planning has been implemented (or where it has been omitted in the planning stage).

Generally, mitigation is implemented from source to receiver. This means that the road surface is the first choice of mitigation measure as it protects the largest extent of receivers. Second are barriers placed either on the road edge or the property boundary. Barriers protect the area behind them, so are not suitable to shield upper floors of multi storey buildings, however, they are suitable to protect ground floors and outdoor living areas where these are facing a road. Barriers may also not be appropriate in suburban and urban environments for urban design reasons – this would be considered when the BPO is confirmed. Lastly, building modification can be implemented to existing PPFs where these are not sufficiently designed to reduce internal noise levels. Building modification is the last choice as it only protects individual living areas and has no benefit to the wider community.

Where future developments are not yet implemented, the road controlling authorities and developers have a shared responsibility to implement reasonable and appropriate mitigation.

Application of AC-14 or equivalent low noise road surface has been recommended for the entire length of the project. No additional mitigation measures are required.

9.3.2.5 Summary of Traffic Noise and Vibration Effects

With implemented mitigation measures, predicted traffic noise levels during operation of the Project are generally expected to meet the most stringent noise criteria (with two exceptions).

Two PPFs are predicted to experience perceptible noise level increase due to the known demolition of several dwellings which would otherwise provide acoustic shieldings. However, ambient noise levels in the area will likely increase as the area urbanises and therefore the change in noise level due to the Project will likely not be as noticeable at the time. Noise barriers were investigated but not considered practical due to the gap that would be required to maintain access to the properties compromising the performance of the barriers.

9.4 Archaeology and Heritage Effects

This section provides an assessment of the actual and potential effects on archaeology and heritage that will result from the construction, operation and maintenance of the Project. The assessment is informed by the *Trig Road Corridor Upgrade: Assessment of Historic Heritage Effects* (**AHHE**) contained within Volume 4.

It is noted that the AHHE was finalised in 2020 prior to the NOR and Regional consents being placed on hold. The general premise of this assessment is still correct, with only very minor changes made to the alignment since 2020 (notably the stormwater pond has been relocated due to the presence of a wetland). We do not consider this has any significant effect based on the findings of the AHHE.

The AHHE has been prepared based on review of the following sources to determine whether any archaeological or other historic heritage sites have been recorded on or in the immediate vicinity of the Project area:

- The New Zealand Archaeological Association's site record database;
- Auckland Council's Cultural Heritage Inventory;
- AUP:OIP schedules;
- Heritage New Zealand Pouhere Taonga New Zealand Heritage List/Rārangi Kōrero; and
- Literature and archaeological reports relevant to the area.

This was supplemented with a visual inspection of the Project area.

The AHHE concludes that there are no archaeological sites or historic heritage sites recorded within or in close proximity to the Project area, and the nearest sites (mainly shell midden relating to Māori occupation) are over 1.5km to the west along the coast and approximately 1km to the south along the Manutewhau inlet and stream. As such, the construction and operation of the Project will have no effects on any known archaeological or other historic heritage values.

In any area where archaeological sites have been recorded in the general vicinity, it is possible that unrecorded subsurface remains may be exposed during development. However, it is considered unlikely in this situation, as the Project area is located some distance from both the coast and navigable waterways where Māori and early European archaeological sites tend to be concentrated. The Project also follows existing road alignments, and most of the Project area has been modified by roading and urban development.

To mitigate the very limited potential for unidentified archaeological remains to be exposed during construction, an ADR advice note has been included with the designation conditions for the Project.

Overall the Project is unlikely to have effects on any known archaeological or other historic heritage values.

9.5 Cultural Effects

Manawhenua have been partners throughout the development of the Programme, with Ngāti Whātua o Kaipara and Te Kawerau ā Maki the predominant iwi groups with an interest in the area.

Manawhenua involvement in the Programme has included options assessment, design refinement and effects assessment for the Project. Engagement with these iwi groups has included site walkovers to identify and address any culturally significant effects. Further detail on the engagement and consultation with Manawhenua is provided in Section 11.2.3.

While the Project area is not subject to any identified Sites of Significance to Manawhenua under the AUP:OIP, Ngāti Whātua o Kaipara and Te Kawerau ā Maki have produced Cultural Impact Assessments (**CIA**) for the Project.

9.5.1 Ngāti Whātua o Kaipara

In the CIA, Ngāti Whātua o Kaipara raised matters including:

- Road design
- Vegetation removal

- Potential to enhance ecology and environment
- Effects of site works
- Potential to uncover archaeological or heritage items
- The proposed design and conditions of the designation includes appropriate measures to control the effects of site works, appropriate road design, avoidance of vegetation remove where possible, and ongoing consultation with manawhenua.

9.5.2 Te Kawerau ā Maki

Te Kawerau ā Maki are associated with the area within which the North West Preferred Transport Network (refer Figure 2) is located. The CIA prepared by Te Kawerau ā Maki addresses the entirety of the North West Preferred Transport Network. This includes the Trig Road Corridor Upgrade Project.

The following is a summary of the key matters raised by Te Kawerau ā Maki, in respect to the Project:

The future transport network

- Te Kawerau ā Maki do not oppose the Project.
- The CIA notes the potential positive operational benefits of the Project through walking and cycling provision and opportunity for cultural design and place making.

Impacts on streams and ecology

- The CIA identifies impacts on Te Waiarohia ō Ngariki (Waiarohia Stream), including effects arising from earthworks in proximity to the awa, works within the awa to install new culverts, permanent fill batter slopes adjacent to the awa and an increase in impervious surface.
- Impacts on Wai Māori (fresh water) are identified, including effects arising from earthworks within proximity to watercourses and vegetation clearance along watercourse embankments.
- Te Kawerau ā Maki identified in the CIA that the stormwater management approach proposed as having minor beneficial effect.

Impacts on whenua (soils)

- The CIA raises the impact of bulk earthworks associated with the Project.

9.5.3 Recommended measures to avoid, remedy or mitigate potential adverse effects

A suite of measures is proposed to avoid, remedy and mitigate cultural effects arising from the Project, and will be secured through consent and designation conditions. These are summarised below.

General

- Te Tupu Ngātahi will continue to engage with manawhenua to further understand the cultural effects that may result from the construction and operation of the Project.

- Manawhenua will be invited to prepare a Cultural Advisory Report in advance of the detailed design. The purpose of the report is to assist in understanding and identifying treasures affected by the project and inform their management and protection.

Cultural design and expression

- Manawhenua will be invited to participate in the development of the ULDMP to input into relevant cultural landscape and design matters on each corridor. This includes the management of potential effects on cultural sites, landscapes and values.

Risk of archaeological discovery

- A Cultural Monitoring Plan will be prepared prior to the start of construction works or enabling works. These plans will be prepared in collaboration with manawhenua to ensure that effects are managed appropriately, including features discovered by accident.
- Accidental discovery protocols set out under the AUP:OIP Accidental Discovery Rule (E12.6.1) will be adhered to. An advice note is proposed to this effect.

Earthworks, erosion and sediment deposition

- A CEMP will be prepared, setting out the overarching management procedures and construction methods to be undertaken to, avoid, remedy or mitigate any adverse effects associated with construction works.
- A finalised Erosion and Sediment Control Plan will be prepared and implemented to ensure appropriate construction methodologies and staging is used, land disturbance and vegetation removal is minimised, watercourses are protected, potential pollutants and debris/construction materials are controlled, outfalls are located to minimise erosion and scour, earthworked areas are stabilsed and retention devices are used to allow settlement of suspended solids/sediment laden runoff.

Wetland enhancement

- Wetland enhancement/planting is proposed to offset the wetland reclamation required to upgrade the road corridor, and will achieve a slight net gain in wetland value and extent. A Wetland Restoration and Enhancement Plan (**WREP**) will be finalised and implemented, requiring enhancement planting, protection in perpetuity and a maintenance plan ensuring ongoing pest control for five years.

9.5.4 Summary of Cultural Effects

Manawhenua have been partners through the development of the Project and their values have been reflected through the decision-making process and implementation of key mitigation protocols. While the Project will not affect any identified Sites of Significance to Manawhenua under the AUP:OIP, there is the potential for impacts on cultural values to the natural environment and cultural landscape context, identified through direct engagement with manawhenua.

Provision for cultural input and engagement will be enabled through the ULDMP and monitoring plans to manage adverse effects on cultural heritage and the potential for new archaeological discovery. The ULDMP will also consider how corridor features integrate with the corridor as a whole, including any proposed mitigation, and how the transport corridors can contribute to or reduce effects on the relevant cultural landscape.

9.6 Landscape and Visual Effects

This section provides an assessment of the actual and potential landscape and visual effects that will result from the construction, operation and maintenance of the Project. The assessment is informed by the *Trig Road Corridor Upgrade – Assessment of Landscape and Visual Effects* (**ALVE**) contained within Volume 4.

It is noted that the ALVE was finalised in 2020 prior to the NOR and Regional consents being placed on hold. The general premise of this assessment is still correct, with only very minor changes made to the alignment since 2020 (notably the stormwater pond has been relocated due to the presence of a wetland). It is recognised that the receiving environment of the ALVE is based on PPC5, which has subsequently been withdrawn. We do not consider this has any significant effect based on the findings of the ALVE as it is still representative of the aspirations of the Whenuapai Structure Plan, and intensification is provided for in the current zonings of the AUP:OIP and PC78.

9.6.1 Construction Landscape and Visual Effects

As outlined in Section 5.3.1, whilst it is likely that construction of the Project will take place in the existing (mostly rural) environment, it will be when the area is transitioning into an urban environment. Within this context, the following changes need to be considered when considering construction related landscape and visual effects:

- Physical changes to the landscape during construction as a result of construction activities, such as earthworks, vegetation removal, and site clearance; and
- Temporary changes to visual amenity as a result of construction activities, such as construction laydown areas and machinery.

These changes to the landscape environment have the potential to result in temporary adverse landscape and visual effects during construction, particularly when viewed from properties that are immediately adjacent to the Project. However, through the implementation of appropriate mitigation and design considerations, the potential adverse effects can be minimised, and the level of effect will diminish over time following completion of the Project. These mitigation and design considerations include:

- Cut and fill slopes are proposed to be shaped to a natural slope to integrate with the surrounding landform and reinstated with appropriate landscaping.
- Localised planting is proposed to mitigate physical landscape effects and to assist with integrating the larger fill slopes further into adjacent landscape and ecological mitigation measures along Trig Road.
- Existing fences and garden plantings (removed through the Project works) are proposed to be reinstated.
- Integrate of any retaining walls or noise mitigation walls with private boundary fencing (i.e., to avoid double layering of noise walls and boundary fences). It is also proposed that retaining walls and/or noise walls incorporate any reinstatement planting required to replace vegetation that may be lost through the Project works.
- Reinstatement of the Project area following the completion of construction, including the removal of residual fill and gravel from construction laydown areas and reinstatement with grass and landscaping.

Overall, there may be minor adverse effects on visual amenity during construction. However, these effects will be temporary and largely confined to the period of construction. These temporary effects are typical for a corridor upgrade project and when considered within the context of a landscape which is likely to be changing at the time of the construction of the Project, are further mitigated.

9.6.2 Operational Landscape and Visual Effects

As outlined in Section 5.3.1, operation of the Project is likely to take place in an urban landscape. As such, operational related landscape and visual effects need to be considered within this context.

The Project will result in longer-term changes to the landscape context of the Project area, which have the potential to result in adverse effects to the landscape character, natural character and visual amenity of the area. These changes include:

- Re-profiling of the existing road surface and adjacent land resulting in changes to surface levels;
- Clearance and/or disturbance of vegetation and landscaping along the corridor and adjacent land; and
- Removal and/or modification of existing structures along parts of the Project area and introduction of new structures such as noise mitigation walls and retaining walls.

The Project area is considered to have low sensitivity to the type and extent of landscape and visual change proposed through the Project, as:

- The Project utilises existing infrastructure and there is no significant change in land use;
- Existing land cover is of low botanical value;
- The AUP:OIP indicates future urban development adjacent to the Project area; and
- There are no regionally or nationally significant landscapes identified with the AUP:OIP within or proximate to the Project area.

The localised effects on the landscape values of the Project area can be managed through the proposed mitigation measures:

- All cut and fill slopes will be shaped to a natural profile to integrate into the surrounding natural landform and reinstate with grass, where practicable.
- Stormwater features will be configured to a natural appearance with appropriate vegetation and integrated into the surrounding urban landscape context, so that any physical landscape effects are ameliorated.
- Retaining walls and noise mitigation walls will be designed to integrate with private boundary fencing and where practicable incorporate existing and reinstatement planting.
- Residual land parcels acquired through the Project should be grassed and maintained within the road corridor.
- Street tree planting will be provided along Trig Road and Hobsonville Road, which along with indigenous planting within the stormwater features will assist with moderating the shift from rural to urban landscape character.

FUZ development areas on adjacent land will, over time, substantially change the scale and character of the adjacent landscape as experienced from within the road and absorb the landscape and visual changes proposed within the Project area. As such, the Project will contribute to an improvement of the landscape values for the future urban context of the area.

9.6.3 Summary of Landscape and Visual Effects

The Project will result in some temporary adverse effects to landscape and visual amenity in the Project area. However, these effects will be localised, of a relatively short period and can be appropriately managed.

The existing landscape character and amenity values of the Project area are currently low and are likely to be enhanced over time as a result of the Project. Overall, when considered within the context of a landscape which is likely to undergo substantial changes as the area transitions into an urban environment, the Project will result in a net improvement to the existing landscape environment which is better suited to the future urban context of the area.

9.7 Ecological Effects

This section provides an assessment of the actual and potential ecological effects that will result from the construction, operation and maintenance of the Project. The assessment is informed by the *Trig Road Corridor Upgrade – Assessment of Ecological Effects* (**AEcE**) contained within Volume 4.

9.7.1 Ecological Baseline

The AEcE included a range of ecological surveys to identify habitat value and ecological features within the Project area. A summary of these findings is provided in Table 14.

Table 14: Value of Ecological Features within the Project Area

Ecological feature – habitat or species	Ecological value	Justification
Terrestrial habitats	Low	Mainly exotic habitats. However, there is planted native vegetation including 'Threatened; and 'At-Risk' Myrtaceae species. These threatened species are planted, immature/semi-mature and are currently widespread in the Ecological District; therefore, their presence has not elevated the value of the habitats.
Wetlands	Low to Moderate	All the wetlands potentially affected are largely modified, with low to moderate ecological value and probably reflect a moderate representation of similar wetland features within the Waiarohia catchment. Likely, residual functions associated with wetlands in and adjacent to the Project area include erosion control and water purification.
Bats	Low	Bat surveys did not identify the presence of bats. Linkages to habitats where bats are known to be present are limited and the habitat in the Project area for bats is considered suboptimal (limited foraging and roosting habitat).
Birds	Low	Habitat dominated by exotic plant species. It is considered that only non-threatened native bird species would regularly use the habitats on or adjacent to the Project area.
Lizards	Low	Exotic scrub and long grass areas of habitat that are potentially suitable for 'Not Threatened' copper skink; although these species were not observed during site inspections.

Fish	Low	There is a low potential for indigenous eel species to be present given low water levels within wetlands 1 and 2 which would affect the presence of fish.

9.7.2 Construction Effects

9.7.2.1 Aquatic Ecology (Streams and Wetlands)

The location of the Project has been determined by balancing a number of factors, including environmental features (including wetland), road operational requirements, other existing and proposed infrastructure, etc. This is further described in Appendix A: Alternatives Assessment and Section 13.2.5 of this AEE which demonstrate a functional need for locating in this area. Despite efforts to avoid streams and wetlands, seven wetlands are potentially affected by the Project - five within the Project Area (TR-W1, TR-W2, TR-W3, TR-W4, and TR-W5) and two directly adjacent (TR-W6 and TR-W7). All seven wetland areas have been classified as NPS:FM natural wetlands because they do not meet the NPS:FM exclusions.

As identified in the ecological baseline, all the wetlands identified are dominated by exotic species, are subject to grazing and pugging and have largely modified conditions.

Table 7.18 of the AEcE, identifies the magnitude of effects on each of the streams and wetlands. In summary, the Project will result in direct effects of:

- Permanent loss of approximately 0.1ha (1000m2) of a 0.37ha (3700m2) hydrogeomorphic unit of a natural wetland (TR-W1)
- Permanent loss of approximately 0.078ha (780m2) of a 0.28ha (2800m2) hydrogeomorphic unit of a natural wetland (TR-W4)

The potential level of effect (without impact management) is considered to be low to moderate.

The loss of wetland habitat at TR-W1 and TR-W4 cannot be mitigated at the point of impact, therefore offset is required. The proposed location for this offset is within the downslope areas of the remaining portions of wetland habitat associated with both wetlands (TR-W1 and TR-W4). The area of wetland enhancement/planting has been calculated to ensure no net loss in ecological value is achieved. A Wetland Offset/Compensation Restoration Plan has been prepared, with initial calculations showing that restoration of 2,700 m^2 (TR-W1) and 1,000 m^2 (TR-W4) is required to provide a no net loss. The proposed designation provides sufficient room for this offset to be finalised at the detailed design stage.

A Wetland Restoration and Enhancement Plan (**WREP**) will be finalised prior to construction (as per draft resource consent conditions in Appendix F). The WREP will include confirmation of offset mitigation, protection in perpetuity and a maintenance plan ensuring ongoing pest control for five years. The proposed wetland offset will achieve a slight net gain in wetland value and extent – meeting the requirements of the NES:FW and AUP:OIP.

9.7.2.2 Terrestrial Ecology

The terrestrial vegetation within the Project site is Negligible to Low ecological value. There are no construction effects for terrestrial ecology where the level of effect was assessed to be Moderate or higher, however habitat is provided to native fauna including:

- Long-tailed bats (Very High ecological value)
- Non-TAR native birds (Low ecological value)
- North Island fernbird (High ecological value)
- Copper skink (High ecological value)

In accordance with the Environment Institute of Australia and New Zealand (EIANZ) guidelines, impact management measures (i.e., mitigation) are only proposed for those effects that have been assessed as moderate and above, therefore no mitigation is required for construction effects on terrestrial ecology.

9.7.3 Operational Effects

With consideration of the ecological baseline (Table 14), the operation of the Project has the potential to result in direct and indirect impacts on ecological features present in the Project area.

Direct adverse impacts from operational effects of the Project may include:

Vegetation removal creating a loss of connectivity.

Indirect adverse operational effects of the Project may include:

- 'Edge effects', creating increased alien and invasive plants within planted areas adjacent to the road that have been subject to vegetation removal.
- An increase in noise, light and vibration from operation of the upgraded road – resulting in disturbance and displacement of indigenous fauna.
- Modification of hydrological flow paths required for the maintenance of downslope wetland habitat for Wetland 1 and 2.
- Reduction in water quality via stormwater discharges from the release of contaminants (i.e., heavy metal and fine sediments) through the operation of the road.

When considering the Project within the context of the future urban receiving environment, the AEcE concludes that the potential operational effects on ecology are "low".

The operation of the road is not considered to present any noticeable change to the existing environment in regard to disturbance/displacement of native fauna. Overall, the magnitude of operational disturbance effects on resident fauna populations were assessed in the AEcE to be low due to the current presence of the road. In accordance with the EIANZ guidelines, no mitigation is proposed.

Through the construction of appropriate stormwater management devices to remove fine sediment and other contaminants (outlined in Section 9.9), operational effects on stream quality can be appropriately avoided.

Overall the operational effects on ecology are considered to be less than minor.

9.8 Property, Land Use and Business Effects

The Project design philosophy has been to avoid and minimise potential adverse effects on private properties and businesses through alignment and project design, where this is practicable. This has included specific consideration of the potential property and business impacts in the assessment of alternatives as discussed in Section 8 and detailed in Appendix A.

Where impacts on property, land use and businesses cannot be avoided, the potential effects are categorised into two broad groups:

- Directly affected properties/landowners; and
- Properties and businesses affected by proximity to the Project.

An assessment of these potential property, land use and business disruption effects is provided in the following sub-sections.

9.8.1 Directly Affected Properties

The proposed designation requires land to provide a sufficient footprint to enable the construction and operation of the Project (Designation Drawings are provided in Volume 3). Based on the proposed designation footprint, 66 private properties will be directly affected.

A description of existing land uses of the properties directly affected by the proposed designation is provided in Section 5.1. In summary:

- The land use immediately surrounding the Project area is characterised by a combination of residential, lifestyle block and rural properties.
- The south-western section of Trig Road is currently residential with predominantly single detached housing on larger (quarter acre) sections.
- Land use along Hobsonville Road is generally more urban, characterised by predominantly single detached housing development along the southern side of Hobsonville Road and northern side of Hobsonville Road west of Trig Road. There are also pockets of commercial and retail development along Hobsonville Road.

The potential pre-construction, construction and post construction effects on directly affected properties is discussed in the following sub-sections.

9.8.2 Pre-Construction

The proposed designation has a lapse duration of 15 years which is the standard lapse period for a designation under section 184 of the RMA. The proposed designation will not preclude the continued (unchanged) use of any directly affected properties prior to construction. However, in accordance with section 176 of the RMA, written consent would be required from AT for any works that would “prevent or hinder” the Project, including:

- Undertaking any use of the land;
- Subdividing the land; and
- Changing the character, intensity, or scale of the use of the land.

The purpose of the Project is to support for planned urban residential growth in Whenuapai. As outlined in Section 5.2, the Project area is largely rural in character and current FUZ zoning under the AUP:OIP indicates a high likelihood of change in the Project area from rural to urban land use. As outlined in Section 5.3, the Project is likely to be constructed within a transitional environment and will be operated within an urban or rapidly urbanising environment. As such, the Project is unlikely to affect the current land use of the Project area until such a time that the area starts to develop which would be concurrent with the construction of the Project. At this point potential land development issues would be addressed through the construction and operation of the Project (further discussed in Sections 9.8.3 and 9.8.4).

The areas of the Project along the south-western area of Trig Road and Hobsonville Road are expected to have a lesser scale of development change as this area is an existing residential environment - albeit that the area is generally zoned MHU under the AUP:OIP which allows for higher density development than that existing. As discussed, development is not precluded within the designation area, however any development within the designation area will require approval pursuant to section 176 of the RMA. As outlined in Section 11, AT has actively sought to engage with developers through the Project development process to address development plans and adapt where practicable to enable development in and around the Project corridor. AT will continue this process once the designation is confirmed, using section 176 of the RMA as the mechanism for approval with particular regard to the compatibility and viability of construction, flexibility of the Project design and where possible avoiding effects on reasonable future changes to land use which do not prevent or hinder the Project.

Considering these effects, the pre-construction of the Project will have no more than minor effects on property, land use and business.

9.8.3 Construction

During construction the Project will temporarily require land to enable construction activities (detailed in Section 7). The Project area adjacent to Trig Road is identified as a combination of residential, rural, pastoral and agricultural land uses, while along the south-western portion of Trig Road and Hobsonville Road the land is predominantly residential. Potential effects from temporary land requirements include temporary loss of grazing pasture, fencing, disruption to access, changes to driveway gradient, loss of vegetation and temporarily affected amenity.

It is proposed that the designation will be drawn back to the operational boundary once construction is complete. Effects from temporary land requirement can be mitigated through site specific arrangements which will be developed with the individual landowners through the Public Works Act processes.

Potential adverse effects from construction activities are addressed throughout Section 9 with appropriate mitigation identified to avoid or minimise effects on properties in proximity to the works. Particular mitigation measures for residential property and business disruption during construction include:

- Implementation of a CTMP to manage construction traffic and disruption to the local transport network (Section 9.2.1), including methods to:
    - Maintain vehicle access to property and/or private roads where practicable, or to provide alternative access arrangements when it will not be; and
    - Communicate traffic management measures to affected parties.
- Implementation of a CNVMS and CNVMP to manage construction noise and vibration effects on sensitive receivers (Section 9.3.1.3), including methods to:
    - Communicate and engage with nearby residents and stakeholders; and
    - Minimise construction disruption for affected properties during construction.
- Implementation of a Stakeholder and Communication and Engagement Management Plan to identify how the public and stakeholders will be communicated with throughout construction, including methods to:

- Determine adequate notice periods for the commencement of construction activities and works that affect access to properties;
- Inform parties of the expected timing, duration and staging of works and regular updating of progress; and
- Provide feedback, inquires and complaints during the construction process.

These measures will appropriately minimise disruption to affected properties and allow the continued use of properties where possible. Potential effects will be temporary and therefore it is considered that they will be less than minor.

9.8.4 Post Construction

The Project will permanently require land which is required for the finished Project (permanent transport corridor). The individual land requirements will vary between properties. The primary effect is loss of productive and residential land which will be mitigated through the Public Works Act process.

Any residual land (land not permanently required) will be reinstated in coordination with landowners through the temporary land acquisition process. The finished form of the corridor and viability of land adjacent to the road corridor will be evaluated based on the principles of the ULDMP. The purpose of this document is to:

> *"Enable integration of the Project's permanent works into the surrounding landscape and urban context; and*
>
> *Ensure that the completed Project mitigates potential adverse landscape and visual effects as far as practicable and contributes to a quality urban environment."*

The ULDMP requires the consideration of the future land use context as this relates to the Project corridor and seeks to ensure a suitable urban outcome for the area. Key considerations include:

Design to integrate with the adjacent urban (or proposed urban) landscape context, including the surrounding existing or proposed topography, urban environment and landscape character.

Integration of batters and cut/fill slopes in the landscape, measures may include:

- Grading cut and fill slopes to integrate with the surrounding landform.
- Minimising encroachment into water bodies and indigenous vegetation.
- Planting batters that coincide with wetland and stream courses.

The ULDMP is anticipated to be further developed in coordination with adjacent development where this is practical. In this way the ULDMP will ensure that the Project appropriately integrates with future land uses which are directly adjacent to the corridor and avoids, where possible, the potential to create residual land as a result of the Project. It is therefore considered that the effects of land requirement will be no more than minor on these landowners.

9.8.5 Properties Impacted by Proximity

Aside from the properties which will be directly affected by the designation, there is the potential that other properties outside the designation footprint could be affected by the Project as a result of their proximity to the construction activities.

Potential adverse effects from construction activities are addressed throughout Section 9 with appropriate mitigation identified to avoid or minimise effects on properties in proximity to the works. The particular mitigation measures for directly affected properties during construction, which are described in Section 9.8.3, are also applicable to properties impacted by proximity.

The potential adverse effects to properties and businesses in proximity to the Project area would be temporary and through the implementation of appropriate construction management, can be avoided or minimised, such that they are no more than minor.

9.9 Stormwater and Flooding Effects

This section provides an assessment of the actual and potential stormwater and flooding effects that will result from the operation and maintenance of the Project. The assessment is informed by the ASE contained within Volume 4. The assessment of construction effects on stormwater are provided in Section 9.10. As outlined in section 4.5, all necessary regional consents are sought for the operation of the Project. Discussions with Auckland Council's Healthy Waters Unit indicate that the proposed stormwater discharge can be authorised under the Regionwide Network Discharge Consent (NDC). However, for completeness, the ASE addresses all potential resource consent requirement in the event that discharge under the Regionwide NDC is not possible.

9.9.1 Flooding Risk

Potential flooding effects will be appropriately managed and are expected to result in negligible up to minor effects subject to the following recommended design outcomes, which will be secured by a designation condition:

- No increase in flood levels for existing authorised habitable floors that are already subject to flooding
- No more than a 10% reduction in freeboard for existing authorised habitable floors
- No increase of more than 50mm in flood level on land zoned for urban or future urban development where there is no existing habitable dwelling
- No new flood prone areas
- No more than a 10% average increase of flood hazard (defined as flow depth times velocity) for main access to authorised habitable dwellings existing at the time the Outline Plan is submitted.

9.9.2 Stormwater

The proposed stormwater dry pond will be utilised to provide on-site attenuation to control peak flows and discharge of runoff in the post-development receiving environment to a maximum that matches pre-development runoff.

Damage to properties and other infrastructure will be avoided by the collection and conveyance of runoff within the road and via underground pipe systems, and by allowing sufficient capacity in pipe crossings for effectively draining upstream catchments for future 'maximum probable development'.

The on-site attenuation ponds and proposed outfall structures provide for stream protection from increased stormwater flow, stream protection by energy dissipation at outfall to minimise scouring and erosion, and controlled discharge into the stream during large storm events to prevent downstream flooding.

The stormwater design approach, elements/infrastructure and concept network layout have been developed to satisfy the regulatory standards. While subject to refinement in detailed design stage the indicative design demonstrates the stormwater needs of the Project can be met, whilst catering to both current land use and for the expected future development upstream and downstream of the Project area.

The total redeveloped site area equates to 31,245m², with the percent of imperviousness increase from 47% in pre-development condition to 73% in post-development condition. The 22,680m² post-development impervious area equates to >50% of the total catchment area and dictates the method for runoff volume calculations as per the GD01.

Due to new impervious areas, this has the potential to result in adverse water quality effects in the mobilisation of contaminants within the runoff that accumulates in impervious areas, particularly with an increase in hydrocarbons, heavy metals, exhaust particles generated by vehicle use within the new transport corridor.

The following mitigation and management measures have been provided for in the indicative stormwater design:

- Water treatment has been designed and selected with consideration of GD01
- Raingardens were selected for “at source” treatment within the berms along the carriageway as well as “end of pipe” treatment in larger raingardens, and meet equivalent treatment requirements as per GD01
- The Project’s stormwater design has been developed with consideration of GD01.

The proposed measures will effectively deal with water quality volumes from the high contaminant generating roads, removing contaminants from runoff prior to their discharge into the environment. This is also consistent with BPO for water sensitive design.

The stormwater design approach, elements/infrastructure and concept network layout have been developed to satisfy the requirements of GD01 and water sensitive design approach. While subject to refinement in detailed design stage the indicative design demonstrates that the adverse effects of the Project on stormwater quality will be less than minor.

9.10 Earthworks, Erosion and Sediment Deposition

This section provides an assessment of the actual and potential earthworks, erosion and sediment deposition effects that will result from the construction and operation of the Project. The assessment is informed by the draft ESCP contained within Volume 4. As identified in Section 4, the proposed earthworks are a matter for both NOR and Resource consent consideration.

As described in Section 7.4.2, a significant volume of earthworks is anticipated to enable the widening of Trig Road and construction of permanent stormwater devices. Section 7.4.2 details the

approximate area and volume of earthworks required. The final amounts of earthworks will be confirmed at detailed design phase.

Erosion and the associated effects of sediment deposition have the potential to cause both physical and ecological disturbance within a watercourse/stream, and control measures (both during construction and within the design of permanent structures) need to be considered.

The key objectives of erosion and sediment control for the project are:

- Construction methodology and staging of work
  Selection and implementation of appropriate construction methods to facilitate staged construction works. This allows for more manageable ESC measures by confining works to smaller sections, making it easier to monitor and maintain, particularly when multiple measures are in place. Staging also means that the areas of exposed soils during earthworks is minimised or limited to only the specific area where works are taking place, minimising erosion of loose soils by wind and runoff, and facilitating dust management. Staging earthworks allows for progressive stabilisation during the construction period.
- Minimising disturbance
  Minimising disturbance by keeping earthworks and area of works to a minimum during operations, ensuring stability of surrounding slopes and structural integrity of nearby infrastructure is maintained. This is applicable to both vegetation removal, earthworks required to carry out cut/fill operations and works within existing watercourses during stormwater crossing upgrades.
- Protection of existing watercourses
  Diversion of clean water away from areas of disturbance and diversion of sediment laden runoff from disturbed areas/exposed soils during earthworks to prevent sediment laden runoff discharging into watercourses and adversely affecting downstream stream health (both ecological and physical).
- Pollutants and debris/construction materials should also be carefully controlled so that these are not deposited within the bed, with the potential to be conveyed downstream along with sediment.
- Minimising earthworks and vegetation removal around and within watercourses to reduce the exposure of soils, and consequential erosion potential from scouring or wind during stormwater crossing upgrades.
- Protection of receiving streams is also applicable for the permanent structures. Outfalls will be designed to ensure stormwater discharges have minimal erosion and scouring impacts.
- Protection and stabilisation of embankments
  Protection of steep embankments by means of clean water diversion, contour channels along embankments, and progressive rapid stabilisation with the application of temporary straw mulch, geotextiles or similar, and hydro-seeding/grassing for permanent measure.
- Protection of existing watercourse embankments by limiting vegetation removal and earthworks during stormwater crossing upgrades.
- Retention devices to allow for settlement of suspended solids/sediment laden runoff
  Allow for sediment laden runoff to be detained and treated to facilitate the settlement of solids prior to discharging back into downstream watercourses.
- Monitoring and maintenance
  ESC measures should be monitored and maintain throughout the construction works so that they remain operational and fit for purpose and modified accordingly to suit changes on site.

The draft ESCP indicates the measures that can be used to achieve these objectives. It includes an indicative Erosion and Sediment Control Plan Layout, providing measures for each construction zone. All measures will comply with GD05 and will be confirmed in a final ESCP once detailed design has been completed.

The topography is mostly flat to rolling landscapes, with localised areas of steepness, and can be appropriately treated by the measures. Specific measures are proposed to ensure discharges are treated prior to entering watercourses. As identified in the AEcE, all works within the wetlands and watercourses can be done offline.

The proposed earthworks are of a scale that is typical for a transport corridor upgrade in a greenfield area and can be appropriately managed by the measures outlined above and detailed in the draft ESCP. As such, the Project is expected to generate less than minor effects from earthworks.

9.11 Contamination

This section provides an assessment of the actual and potential contamination effects that will result from the construction, operation and maintenance of the Project. The assessment is informed by the *Trig Road Corridor Upgrade: Preliminary Site Investigation* (**PSI**) contained within Volume 4. As identified in Section 4.5, resource consent is being sought in accordance with the NES: Soil.

The PSI identified numerous activities classified in the Hazardous Industries and Activities List (**HAIL**) that have historically occurred or are currently being undertaken on properties adjacent to the Project area. It states that while the human and environmental risk profile associated with soil contamination of properties in the Project area is likely to be limited, soil materials scheduled for disturbance as part of the Project may have been impacted by a range of contaminants of concern associated with the storage or use of hazardous materials or disposal of hazardous wastes at the adjacent properties.

The activities that are particularly relevant to the assessment of effects include:

- Commercial nurseries and glass houses;
- Potential horticultural activities (such as orchards, glass houses and market gardens);
- Transformers outside of properties and adjacent to road corridor; and
- A Vector substation.

The presence of these activities, means that soil materials scheduled for disturbance as part of this Project may have been impacted by a range of contaminants of concern, including:

- Heavy metals;
- Acid herbicides;
- Organophosphates;
- Organochlorine pesticides;
- Polychlorinated biphenyls;
- Hydrocarbons; and
- Asbestos containing materials.

The PSI recommends that a DSI be prepared to quantify the nature and extent of actual soil contaminant conditions within the Project area. This should be completed in accordance with Ministry for the Environment Contaminated Land Management Guideline No 5, Site Investigation and Analysis of Soils. A recommended condition of consent has been included to address this matter.

Given the above, the potential risks associated with the disturbance of contaminated material will be appropriately managed throughout the works and any potential adverse effects resulting from land disturbance are considered to be less than minor.

10 Summary of Key Proposed Mitigation

The table below sets out the proposed designation conditions by matter to manage the actual and potential effects on the environment as a result of the Project.

The concept design for Trig Road proposed designation and regional consents (as reflected in this AEE and supporting drawings and assessments) has sought to avoid or mitigate adverse effects through the route selection process and the concept design of the Project elements. Where it has not been practicable to avoid adverse effects, through route selection or design, measures are proposed to remedy or mitigate any residual adverse effects.

This will be achieved through the development and implementation of a suite of measures covering detailed design, construction and operation management plans and monitoring. These measures are included in the NOR conditions, and proposed Regional consent conditions (refer Appendix E and Appendix F) and are summarised in Table 15 below.

Table 15: Summary of key proposed mitigation measures

Matter	Measure
Transportation	• Construction Traffic Management Plan (**CTMP**)
Traffic Noise and Vibration	• Traffic noise mitigation measures as set out in designation conditions
Construction Noise and vibration	• Construction Noise and Vibration Management Plan (**CNVMP**)
Archaeology and Heritage	• Accidental Discovery Rule under the AUP:OIP
Cultural	• Mana whenua partnership • Cultural Advisory Report • Urban Landscape and Design Management Plan (**ULDMP**) • Stakeholder and Communication Engagement Management Plan (**SCEMP**); • Cultural Monitoring Plan • Contaminated Land Management Plan (**CLMP**) • Accidental Discovery Rule under the AUP:OIP • Wetland Restoration and Enhancement Plan (**WREP**).
Urban design	Urban Landscape Design Management Plan (**ULDMP**).
Landscape	
Ecology	• Tree Management Plan (**TMP**); and • Wetland Restoration and Enhancement Plan (**WREP**)
Property, Land Use and Business	• Stakeholder and Communications and Engagement Management Plan • Complaints register • Construction Noise and Vibration Management Plan (**CNVMP**) • Construction Traffic Management Plan (**CTMP**)
Stormwater and Flooding	• Construction Environmental Management Plan (**CEMP**); and • Flood Hazard Risk Outcome condition
Earthworks	• Construction Environmental Management Plan **(CEMP)**; • Erosion and Sediment Control Plan (**ESCP),** • Chemical Treatment Plan **(CTP)**

Contamination	• Contaminated Land Management Plan (**CLMP**)

11 Engagement

This section provides a summary of engagement that has been undertaken to date and which is ongoing for the Project. It summarises the approach during each phase, focusing on key themes and common issues raised across the Project and the North West Network more generally.

Prior to detailed design and construction, further engagement will be undertaken by the requiring authority, as needed to manage impacts of the Project. This is set out in detail in the AEE and the proposed conditions.

11.1 Overview of Engagement

Engagement with partners, stakeholders, potentially affected parties and the wider community has been ongoing. Table 16 provides a brief summary of the key Project development stages and engagement undertaken.

Table 16: Project Stage Engagement Summary

Project Stage	Timing	Description

Programme Business Case (PBC) – Auckland wide	2015 – 2016	**Engagement undertaken:**
		• Workshops, meetings and events with Manawhenua, Local Boards, communities and a wide range of stakeholders, to understand the issues, opportunities and community aspirations in each growth area (Auckland-wide).
		• Manawhenua were engaged to:
		  • Seek feedback on the draft preferred transport networks;
		  • To develop a set of Manawhenua values that could be considered and further developed at the next stage of the Project; and
		  • To provide cultural, historical and social knowledge and information that will help to inform the Project.
		• Two stages of consultation undertaken ('Long-list' options phase and preferred programme stage) – both stages involved a series of public based community open day events, feedback sessions, online forms and a business owner/operator survey.
		Outcome
		• A process-led refinement of the long list into preferred options leading to the completion and publication of the Preferred Transport Network Plans in 2016.
		• These high-level maps showed a range of indicative transport connections required to support the growth in each growth area of Auckland.

Indicative Business Case (IBC) – North West area wide	2018/19	**Engagement undertaken:** • Engagement sought to build on the PBC and receive feedback and input from partners, stakeholders and the general public on the short-listed options being considered for the four Supporting Growth business case areas, including the North West. • Engagement was undertaken via information days, workshops and meetings to develop an IBC for the entire North West growth area. **Outcome**

Project Stage	Timing	Description
		• The Project options were subsequently modified and refined as the process progressed. • As a result, the Indicative Strategic Transport Network was identified in Redhills and Whenuapai to support growth. The Indicative Network maps were published in mid-2019.
Detailed Business Case – North West HIF	2019	**Engagement undertaken** • Engagement with stakeholders, developers, and landowners was undertaken to prepare a DBC and understand the issues and opportunities of the Indicative Strategic Transport Network developed during the IBC phase. • Focus was on meetings with landowners and developers affected by the Project and informing the wider community on the Indicative Strategic Transport Network. **Outcome** • Designs were subsequently modified and refined. • As part of this, the Indicative Strategic Transport Network was further developed in this phase to create preferred routes (including for this Project).
Notices of Requirement - North West HIF	2019/20 and 2022	**Engagement undertaken** • Engagement with stakeholders, developers, and landowners has been undertaken to prepare NoRs for the new and upgraded arterials in Redhills and Whenuapai to support growth (including this Project). This has included briefings and presentations to local boards and elected representatives, Community Drop-in sessions held at Te Manawa in Westgate, letters and plans sent to identified affected landowners, and emails, phone calls and meetings with landowners. • Engagement was undertaken during 2019 and 2020 when the NoRs were first prepared. Due to funding constraints, the Project was not lodged with Council until 2022. Further engagement was undertaken during 2022 prior to lodgement. The purpose of engagement in 2022 was to refresh the project purpose with Local Boards as well as key stakeholders, with the focus being directed to landowner engagement. **Outcome** The preferred routes were further refined as part of this phase to create indicative alignments including for this Project.

11.2 Engagement with Programme Partners, Stakeholders and Landowners/Developers

The Programme partners and stakeholders have continued to be involved throughout the various Project development stages. This has included engagement with key stakeholder groups and developers on a Programme-wide basis to gain an understanding of proposed work programmes, land holdings, projects, timing, integration opportunities and to establish enduring relationships. Where possible, engagement with landowners has been undertaken on a one-to-one basis to understand how they use their land (including any further development plans to the property) and how they would be affected by the Project.

As illustrated in Figure 21 below, the feedback from these stakeholder groups, including landowners and developers, has been used to build knowledge, to understand risk, and to refine the design of the Project where practicable and appropriate.

Figure 20: Engagement Feedback Loop

11.2.1 Waka Kotahi

Waka Kotahi are investors and partners to the Programme and engagement has been undertaken with Waka Kotahi through the development of the Project. Engagement with Waka Kotahi has been facilitated via the Owner Interface Managers within the Programme, and through regular forums leading up to business case milestones and attendance at business case workshops. Other projects and business cases are also being progressed within the North West area to provide for predicted growth and safety improvements. The Programme has sought to integrate across these other projects and has been involved in updates and workshops, with information shared between the projects to align key messaging.

11.2.2 Auckland Council

There is close alignment between the Programme and the Council that supports the Programme's desired outcome of integration of land use and transport. Programme-wide, a regular Integration Forum between the Programme and Council has been facilitated to enable these commitments, and to actively identify and manage risks and opportunities inherent to the Programme.

Engagement with the Council regarding the Project has been closely aligned with the structure planning process that has already been completed. Notably in Whenuapai, where the Project is located, the Auckland Council Whenuapai Structure Plan was adopted in 2016.

Additional engagement undertaken with the Council through the North West business case stages included attendance at business case workshops, stakeholder workshops, Council attendance at North West Public Information Days and various meetings with the Council Resource Consents, Policy Planning and Parks teams.

11.2.3 Manawhenua

Manawhenua are recognised as Treaty Partners by AT and Waka Kotahi, and as such the Programme recognises their responsibilities and commitments in regard to engagement with Manawhenua.

Across the Programme, Manawhenua have been involved in the development of the indicative strategic transport networks.

The Programme recognises the Crown Settlement Area of Interest and Statutory Acknowledgement instruments in place for Te Kawerau ā Maki and Ngāti Whātua o Kaipara. Both iwi have been actively involved throughout the business case process.

Ngāti Whātua o Orākei, Te Runanga o Ngāti Whātua, Ngāti Te Ata Waiohua, and Te Ākitai Waiohua have noted their interest in the area with the Council and council-controlled organisations and were involved in the development of the Project since November 2017.

Te Tupu Ngātahi maintains a Manawhenua Forum (for operational and kaitiaki level interaction that focuses on Programme-wide delivery and consistency) with specific discussion on the Project. This has involved presenting to manawhenua on a regular basis, seeking input on the corridor development and potential effects on cultural values. This has informed the corridor alignment and the mitigation measures proposed. Iwi invited to the Northern Te Tupu Ngātahi hui includes Ngai Tai Ki Tamaki; Ngati Maru; Ngati Whanaunga; Ngati Whātua o Kaipara; Te Ākitai Waiohua; Ngati Paoa Trust Board; Te Kawerau ā Maki; Ngati Tamatera, Te Runanga o Ngati Whatua and Ngati Manuhiri.

Further opportunities for governance level relationships are provided via the Tamaki Transport Table and the existing connections with governance through the owner participants (AT and Waka Kotahi).

Manawhenua contributed to the development of criteria and values to be integrated into the MCA framework. Ngāti Whātua o Kaipara and Te Kawerau ā Maki have both prepared CIAs for the Project. These are summarised in Section 9.5 of this AEE.

The Programme involved Manawhenua as partners in decision making and considered their views when identifying priorities for investment options. This included seeking feedback on the draft preferred transport networks, developing a set of Manawhenua values to be considered and further developed, and attending the option evaluation and recommendation making processes.

Throughout this, key Manawhenua issues and opportunities were identified, as summarised in Table 17.

Table 17: North West Specific Manawhenua Issues and Opportunities

Key issues	Opportunities
• Impacts on riparian planting • Property development impacting waterway health • Impacts on wetlands, including reclamation • Protection/consideration of growing areas and history	• Restoration of streams and waterways • Mitigation planting and art work • Wetland restoration and enhancement • Improvement of forest and native vegetation areas through the Crown Settlement Area of Interest & Statutory Acknowledgement of Te Kawerau ā Maki & Ngāti Whātua o Kaipara

The Programme has also held various hui with Manawhenua to feed into the development of the Project, with these Hui both informing and enabling Manawhenua to influence the preferred network options. Manawhenua also participated in the site walkover in November 2019 with the wider Project team and Council specialists.

11.2.4 Engagement with Stakeholders

Engagement with stakeholders has been undertaken primarily at a Programme-wide level, through a series of Stakeholder Reference Group presentations and one-to-one meetings. Engagement methods and communication techniques have been tailored to each stakeholder, largely with the purpose to discuss issues/opportunities in relation to specific projects. Table 18 provides an overview of the key stakeholders and the purpose of engagement with each.

Table 18: Key Stakeholders for the Project

Key Stakeholders	Purpose of Engagement
Auckland Council Councillors	• Discuss issues/opportunities in relation to the Project
Auckland Council Local Boards	• Discuss issues/opportunities in relation to the Project
Auckland Council Parks and Reserves	• Discuss issues/opportunities in relation to the Project and the Council's long-term plans for future parks in the Whenuapai Structure Plan process
Watercare	• Watercare is a landowner in the Project area • Preliminary discussions to align Watercare planned infrastructure in both Whenuapai and Redhills
The Ministry of Education	• The Ministry of Education is a landowner in the Project area • Discuss issues/opportunities in relation to the Project • Discuss new potential school locations
The New Zealand Defence Force	• The New Zealand Defence Force is a landowner adjacent to the Project area • Discuss future plans and integration with Auckland Council plan changes
Vector	• Vector are a landowner within the Trig Road Project area and have infrastructure across all urban areas

Engagement with these stakeholders was largely through one-on-one meetings or email updates to explain both the study areas and plans for further refining the network, and to explore opportunities to work together to minimise impacts and enable positive outcomes.

Local Boards were provided with project update presentations and memorandums in July and August 2022, and briefings were held with elected representatives.

A Utility Infrastructure Alignment Forum lead by Watercare is held regularly and provides an opportunity for integration between infrastructure and utilities projects. The North West Infrastructure Forum includes representation from:

- Watercare
- Vector
- Chorus
- AT
- Waka Kotahi

The Programme delivered numerous presentations to introduce the Programme as a whole, discuss public feedback periods and the timeline of the Programme. It was also an opportunity to receive updates from infrastructure providers on plans for the North West.

11.2.5 Engagement with Landowners

During the DBC and NoR phases of the Project, one-to-one meetings were arranged with potentially and directly affected landowners within the Project area to discuss impacts and opportunities. Initial engagement took the form of informing landowners that they are located within the investigation area, via a letter. Landowners were then met with individually, including both residential (owner-occupied and tenanted) and business owners, at various stages of the Project development to gain an understanding of local knowledge of the area, how they use their land, to talk through the indicative strategic transport networks and to understand any arising constraints, issues and opportunities.

Driveway surveys of some properties were undertaken at the end of 2019 to better understand the impact on access to these properties. The alignment design was further developed and refined during early 2020 which resulted in minor to significant changes to property impacts and designation boundaries. In June 2020 those landowners were contacted by letter where there had been a change in impact or a new impact. A plan was attached to the letter showing their property and the new road alignment and face to face meetings were offered. These included 13 landowners in the Project area that had not been engaged with yet.

The purpose of the engagement was to:

- Engage with newly impacted landowners the Programme hadn't met with yet.
- Re-engage with landowners and communicate the post-design changes and impact to their property.
- Understand from those landowners whose properties were now fully designated their sentiments and appetite for undertaking topographical driveway surveys to see if there is a suitable access solution.

When the Project recommenced in 2022, further landowner engagement was undertaken, commencing with letters and project overview maps being sent to all property owners identified as potentially affected by the proposed designation. Once the proposed designation boundaries were confirmed, a plan of each property was produced and a further letter and copy of the plan were sent to each property owner. This encouraged landowners to get in touch with Te Tupu Ngātahi should

they have any further questions or require a meeting. 18 phone calls and emails were received in relation to the Project.

Meetings with landowners were held at local community venues or online via Microsoft Teams. These meetings were attended by two members of the Project Team and, in some cases, a property specialist from AT. These meetings allowed landowners to ask questions and understand the route protection process and timing. To date, 12 meetings have taken place with landowners in relation to the Project. In summary, four key periods of landowner engagement for the Project (in conjunction with engagement for the Redhills project, which is a separate project as part of the Programme) were undertaken:

- For the 2019 North West DBC landowner engagement period, the Programme sent letters to 112 landowners. A total of 75**3** landowner meetings were undertaken over a five-week period.
- For the 2019 North West NoR landowner engagement period the Programme sent letters to 112 landowners. A total of 55**4** landowner meetings were undertaken over a five-week period.
- For the 2020 North West NoR landowner engagement period the Programme sent letters to 83 landowners where there was substantial change in impact to their property. Approximately 59**5** landowner meetings were undertaken over a four-week period. This included 13 landowners newly impacted by the further design work that was undertaken.
- For the 2022 North West NoR landowner engagement period, 12 landowner meetings were undertaken for the Project.

The predominant themes of feedback received across the four engagement periods for the Project were:

- **Site boundary**: Concerns with loss of land and acquisition, queries if boundaries would stay the same, and concerns with the repercussions of the road coming closer to their house.
- **Access**: Questioning how this is impacted, and how it will be restored. Access, in particular right turn movements to/from some Hobsonville Road properties was a key theme during the 2020 engagement period.
- **Property acquisition**: Most landowners mentioned this, questioning what the process is, how compensation is determined, and whether it would be full or partial acquisition. During the 2020 engagement period an AT Property Specialist attended most of the landowner meetings to provide information on the property acquisition process including compensation and timeframes.
- **Property - Loss of Value**: Loss of property value was a main theme during the 2020 engagement period.
- **Re-development potential**: Landowners concerned with the loss of land and the impacts this has on their ability to subdivide or develop land.
- **Alignment concerns**: Landowners generally expressed interest in wanting more detail on alignments – there was an ongoing trend that the lack of detail is frustrating and causes a lack of certainty. More detail was provided during the 2020 engagement period.

[3] 75 being the number of landowners who responded to requests from the Project team for a landowner meeting
[4] 55 being the number of landowners who responded to requests from the Project team for a landowner meeting
[5] 59 being the number of landowners who responded to requests from the Project team for a landowner meeting

- **Timing**: Landowners enquired about timeframes for NoR lodgement and the construction period. Landowners raised during the 2022 engagement period that they were surprised the Project was still occurring as they had thought it had been cancelled rather than put on hold. As a result, generally, landowners expressed that due to the delay and uncertainty around the timing of the Project they wanted to move forward with property acquisition. In summary, the Project Team has undertaken ongoing engagement with affected landowners throughout the development of the Project. This has both informed affected landowners of the Project and potential impacts, and identified the key themes of concerns to landowners, with further information provided and surveys undertaken (where appropriate) to close out concerns. As such, the landowner engagement provided and detailed in this section is considered sufficient.

11.2.6 Engagement with Developers

To facilitate effective developer engagement across the Programme, a Land Development Co-ordination Team was initiated that included appropriate representatives from within the Programme (including AT and Council personnel) that meets and coordinates discussions with developers.

The Programme has undertaken a direct approach to engagement with developers, predominantly through one-to-one meetings. The purpose of these meetings was to ensure the Project Team had a greater understanding of their landholdings and to establish relationships for ongoing engagement and discuss how their land is potentially impacted by the proposed alignments. Additionally, engagement has also been undertaken with developers with interests in the Project area, in conjunction with those developers with property impacted by the other North West projects being progressed by the Programme.

During the 2022 engagement period, developers, commercial landowners and local businesses were contacted and draft designation plans were shared with these stakeholders via online and in person meetings.

The predominant themes from engagement with developers can be summarised as follows:

- Developers with development plans that are ready to develop need to align timing and sequencing with the Programme.
- Developers interested in developing are seeking a better understanding of transport networks in relation to their land.
- Existing developments may be impacted by transport networks and upgrades.
- Developers in the general vicinity are interested in the way the areas may develop and how transport networks may influence growth.
- Developers are interested in projects in the wider business case areas and other growth-related infrastructure that is to be implemented by others.
- Questions surrounding funding of transport networks and cost of development.
- Expectations for greater level of detail at the NoR stage, with specific requests such as the engineering approach, access changes, timing of works, acquisition processes and opportunities for design compromise to reflect developer plans.

Developers have generally been supportive of the Programme, recognising the need to improve transport infrastructure to enable the release of developable land in these areas. The delivery timing

of transport infrastructure is of significant interest for developers, in order to establish certainty for their own development plans.

11.3 Community Engagement

Engagement with the community for the Project has been undertaken as part of the wider engagement for the North West.

This engagement was largely through Public Information Days and survey questions, and included written responses, completed online and hardcopy surveys, and webpage views. Furthermore, to reflect the future 'communities' of these future growth areas (given the largely route protection focus of the Programme), engagement with youth and young professionals was undertaken across three workshops.

The North West Project Team also attended a community drop-in session in October 2022 at Te Manawa Library in Westgate. This was organised by the Waka Kotahi State Highway 16 Brigham Creek to Waimauku Safety Improvements project which has crossover with the North West projects. Approximately 40 people visited the Te Tupu Ngātahi stand to talk to the team and pick up information handouts. Attendees included both landowners affected by the Project and local community leaders.

The Te Tupu Ngātahi website was also updated to provide information about the Project, including an updated project overview map and information sheets about how the proposed designation may be used in the future.

The summary of community feedback relevant to the Project is presented in Table 19 below.

Table 19: Summary of Key Public Feedback Themes

Key Theme	Feedback Summary
General Transport (some relate to wider North West area feedback)	
Walking and Cycling	• Lack of safe cyclists and pedestrian facilities and crossings, and strong support for increased facilities (including separation between vehicles and cyclists • Support for increased facilities between residential areas and town centres, increased linkages to regional cycle network • Need for cycle facilities at transport centres
Safety	• Key concern for all transport mode users • Rural roads not fit for urban growth • Existing road corridors too narrow • High engagement regarding speed limit review, with it commonly perceived too high
Public Transport	• Currently poor or non-existent service and desire for immediate improvement • Desire for provision of Park and Rides and local feeder buses to support public transport (largely regarding ferries) • Consistent themes of improving connections, level of service (frequency, speed, increased destinations) and connectivity, and integrating modes of transport
Local Bus Network	• Greater accessibility to bus services, including suggestions for more bus stops, park and rides and shuttle buses to major transport stations

	– specific areas that require bus stops/stations provided and destinations provided • Concerns with the current low frequency of bus services • Suggestions for bus lanes and express services
Rail (light and heavy)	• Strong support for utilising and extending the existing heavy rail infrastructure as a quick fix and cost-effective option • Suggestions to upgrade the heavy rail for passenger use with double tracking and electrification of the routes • Some thought light rail would be better and quicker than buses, providing more options for transport • Concerns with long-term nature of light rail amidst immediate pressure for rail • Concerns with possible changes in political priority
Key State Highway	• Intersections and roundabouts were noted to require safety upgrades • Half interchanges should be upgraded to full diamond interchanges • Congestion deemed a key issue, leading to strong support for the SH16/18 connection to bypass Whenuapai and dedicated bus and cycle lanes • Support for environmental consideration in designing alignments
Area Specific Feedback	
Whenuapai	• Safety consistently mentioned, such as pedestrians and cyclists, crossings, school design interface, widening roads, capacity/maintenance and need to accommodate rural vehicles and activities

11.4 Ongoing Consultation

Te Tupu Ngātahi continues to meet and engage with potentially impacted landowners as required. The Te Tupu Ngātahi website will continue to be updated with the key steps in the NoR process (i.e. public notification, hearing dates, decisions and appeals) and the Programme will continue to engage with submitters post lodgement during the hearings process.

12 Resource Management Amendment Act 2020

To date, the overlap between the RMA regime and climate change has been limited as sections 104E and 70A of the RMA have constrained the ability of local authorities to account for climate change considerations in exercising their roles and functions. However, the amendment to the RMA that came into effect on 30 November 2022 is intended to better align the RMA with the CCRA. The Resource Management Amendment Act 2020 repeals the restrictions under the RMA in relation to climate change with the following consequences:

- The repeal of section 104E means that effects on climate change of a discharge to air of greenhouse gases can in future be considered in the context of an application for a discharge permit or coastal permit to do something that would otherwise contravene section 15 or section 15B.
- The repeal of section 70A means that when making a rule to control the discharge into air of greenhouse gases a regional council may now have regard to the effects of such a discharge on climate change.
- An amendment to section 74(2)(c) means that when preparing or changing a district plan, a territorial authority must now have regard to any ERP or national adaptation plan made in accordance with the CCRA.

The above RMA amendments do not directly affect the Project as no resource consent is sought or required for the discharge of contaminants to air. AUP:OIP rule E14.4.1(A14) permits discharges to air from the engines of motor vehicles, and the general permitted activity standards do not apply.

13 Statutory Assessment

The following statutory assessment for the Project is provided in accordance with the relevant sections under the RMA.

13.1 Section 171 Recommendation by a Territorial Authority

Section 171(1) of the RMA sets out the matters which are to be taken into consideration by the Council when considering a NoR. Section 171(1B) of the RMA states the assessment of effects may include: "*any positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from the activity enabled by the designation, as long as those effects result from measures proposed or agreed to by the requiring authority.*"

These matters have been addressed throughout the AEE and associated technical assessments. In summary:

- Effects on the environment and Part 2 of the RMA are addressed in Sections 9 and 13.3 of this AEE respectively;
- Relevant provision of policy statements and plans have been addressed by Appendix B and in Section 13.3 of this AEE;
- Adequate consideration of alternative sites, routes and methods has been addressed in Section 8 and Appendix A of this AEE;
- The works and proposed designation are reasonably necessary to achieve the Project Objectives for the proposed designation because:
    - The proposed works will assist in the efficient operation of the local transport network.
    - The proposed works will provide additional transport network capacity for planned growth in the Whenuapai area, in particular it will enable the use and development of planned future urban land adjoining the Project in accordance with the AUP:OIP.
    - Sufficient space and facilities will be provided to ensure that the proposed transport corridors are safe for all transport users, including vehicles, public transport, walking and cycling.
    - The proposed works contribute to mode shift by providing a choice of transport options through the provision of separated and protected walking and cycling facilities, including signalised pedestrian/cycle crossing facilities, and public transport measures to improve bus travel time and reliability.
    - It will allow AT and/or its authorised agents to undertake the works for the construction, operation and maintenance of the Project comprising transport corridors and associated ancillary components/ activities.
    - It will enable works to be undertaken in a comprehensive and integrated manner.
    - It will add protection to the route from future incompatible development which may preclude or put at risk the construction and/or operation and maintenance of the corridor.
    - The designation will be included in the AUP:OIP providing certainty to the public as to the intended use of the land and nature of the activity authorised.

- Other matters that inform the territorial authority's consideration are addressed in Section 13.1.1 below.

Given the above, it is considered that the Council can confirm the requirement by AT.

13.1.1 Section 171(1)(d) Other Matters

Section 171(1)(d) requires the territorial authority to have particular regard to:

> *'Any other matter the territorial authority considers reasonably necessary in order to make a recommendation on the requirement'*

It is considered that there are no other matters under s171(1)(d) that are reasonably necessary to make a recommendation on the NOR.

13.2 Section 104 Assessment

Section 104 of the RMA relates to the consideration of resource consent applications by a consent authority. This assessment is therefore relevant to those matters for which resource consent is being sought.

13.2.1 Section 104(1)(a)

This section of the RMA requires that regard is given to any actual and potential effects on the environment of allowing the activity. An assessment of the actual and potential environmental effects on the environment as a result of implementing the proposed works is included in Section 9 of this report which concludes that effects can be adequately avoided, remedied or mitigated through the proposed mitigation and monitoring measures.

13.2.2 Section 104(1)(ab)

This section of the RMA requires that regard be had to any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity. As outlined in Section 9.7 of this report, the Project will result in adverse effects on the Trig Stream wetland as a result of corridor widening. As previously discussed, these effects will be offset by proposed wetland enhancement/planting, with the proposed designation providing sufficient room for this offset to be finalised at the detailed design stage.

13.2.3 Section 104(1)(b)(i)

This section of the RMA requires that regard is given to any relevant provisions of a national environmental standard.

The NES: Soil applies to activities that disturb the soil if the relevant piece of land is, or has previously been, a HAIL site.

The PSI has shown that there are numerous activities classified in the HAIL that have historically occurred or are currently being undertaken on properties adjacent to the Project area. While the human and environmental risk profile associated with soil contamination of properties in the Project area is likely to be limited, soil materials scheduled for disturbance as part of the Project may have

been impacted by a range of contaminants of concern associated with the storage or use of hazardous materials or disposal of hazardous wastes at the adjacent properties.

As previously discussed in Section 9.11 and Volume 4, a DSI is recommended to be prepared at the detailed design stage to quantify the nature and extent of actual soil contaminant conditions within the Project area. This will be completed in accordance with Ministry for the Environment Contaminated Land Management Guideline No 5, Site Investigation and Analysis of Soils (revised 2021) and be used to determine whether further site management is required.

A Contaminated Land Management Plan will also be prepared prior to the commencement of any land disturbance activities and will be prepared in accordance with the Ministry for the Environment Contaminated Land Management Guidelines No. 1, Reporting on Contaminated Sites in New Zealand (revised 2021).

The NES:FW applies to activities undertaken within or near natural wetlands. While the Project has sought to avoid wetlands and streams through optioneering and design, seven wetlands are potentially affected by the Project.

As set out in Section 9.7 of this AEE, to mitigate the effects of potential wetland loss, offsetting is proposed to be provided through a Wetland Offset/Compensation Restoration Plan. This will be finalised at construction and will confirm the offset mitigation required to ensure no net loss in ecological value is achieved, consistent with the requirements of the NES:FW. The proposed designation provides sufficient room for this offset to be finalised at the detailed design stage.

As such, the Project is considered to be consistent with section 104(1)(b)(i) of the RMA.

13.2.4 Section 104(1)(b)(ii)

This section of the RMA requires that regard is given to any relevant provisions of any other regulations.

The Hauraki Gulf Marine Park Act 2000 (**HGMPA**) is considered relevant to the Project given that the downstream receiving environment is the Hauraki Gulf.

It is considered that the proposed works are consistent with these the objectives of the HGMPA as the Project will employ an ESCP during construction to manage the effects from bulk earthworks, while the use of GD01 compliant stormwater management and treatment devices will minimise the long-term effects from the Project's surface runoff on the receiving environment.

13.2.5 Section 104(1)(b)(iii)

This section of the RMA requires that regard is given to any relevant provisions of a National Policy Statement (**NPS**).

National Policy Statement for Freshwater 2020 (NPS:FM)

The NPS:FM seeks to ensure that natural and physical resources are managed in a way that prioritises first, the health and well-being of water bodies and freshwater ecosystems followed by the health needs of people and then the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future. In particular, the NPS:FM seeks to protect natural wetlands, rivers, outstanding waterbodies and habitats of indigenous freshwater species.

It is considered that the Project is consistent with the objectives of the NPS-FM.

There is a functional need for the Project to provide an urban standard transport corridor between the northern end of Trig Road (north of State Highway 18) and Hobsonville Road, in order to support urbanisation of the surrounding land. The Project has sought to avoid adverse effects on water bodies and freshwater ecosystems where possible, as demonstrated through the alternatives assessment and desig refinement process. The alternatives assessment process establishes that all potential road corridor alignments would have resulted in impacts on water bodies and freshwater ecosystems.

While the Project will result in adverse effects on two wetlands, these effects will be offset through wetland enhancement/planting calculated in an Indicative Wetland Offset/Compensation Restoration Plan and sufficient room for this offset to be finalised is provided for in the proposed designation boundary. AT will also employ measures during both the construction and operational phases of the Project to ensure that local water quality is protected. This will include the use an ESCP, stormwater treatment and wetland mitigation, all of which will address the environmental effects of the Project on local waterbodies, wetlands and their associated ecosystems. Given that there is limited existing stormwater management infrastructure in place within the Project area this is likely to result in an improvement to the overall quality of freshwater.

National Policy Statement on Urban Development (NPS-UD)

The NPS-UD seeks to ensure urban environments are well-functioning and enable all people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety. Within the NPS-UD Auckland is recognised as a Tier 1 urban environment and therefore is subject to a greater policy direction in terms of intensification and density of urban form. The NPS-UD directs that urban development is integrated with infrastructure planning and funding decisions and is strategic over the medium to long term. The Project gives effect to these objectives and policies by protecting a corridor to deliver an accessible, high quality, effective, efficient and safe transport system to positively contribute to, and support, quality, connected urban environments.

13.2.6 Section 104(1)(b)(iv)

This section of the RMA requires that regard is given to any relevant provisions of a New Zealand Coastal Policy Statement. As the Project is not located in the coastal environment, the New Zealand Coastal Policy Statement is not considered to be relevant.

13.2.7 Section 104(1)(b)(v)

This section of the RMA requires that regard is given to any relevant provisions of a regional policy statement or proposed regional policy statement. An analysis of the Project against the AUP:OIP Regional Policy Statement is provided in Appendix B and is not repeated here. However, in summary the Project is considered to be consistent with the AUP:OIP Regional Policy Statement as it will support the desired urban growth objectives of the AUP:OIP, assist in the development of a quality urban form, enable efficient movement of vehicles and people, provide resilient infrastructure and maintain and enhance environmental values. Furthermore, the Project has been designed with consideration to cultural and environmental values.

13.2.8 Section 104(1)(b)(vi)

This section of the RMA requires that regard is given to any relevant provisions of a plan or proposed plan. Appendix B provides an assessment of the Project against the relevant objectives and policies contained within the AUP:OIP. In summary, the Project is considered to be consistent with the provisions of the AUP:OIP. The Project has been designed to meet the local growth requirements of Whenuapai, where appropriate mitigation has been offered by AT and when combined with the management plans proposed, the Project will provide a positive contribution to the local community and environment.

13.2.9 Section 104(1)(c)

Section 104(1)(c) requires the consent authority to have particular regard to:

> *'any other matter the consent authority considers relevant and reasonably necessary to determine the application'*

It is considered that there are no other matters under s104(1)(c) that are reasonably necessary to determine the consent application.

13.3 Other Policy Considerations

Other legislation and policy that has informed development and will inform the implementation of the Project is set out in Table 20, Table 21 and Table 22.

Table 20: Assessment against potential other matters - National

National
Government Policy Statement on land transport (GPS) for 2021/22 – 2030/31
The Government Policy Statement on Land Transport 2021 continues the strategic direction of GPS 2018, but provides stronger guidance on what Government is seeking from land transport investments. The GPS outlines the Government's strategy to guide land transport investment over the next 10 years, influencing decisions on how money from the National Land Transport Fund will be invested across activity classes, such as state highways and public transport. The overall strategic priorities for GPS 2021, the national objectives for land transport and the themes and the results the Government wishes to achieve through the allocation of the Fund are summarised as follows: • Safety – a safe system, free of death and serious injury • Access – a system that provides increased access to economic and social opportunities • Climate change – a low carbon transport system that supports emissions reductions, while improving safety and inclusive access • Improving freight connections – improving freight connections for economic development. The Project provides a safe and reliable transport corridor that supports growth, enables sustainable travel choice, addresses safety concerns and improves access to employment and social amenities. The Project will provide transport infrastructure appropriate to the urban context; a slower speed environment and improved intersections with dedicated cycling and pedestrian facilities. The upgrades to the road network will improve bus travel time and reliability by providing for bus priority, and is designed with flexibility to respond to the future public transport network in the surrounding area. The GPS 2021 prioritises reduction of greenhouse gas emissions and a shift to active modes, public transport and low emission vehicles. This focus is well aligned to the upgraded transport corridor which provides an

National
increase in modal choice including active modes and public transport, thereby seeking to reduce reliance on single occupancy vehicles. Overall, the Project positively contributes towards the strategic priorities in the GPS.
The Thirty Year New Zealand Infrastructure Plan 2015
The Thirty Year New Zealand Infrastructure Plan makes changes to the current approach to planning and management and to encourage investment in New Zealand's infrastructure while recognising the challenges the country needs to navigate. The Plan envisages that by 2045 New Zealand's infrastructure will be resilient, co-ordinated and contribute to a strong economy and high living standards. The Plan notes that challenges exist around projected population growth with Auckland forecast to grow by another 716,000 people by 2045 meaning that over the next 25 years, the city will need to provide 400,000 more dwellings. The Project provides an integrated approach to land-use and infrastructure planning which is critical to deliver good urban outcomes. The plan envisages $18.7 billion being spent on infrastructure between 2015 and 2025. The Project forms part of this spending and falls within the scope of this Plan by enabling and providing for future urban growth in Whenuapai.
Road to Zero: New Zealand's Road Safety Strategy 2020-2030
Road to Zero outlines a strategy to guide improvements in safety on our roads, streets, footpaths, cycleways, bus lanes and state highways in New Zealand over the next 10 years. The vision of the strategy is a *New Zealand where no one is killed or seriously injured in road crashes.* The Strategy focuses on achieving this vision through system management, road user choices, vehicle safety, work-related road safety and infrastructure improvements and speed management. The Project plays a role in providing opportunity to plan and design system improvements that embed the Road to Zero strategy. The Project will reduce the risk of DSI's and improve road safety for all users. The Project will significantly improve all transport facilities for all modes, resulting in improved safety for those that travel by car, commercial vehicle, active mode and public transport.
Heritage New Zealand Pouhere Taonga Act 2014
Under the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA) no person shall modify or destroy an archaeological site unless an authority is granted by Heritage New Zealand Pouhere Taonga (whether or not a site is a recorded archaeological site). An archaeological assessment has been provided (Volume 4) which states that no known archaeological sites are located within the Project area. As such there are no requirements to obtain authority under the HNZPTA.

Table 21: Assessment against other potential matters - Regional

Regional
Auckland Transport Alignment Project (ATAP)
The Auckland Transport Alignment Project ("ATAP") is a joint project involving Auckland Council, the Ministry of Transport, AT, Waka Kotahi, the Treasury and the State Services Commission. The final report (April 2018) sets out a clear direction for the development of Auckland's transport system over the next 10 years. The vision seeks transport investment decisions that deliver broad economic, social, environmental and cultural benefits to Auckland and New Zealand by providing safe, reliable and sustainable access to opportunities. Specifically, this includes easily connecting people, goods and services to where they need to go; providing high quality and affordable travel choices for people of all ages and abilities; seeking to eliminate harm to people and the environment; supporting and shaping Auckland's growth, and; creating a prosperous, vibrant and inclusive city.

Regional
The ATAP package highlights the need for significant investment in transport infrastructure to enable urban growth in greenfield FUZ areas, encourage the use of public transport and active modes, and to provide a reasonable level of service to future residents. ATAP specifically notes investment into three main areas including for arterial roads and footpaths (including bus and cycle lanes where required). The Project is consistent with ATAP as it will provide a safe and reliable transport corridor that integrates with land use planning, supports growth, enables sustainable travel choice for all transport users, addresses safety concerns and improve access to employment and social amenities.
Auckland Regional Land Transport Plan 2018-2028
The Regional Land Transport Plan (RLTP) sets out the funding programme for Auckland's transport services and activities over a 10-year period. Planned transport activities for the next three years are provided in detail while proposed activities for the following seven years are outlined. The RLTP is jointly delivered by AT, Waka Kotahi and KiwiRail, and forms part of the National Land Transport Programme. Te Tupu Ngātahi is identified as a committed, ongoing programme in the RLTP which it identifies will enable the sequence of land release specified in the FULSS, and improves access to places where people live and work.
Auckland Future Land Supply Strategy 2017
The FULSS was adopted by the Council in July 2017 and is a region wide strategic document detailing the location and timing for the release of new greenfield areas. It recognises the importance of aligning infrastructure planning with growth management and identifies Whenuapai as being development ready by the first half of Decade 1 (2018-2022). The Project is critical to delivering this greenfield capacity, given the improved accessibility it will provide to future collector roads and sites along its length. Without the Project, the opening up of these sites to greenfield development could be delayed and/or at lower development yields, thereby undermining the growth objectives of the FULSS and the wider sustainable urban development of Auckland.
Hauraki Gulf Marine Park Act 2000
The Hauraki Gulf Marine Park Act seeks to integrate the management of natural, historic and physical resources of the Hauraki Gulf, the islands and its catchment which includes the Whenuapai area within the Schedule 3 'catchment' indicating areas that drain to the Hauraki Gulf. The Act recognises the national significance of the Hauraki Gulf and life supporting capacity of the environment of the Gulf. The Project is designed with provision for stormwater treatment via raingardens within the berms along the carriageway as well as "end of pipe" treatment in larger raingardens. These meet the treatment requirements in accordance with Auckland Council Guidance Document GD01. These devices will treat the runoff from the corridor before discharge into the receiving environment of the Hauraki Gulf. The Project will also employ an ESCP during construction to manage the effects from bulk earthworks. This enables the protection of the Hauraki Gulf environments life supporting capacity.
Auckland Plan 2050
The purpose of the Auckland Plan is to contribute to Auckland's social, economic, environmental and cultural well-being through a 30 year vision for Auckland's growth. It sets a strategic direction for Auckland and its communities that integrates social, economic, environmental, and cultural objectives. The Auckland Plan's Development Strategy outlines the direction Auckland will take managing expansion in future urban areas noting the constraint that these areas are predominantly rural at present and have little or no infrastructure in place to cope with urban development. The Auckland Plan outlines the need to provide the required bulk infrastructure (water, wastewater, storm water and transport) to these areas in the right place at the right time. The Auckland Plan also seeks that Aucklanders will be able to get where they want to go more easily, safely and sustainably. The Project will provide a safe and reliable arterial corridor that integrates with land use planning, supports growth, enables sustainable travel choice for all transport users, addresses safety concerns and improve access to employment and social amenities. The development of the Project has been a direct response to the Auckland Plan. The Project will help facilitate the sustainable growth of the North West area enabling the bulk transport infrastructure required to unlock development potential.

Regional
Vision Zero for Tāmaki Makaurau: a transport safety strategy and action plan to 2030
Developed in 2019, Vision Zero extends the existing safe system approach, to place safety at the forefront of the future transport system for all modes by designing safe places for people. Vision Zero has a goal to eliminate transport deaths and serious injuries by 2050 (in line with the Auckland Plan 2050). The Project plays a key role in providing opportunity to plan and design system improvements that embed Vision Zero principles, and specifically contribute to the Vision Zero priorities. The Project is anticipated to reduce the risk of DSI's and improve road safety for all users. The Project will significantly improve all transport facilities for all modes, resulting in improved safety for those that travel by car, commercial vehicle, active mode and public transport.
Te Tāruke-ā-Tāwhiri: Auckland's Climate Action Framework and Plan
The purpose of Auckland's Climate Action Framework and Plan is to increase Auckland's resilience to the impact of climate change and reduce emissions that cause climate change, with one of the key moves identified to deliver clean, safe and equitable transport options. The Project has been designed having regard to and taking into account climate change and resilience to it. The Project will deliver better accessibility and mode choice (thus reducing the present reliance on low occupancy vehicles). This provides an important component to realising the regional emissions benefits of an integrated network. This shows alignment with, and a positive contribution towards the Climate Action Framework and Plan.
Auckland's Urban Ngahere (Forest) Strategy
The Auckland Urban Ngahere (Forest) strategy recognises the ecosystem services as well as economic and cultural benefits delivered by green infrastructure within the urban environment and sets out objectives of the strategy which include the need to grow and protect urban ngahere in existing and future urban areas. Although the Project seeks the removal of some street trees within the proposed designation footprint (protected by district plan rules), this will be mitigated by planting within the upgraded road corridor.. The long-term outcome of comprehensive street tree planting will be more trees in the public realm and increased amenity value within the road corridor, consistent with the Auckland Urban Ngahere (Forest) strategy.

Table 22: Assessment against other potential matters - Local

Local Board Plans
The Project is situated within two local board areas: Upper Harbour and Henderson-Massey. The Local Board Plans outline outcomes for the respective local board areas. The plans identify outcomes relating to an improved and well-connected transport system, including active modes, managing growth, economic prosperity and protection and care for the environment. The Project is consistent with the outcomes of the Local Board Plans. The upgrade will integrate well with proposed surrounding land uses and the wider transport network, to respond to the timing, scale and form of urban development triggers and staging of future infrastructure corridors. In doing so the Project manages any adverse effects on the environment. The Project will provide a multimodal, safe and reliable arterial corridor that supports growth, enables sustainable travel choice for all transport users, address safety concerns and improve access to employment and social amenities. The Project will also support the economic outcomes sought by supporting economic growth and increased productivity. The Project will help facilitate the sustainable growth of the Upper Harbour and Henderson-Massey areas.
Whenuapai Structure Plan (2016)
The Whenuapai Structure Plan is the strategic planning document for Whenuapai, supported by objectives with seven themes. These themes comprise of; sustainable urban development, a quality built urban environment, a well-connected Whenuapai, the national significance of the Whenuapai Airbase, the provision of infrastructure, an enhanced natural environment and protection of heritage, and the provision of quality open spaces.

Local Board Plans

The objectives around transport involve higher residential densities around Rapid Transit stations and park and ride facilities, as well as ensuring Whenuapai will have a well-connected cycling and pedestrian network. Specifically, the Structure Plan seeks to ensure that:

- The transport network responds to anticipated growth and maximises connectivity for commuters and freight within Whenuapai and to surrounding areas.
- Frequent, attractive public transport options are supported by greater density along key routes, and good local and regional connections exist.
- Dedicated cycle and pedestrian footpaths provide safe, connected and high amenity linkages between areas of activity at a local scale.

The Project provides for separated walking and cycling facilities, achieving safe, connected and high amenity linkages. The upgrades to the road network will improve bus travel time and reliability by providing for bus, and is designed with flexibility to respond to the future public transport network in the surrounding area.

13.4 Part 2 (Purposes and Principles)

With regard to the relevance of Part 2, it has been well established, that where a plan has been competently prepared under the RMA it may be that in many cases there will be no need to refer to Part 2. However, if there is doubt that a plan has been "competently prepared" under the RMA, then it will be appropriate and necessary to have regard to Part 2. That is the implication of the words "subject to Part 2" in sections 171(1) and 104(1) of the RMA.

In the context of these application's, the objectives and policies of the relevant statutory documents were prepared having regard to Part 2 of the RMA, they capture all relevant planning considerations and contain a coherent set of policies designed to achieve clear environmental outcomes. They also provide a clear framework for assessing all relevant potential effects, and there is no need to go beyond these provisions and look to Part 2 in making this decision. However, in the interests of caution, an assessment has been provided.

Sections 13.4.1 to 13.4.4 consider the Project against the purpose and principles of Part 2 of the RMA.

13.4.1 Section 6 Assessment

Section 6 of the RMA states that in achieving the purpose of the Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for matters of national importance. The specified matters of national importance of particular relevance to this Project are:

(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:

(e) the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:

(h) the management of significant risks from natural hazards.

It is considered that the Project recognises and appropriately responds to these matters of national importance. With regard to natural character and indigenous ecology, the Project has sought to avoid the most significant vegetation and habitats.

The Project will result in unavoidable adverse effects on two wetlands. However, these effects will be offset through appropriate wetland restoration, as discussed at Section 9.7 of this AEE, and the proposed designation provides sufficient room for this offset to be finalised at the detailed design stage.

Manawhenua have been actively involved throughout development of the corridor, including through alternatives assessment and identification of the preferred options. The opportunity to provide CIA's was provided and the CIAs prepared by Te Kawerau ā Maki and Ngāti Whātua o Kaipara have been considered by the Project team.

The ongoing partnership with Manawhenua has provided an understanding and the incorporation of Manawhenua values and expression of kaitiakitanga throughout the development of the Project.

There are no sites of significance to Manawhenua, wāhi tapu, other taonga or Māori land identified under the AUP:OP within the transport corridor. The relationship of the respective iwi with the transport corridor, their ancestral lands, wāhi tapu and taonga will be recognised and provided for through the involvement of Manawhenua in developing and implementing various mitigation measures and management plans at the time of detailed design and construction.

The proposed stormwater management for the Project will provide sufficient attenuation to avoid the potential adverse effects of flood hazards, both upstream and downstream of the Project area.

Given these factors, the Project is considered to be consistent with section 6 of the RMA.

13.4.2 Section 7 Assessment

Section 7 of the RMA relates to other matters that all persons exercising functions and powers under the RMA shall have particular regard to, in relation to managing the use, development, and protection of natural and physical resources, including (as particularly relevant to the Project):

(a) kaitiakitanga:

(aa) the ethic of stewardship:

(b) the efficient use and development of natural and physical resources:

(c) the maintenance and enhancement of amenity values:

(d) intrinsic values of ecosystems:

(f) maintenance and enhancement of the quality of the environment:

(i) the effects of climate change:

The values of kaitiakitanga and the ethic of stewardship have been adopted to direct the option assessment and design development process for the Project. As previously discussed, the Project team has worked with, and is continuing to work with Manawhenua to ensure that appropriate measures are employed to protect the mauri of the local environment. This includes the use of an

ESCP during construction and GD01 compliant stormwater infrastructure within the completed transport corridor. The proposed design also avoids new stream crossings and minimises the required removal of vegetation and habitat, with any adverse effects adequately mitigated through wetland restoration and enhancement.

The Project also represents the efficient use and development of the Project corridor's natural and physical resources by utilising the existing transport corridor as much as possible, rather than constructing a new corridor.

The adjacent land to the existing Trig Road corridor is currently rural in character but is identified in the AUP:OIP and FULSS as future urban land. The Project will provide an urban transport corridor to reflect this intended future urban character of the surrounding area. The corridor has been developed to provide for walking and cycling facilities and sufficient space is provided for street planting and street furniture, contributing to the enhancement of amenity values associated with a high-quality urban environment.

The Project avoids any Significant Ecological Areas, and while wetland reclamation is required wetland restoration and enhancement will be undertaken to offset the adverse effects of the Project. In this way the Project recognises the intrinsic values of the local ecosystem.

The proposed stormwater infrastructure has been designed to accommodate predicted climate conditions, including ensuring that the proposed culverts can safely transport water without affecting the stability of the transport corridor. In addition, the Project supports a compact urban form within the existing urban boundaries by supporting the development proposed by the AUP:OIP, limiting the need for further urban expansion. It is also noted that the Project does not preclude the provision of future public transport services, and provides for active transport modes, assisting in seeking to achieve mode shift.

As such, the Project is considered to be consistent with section 7 of the RMA.

13.4.3 Section 8 Assessment

Section 8 of the RMA requires that the principles of the Treaty of Waitangi (Te Tiriti o Waitangi) are taken into account, when managing the use, development, and protection of natural and physical resources.

AT has partnered with Manawhenua throughout the development of the Project. This has resulted in the selection of a corridor alignment which avoids and minimises adverse effects on cultural values where practicable. This has included treating stormwater to a high standard, minimising the disturbance of streams and ensuring that construction management plans will be in place to protect water quality and any unrecorded cultural heritage items encountered during construction.

Further engagement will be undertaken in the design and construction phases to ensure that the principles of the Treaty of Waitangi are taken into account. Given these factors, the Project is considered to be consistent with section 8 of the RMA.

13.4.4 Section 5 Assessment

The RMA has a single overarching purpose: to promote the sustainable management of natural and physical resources. Sustainable management is defined in Section 5 of the RMA as:

...managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –

(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

(c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.

The effects of the Project are addressed in Section 9 of this AEE. The Project represents the sustainable use of natural and physical resources, by avoiding and minimising adverse effects on local ecology and water quality through both its design and the proposed mitigation. AT has sought to avoid new adverse effects on, and minimise disturbance of other, natural features during construction by upgrading the existing Trig Road corridor, and therefore utilising the efficient use of existing infrastructure, rather than providing a new transport corridor.

The finished Project corridor will feature stormwater infrastructure, which meets the Council's standards and avoids more than minor adverse effects on the receiving environment, while the design also addresses the natural hazards present in the Project area. AT has also proposed a number of management plans and offsetting for wetland loss to address the Project's effects, including those arising from construction traffic, works within watercourses, earthworks and noise and vibration generation (see Section 10 for specific management plans). This is a standard approach to projects of this scale and type, and similar measures have previously been used on other transport projects in the Auckland region. Following a management plan approach provides adequate flexibility to allow for minor design changes while ensuring that any adverse effects are addressed in a practical manner.

The Project will improve the existing transport network in Whenuapai and provide a vital transport connection for the Whenuapai area. This will ensure that the local transport network operates in an efficient manner as the area urbanises, thereby supporting the economic and social wellbeing of the community. The Project has also been designed to provide for multiple transport modes in a manner which protects the health and safety of all road users. The Project is needed to support the growth and development of the Whenuapai area and is an integral part of a wider programme to provide a comprehensive transport network in the North West area.

AT has also worked with Manawhenua to incorporate cultural protocols and mitigation where practicable and will continue working with iwi in this regard. Given these factors, the Project is considered to be consistent with section 5 of the RMA.

14 Conclusion

The Project represents an important transport investment in the future of Whenuapai. The Project will support the planned development of land identified under the AUP:OIP as appropriate for continued urbanisation.

While some adverse effects will be generated during construction, operation and maintenance, these can be adequately mitigated by the management plans and other measures proposed by AT.

In assessing these effects, it is also important to consider that the landscape and natural values associated with the Project corridor are in transition with the final receiving environment changing from the current rural land uses to an urban environment. Within this urban context, the Project will provide a high-quality transport corridor similar in character to other roads in metropolitan Auckland.

Overall, the Project is considered to be consistent with the relevant statutory planning documents and regulatory tests, thereby satisfying the requirements of the RMA for the Council to recommend that the NoR be confirmed by the requiring authority, and for the Council to approve the associated resource consent application.

Appendix A. Assessment of Alternatives Report

Appendix B. Statutory Assessment

Appendix C. Rules Assessment

Appendix D. Matters of Discretion and Assessment Criteria

Appendix E. Proposed NoR Conditions

Appendix F. Proposed Regional Consent Conditions

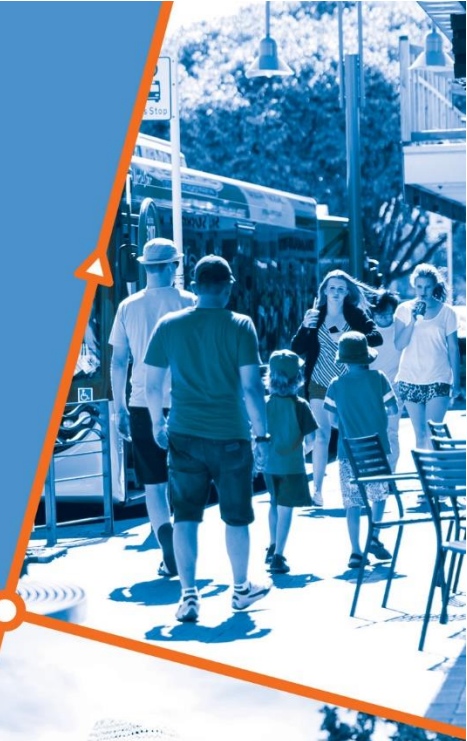
ATTACHMENT 05

TRIG ROAD CORRIDOR UPGRADE ASSESSMENT OF ALTERNATIVES

Supporting Growth

Trig Road Corridor Upgrade

Assessment of Alternatives



Volume 2 Appendix A

December 2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Document Status

Version	Responsibility	Name
2020 Draft	Authors	Matthew Kerr-Ridge Nicolai Berry
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1.0	December 2022	Final for Issue

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Acronyms

Acronym/Term	Description
AC DBC	Auckland Council Housing Infrastructure Fund Detailed Business Case
AEP	Annual Exceedance Probability
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan Operative in Part 2016
FULSS	Future Urban Land Supply Strategy
FUZ	Future Urban Zone
GD01	GD01: Stormwater Management Devices Guide
GD04	GD04: Water Sensitive Design Guide
HIF	Housing Infrastructure Fund
MCA	Multi-Criteria Analysis
NoR	Notice of Requirement
PBC	Programme Business Case
PPC5	Proposed Plan Change 5
RMA	Resource Management Act 1991
SG DBC	Supporting Growth Detailed Business Case
SH18	State Highway 18
The Project	Trig Road Corridor Upgrade
Waka Kotahi	Waka Kotahi NZ Transport Agency

1 Introduction

1.1. Purpose of this Report

Auckland Transport (**AT**) as a requiring authority under the Resource Management Act 1991 (**RMA**), is serving a Notice of Requirement (**NoR**) on Auckland Council (as the territorial authority) to designate land in the Auckland Unitary Plan: Operative in Part 2016 (**AUP:OP**) to enable the construction, operation and maintenance of the Trig Road Corridor Upgrade (the **Project**).

The Project consists of an upgrade of Trig Road, Whenuapai, between the State Highway 18 (**SH18**) over-bridge and Hobsonville Road, to form an urban arterial corridor to support the anticipated urban residential development in Whenuapai. The upgrade will provide a widened transport corridor which includes two traffic lanes and new walking and cycling facilities.

To ensure the Project integrates into the existing transport network the Project also includes:

- The upgrade and widening of approximately 500 metres of Hobsonville Road, including the signalisation of the existing intersections of Hobsonville Road with Trig Road and Luckens Road; and
- The reconfiguration of the existing traffic layout on the Trig Road SH18 over-bridge and upgrade of walking and cycling provisions north of the over-bridge. These works will occur entirely within the existing road reserve.

Section 171(1)(b) of the RMA requires a territorial authority, when making a recommendation on a NoR, to consider whether adequate consideration has been given to alternative sites, routes or methods of undertaking the work in situations where:

a. the requiring authority does not have an interest in the land sufficient for undertaking the work; or

b. it is likely that the work will have a significant adverse effect on the environment.

AT does not have an interest in all of the land required for the Project and so AT is required to give adequate consideration to alternative sites, routes and methods in accordance with section 171(1)(b).

The purpose of this report is to document both the development of alternatives and the process used to assess and compare options in order to provide the information necessary to inform an assessment under section 171(1)(b) of the RMA for the Project and to demonstrate that a thorough and robust assessment of alternatives has been undertaken.

1.2. Structure of this Report

The structure of the report is as follows:

Section	Heading	Description
1	Introduction	Purpose and structure of the report.
2	Background	Summary of the relevant project background which has directed the options development process, including a summary of the business case history for the Project, and a discussion on the development of the investment objectives and project objectives.
3	Summary of Corridor Option Development and Assessment	Summary of the development and assessment of corridor options for the Project as part of the Auckland Council Housing Infrastructure Fund Detailed Business Case.
4	Consideration of Alternative Routes	Overview of the development and assessment of corridor options and route options for the Project as part of the Supporting Growth Programme Detailed Business Case, and the identification of the recommended option.
5	Stormwater Assessment	Overview of the assessment of stormwater options for the Project.
6	Alternative Methods	Overview of the assessment of alternative methods for implementing the Project.
7	Conclusions	Summary of conclusions.

2 Background

The delivery of bulk infrastructure is critical to enabling the urban development of greenfield land. As such, Auckland Council developed the Future Urban Land Supply Strategy (**FULSS**) to help provide clarity and certainty around when future urban land will have bulk infrastructure in place and be ready for urban development. In July 2017, the FULSS was updated in line with the AUP:OP zoning to establish an indicative approach to the staged urbanisation of rural land over the next 30 years.

In response to the FULSS, AT, Waka Kotahi NZ Transport Agency (**Waka Kotahi**), and Auckland Council identified a need to determine the most appropriate transport responses to support this envisioned urban growth.

To determine the most appropriate transport solution to respond to the scale and pace of growth in Auckland, AT and Waka Kotahi worked in partnership to develop business cases for each of Auckland's identified growth areas: Warkworth, North, North-west and South.

The Supporting Growth Programme was established in 2018 and is a collaboration between AT and Waka Kotahi to plan and identify the required transport network to support Auckland's future urban growth areas over the next 30 years. AT and Waka Kotahi have partnered with Auckland Council, Manawhenua and KiwiRail Holdings Limited and are working closely with stakeholders and engaging with the community to develop the strategic transport network to support Auckland's growth areas. Trig Road is located within the North West Growth area (refer to AEE for further detail).

2.1. Project Area – Overview

This report relates to the North West growth area. Particularly, it relates to the upgrade of Trig Road which is located in Whenuapai, in the North West of Auckland. The majority of the area surrounding Trig Road is zoned as Future Urban Zone (**FUZ**) under the AUP:OP with the exception of the existing residential land use along Hobsonville Road which is zoned Residential – Mixed Housing Urban. The area was also subject to Proposed Plan Change 5 (**PPC5**) which sought to rezone the areas zoned FUZ to urban zoning to enable intensive residential development to occur. PPC5 was withdrawn on 16 June 2022, however given the proximity to the existing urban area along Hobsonville Road this pocket of FUZ land is expected to be subject to private development initiatives in the near future.

2.2. Overview of the Option Development and Evaluation Process

In 2016, the Programme Business Case (**PBC**) was completed which identified a high-level draft preferred strategic transport network to support all of the growth areas in Auckland. This initial option development process involved workshops and collaborative consultation with multiple stakeholders to formulate potential options and interventions.

For the North West growth area, the PBC considered 80 long list options and 39 short list options, ultimately recommending 13 transport network components, including improved local transport connections across Whenuapai to provide improved functionality and active mode facilities, and greater access to existing and greenfield areas and across SH18. The upgrade of Trig Road was identified as a key component of the improved local transport network – with the section of Trig Road south of SH18 identified as a key route for enabling the development of housing which is anticipated on the adjacent land.

Following the completion of the PBC and the identification that Trig Road requires upgrading as a key component of the improved local network, the Crown announced its recommendation (in principle) to provide a loan to Auckland Council to fund $300 million of bulk infrastructure in North West Auckland through the Housing Infrastructure Fund[1] (**HIF**). This funding of bulk infrastructure was estimated at the time to support the early construction of at least 10,500 new homes in North West Auckland.

In order to consider the extent to which the HIF could be used to fund the investment of all infrastructure required to support accelerated development in Whenuapai and Redhills, Auckland Council prepared the HIF Detailed Business Case (**AC DBC**). The AC DBC was supported by the Transport Network Option Evaluation Report that assessed options for the Trig Road alignment.

The AC DBC concluded that as Whenuapai was identified in the FULSS for Decade 1 housing development and was subject to PPC5, the upgrade of Trig Road between SH18 and Hobsonville Road was a key transport project which would enable housing development to occur in this area. As such, part of the HIF was allocated for the construction of the Project (including design and planning) with the expectation that the Project would be constructed within 3-5 years. AT does not currently have an interest in all the land necessary to construct the Project so there is an immediate need to secure the land necessary to undertake the works.

Following the AC DBC, the Supporting Growth Programme prepared the Supporting Growth Detailed Business Case (**SG DBC**) which specifically developed and evaluated options for the Project. The SG DBC included further corridor and route refinement, multi-criteria analysis (**MCA**) and input from stakeholder/community engagement to assess options for Trig Road.

The options from the SG DBC were then subject to further review, taking into account the additional protection afforded to natural wetlands under the National Policy Statement for Freshwater Management 2020.

The development and assessment of alternatives for the Project has therefore been completed through sequential options development processes in the PBC, AC DBC and SG DBC. This process forms the basis for this report and a summary of this process is outlined in Figure 1 below.

[1] The HIF was established by the Crown in 2016 to provide 10-year interest-free loans to high-growth councils. The funds were provided to help address funding constraints of high growth councils, with the purpose of funding core infrastructure to support housing development and increase housing supply. With approval of the HIF in 2017 for bulk infrastructure in the North West, Auckland Council is expected to repay this loan by 2027.

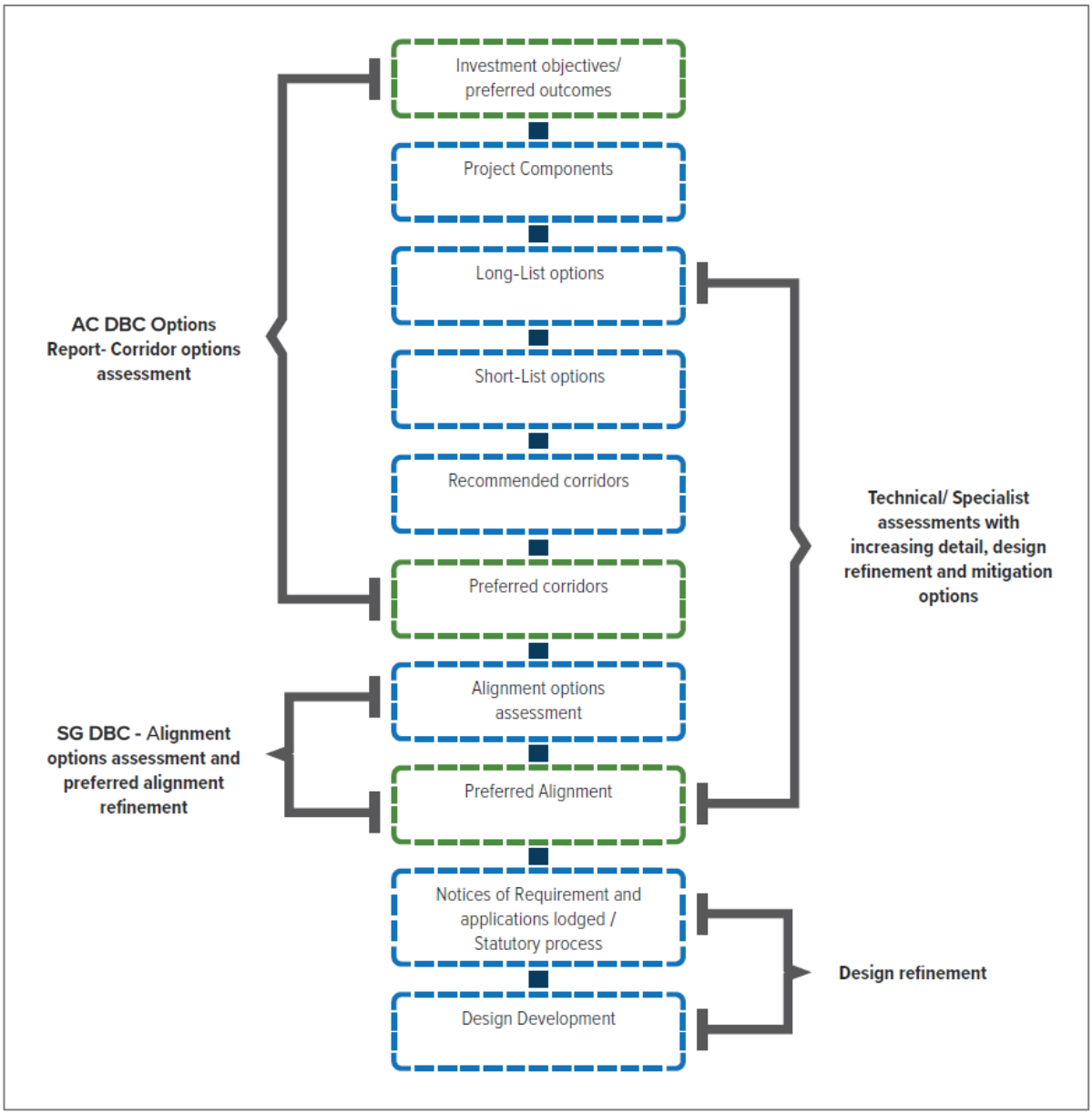


Figure 1: Options Development Process

2.3. Trig Road Investment Objectives and Project Objectives

Investment objectives were developed through the AC DBC process to assist with option assessment and investment decisions. These were developed at an area wide level for Whenuapai and Redhills and therefore did not contain project specific detail.

The investment objectives were then refined through the SG DBC process to confirm whether they remained relevant when focusing on the transport network option evaluation for the North-West HIF area. As discussed at section 4.4 of this report, options have been assessed against the investment objectives in each of the MCA processes to assist in identifying the preferred option for the Project.

The investment objectives have then been used to develop the RMA project objectives that are specific to the Project. This process is shown in Figure 2 below.

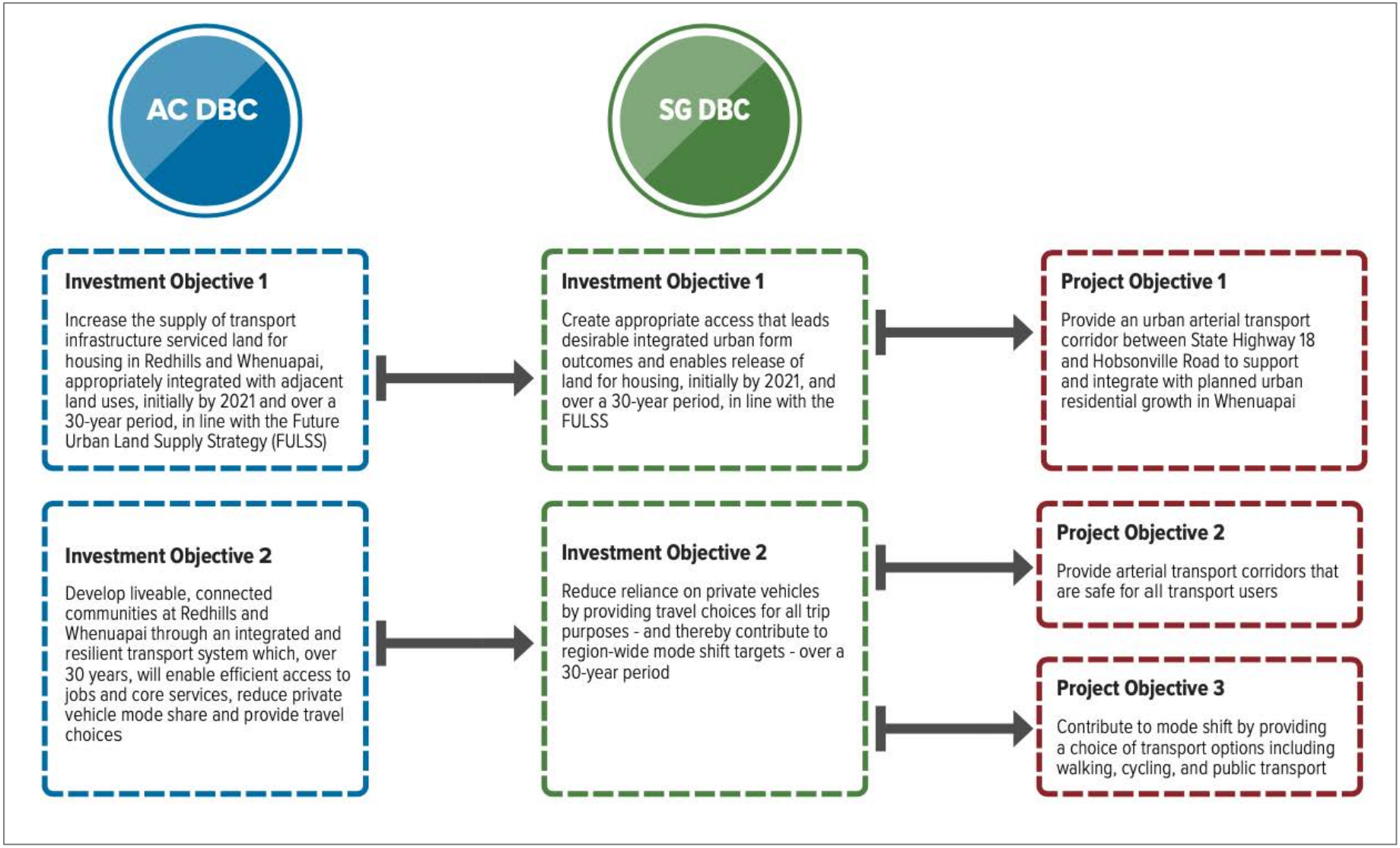


Figure 2: Development Process for Project Objectives

3 Summary of Corridor Option Development and Assessment

As noted above, following the Crown's recommendation (in principle) to provide a loan to Auckland Council to fund $300 million of bulk infrastructure in North West Auckland through the HIF, Auckland Council undertook to assess which parts of the PBC recommended network should be accelerated through the HIF funding.

This section of the report briefly describes the options assessment undertaken as part of the AC DBC which built on the conclusions of the PBC that an improved road corridor at Trig Road was required.

For the purposes of this assessment, a 32m wide cross section was assumed for all Whenuapai assessments in order to accommodate the recommended typologies and key features of an urban arterial road.

3.1. Overview of Assessment Framework

To enable a structured, consistent, systematic and replicable process for assessing alternatives and options, an MCA framework was developed for the AC DBC. The MCA is a tool that is often used to assist in the decision-making process and provides an opportunity to understand how different options compare against a set of standard and grouped criteria. This interdisciplinary framework was developed collaboratively, drawing on the collective knowledge and experience of AT, Waka Kotahi, Auckland Council, Manawhenua and the Supporting Growth Programme team. This framework, with additional refinements, would later form the basis of the Supporting Growth Programme wide MCA framework (as discussed further at section 4.4), and was used during the SG DBC options assessment process discussed at section 4 of this report.

The MCA framework utilised for the AC DBC adopted four broad criteria – investment objectives, implementability, assessment of environmental effects and opportunity outcomes and applied the following principles:

- The process should be transparent and ideally replicable, allowing additional options to be consistently assessed if they are developed or raised after the original options;
- The environmental effects component of the MCA framework would be finer grained and would require specialist input; and
- No in-built weighting would be applied, although sensitivity testing could be undertaken as appropriate.

The full MCA framework used for the corridor assessment is set out in Appendix 1 to this report. The MCA used a graduated 11-point scoring scale, ranging from -5 for Very High Adverse Effects to +5 Very High Positive Impacts. A final overall score was based on a qualitative assessment of potential effects.

In addition to the MCA scoring, the options and their scores were discussed at a workshop with the Project stakeholders and Manawhenua. These stakeholders included members of the Supporting Growth Programme Partners (Waka Kotahi, AT) and Auckland Council. The workshops helped to test options and scoring and assist with determining which options should proceed to the next stage and be assessed further.

3.2. Options Development and Assessment

Three primary options for an upgraded transport corridor between SH18 and Hobsonville Road were developed through the AC DBC, as shown in Figure 3 below with each option varying towards the southern end of Trig Road where it connects in with Hobsonville Road. Option A deviates from the existing Trig Road alignment to the west, connecting in with Hobsonville Road at Cyril Crescent, while Option C deviates to the east of the existing Trig Road alignment to connect into Hobsonville Road at Luckens Road. Option B follows the existing Trig Road alignment for the length of Trig Road and connects into Hobsonville Road at the existing intersection between Trig Road and Hobsonville Road.

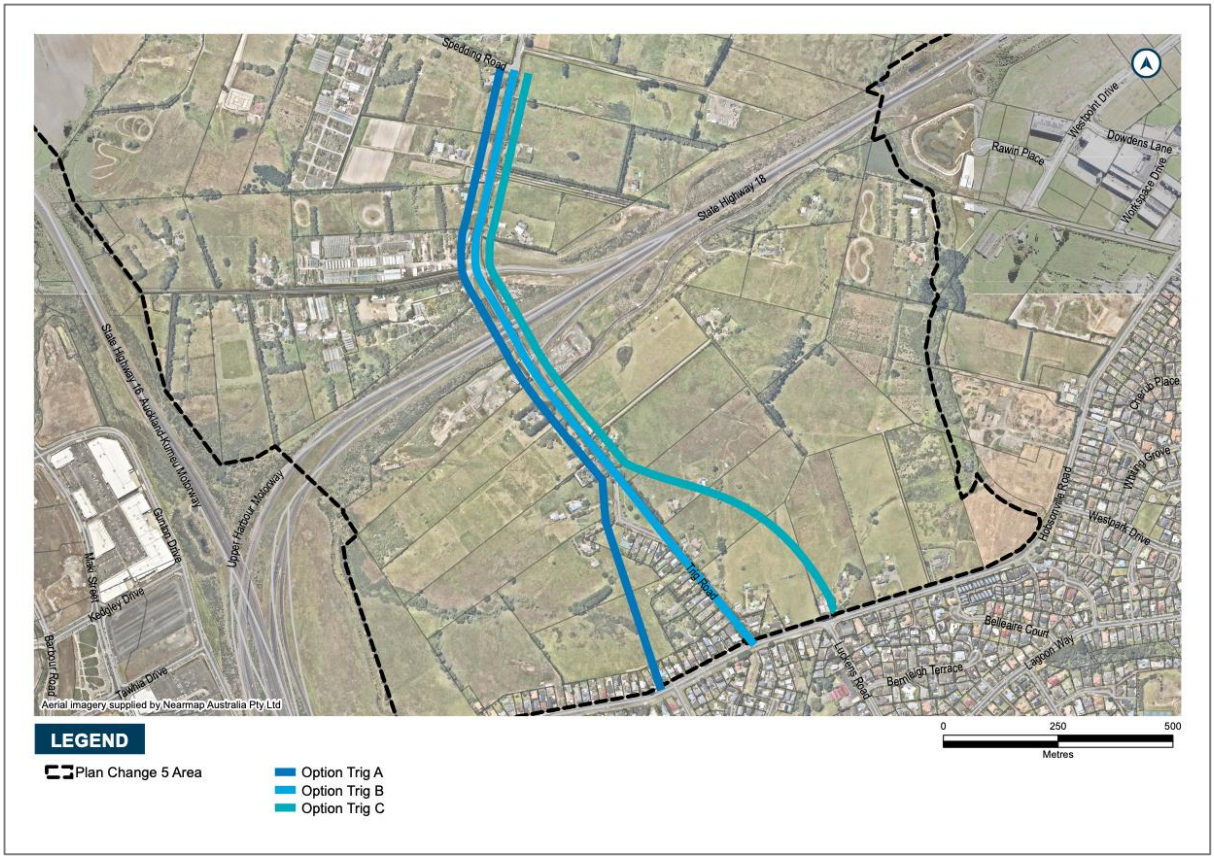


Figure 3: Corridor Assessment Options

At this stage of the assessment process, the information used to inform the consideration of the different options was primarily derived from desktop assessments. When assessing the three options, consideration was had to the purpose of the upgrade and potential realignment of Trig Road which is to increase supply of land for housing, and to improve access for Whenuapai residents to adjacent land uses in Hobsonville, as well as rapid transit and ferry services, effects of the options on existing properties access, and the need to minimise the number of intersections along Hobsonville Road.

The options were assessed against the MCA framework in a workshop setting. Technical specialists were provided with information packs prior to workshops occurring to inform them of the MCA process and allow them to undertake pre-scoring and assessment. Workshops were then held with representatives from Auckland Council, AT, Waka Kotahi and Manawhenua to allow discussion of options and the scores assigned by technical specialists, and for technical specialists to confirm their scores.

Following the assessment process of the three long list options, the Project Team identified Option C as the preferred option, and the only option recommended to be taken to the shortlist, on the basis that:

- Options B and C performed best in achieving the investment objectives as they provided a more strategic transport connection into the existing transport network along Hobsonville Road.
- Option A performed significantly worse in all criteria due to providing sub-optimal transport connections, creating land redundancy from the alignment and considerable effects to the existing land use, as well as resulting in a more constrained environment which would likely result in greater construction impacts and costs.
- Option C avoided potential impacts on the existing residential land use along the southern section of Trig Road; however, it would require substantial earthworks and new stream crossings to construct the diversion of Trig Road into a new intersection with Luckens Road.
- Option B utilised the existing Trig Road alignment and intersection; however, the existing residential land use along the southern section of Trig Road was identified as a potential constraint to widening the corridor due to the close proximity of dwellings to the road frontage. Furthermore, there was uncertainty as to whether the signalisation of the Hobsonville Road intersections at Luckens Road and Trig Road could achieve as efficient a strategic transport connection as the new intersection at Luckens Road proposed for Option C.

Stakeholders generally preferred Option C because it provided more strategic transport connections at Luckens Road through to the ferry terminal at West Harbour Marina.

Following the recommendation that only Option C should be taken to the short list, the short list process tested six alternative options derived from Option C. These options varied in relation to the location of widening of Option C (i.e. widening on the west only, east only, or both).

Following the short list assessment, which went through a similar workshop MCA process, it was concluded that further design and engineering assessment was required to determine a preference between the options. As such these options were re-tested through the SG DBC. This is discussed in further detail at section 4.2 of this report.

4 Consideration of Alternative Routes

As noted above, the process taken to considering alternatives for the Project was sequential and iterative, with each stage of assessment being informed by the previous stage of assessment and an increasing level of detail and refinement occurring depending on the stage of assessment. As such, the SG DBC built on the AC DBC.

4.1. Overview of further design undertaken prior to Options Assessment

As noted in the AC DBC, further design and engineering assessment was required to determine a preferred option. Further design work was undertaken as part of the SG DBC which identified that the earthworks required for Option C to realign Trig Road to connect to Luckens Road and achieve current roading standards were greater than previously anticipated and would result in the road needing to be as much as 15m (equivalent to a four-storey building) above the surrounding ground level. The earthworks would also have a greater area of impact on Trig Stream than anticipated, which the realigned corridor would need to cross.

Stemming from this issue, it was considered that there were several secondary impacts which could have the potential to compromise the viability of the alignment including:

- Landscape and visual impacts;
- Ecological impacts;
- Severed access to existing parcels of land;
- Compromised pedestrian and cyclist access;
- Severance effects for adjacent land use; and
- Poor value for money.

These issues were assessed as having potential to impact the ability of the option to meet the project objectives and achieve a satisfactory value for money outcome. As such, a decision was made to undertake further options development and assessment at a corridor level to ensure the best option was chosen to take forward to route refinement and that this decision was based on a robust process.

4.2. Review of Corridor Options

As a result of the above, the original three options considered during the earlier corridor assessment phase as part of the AC DBC (as shown above in Figure 3 and recreated again below in Figure 4), were reconsidered.

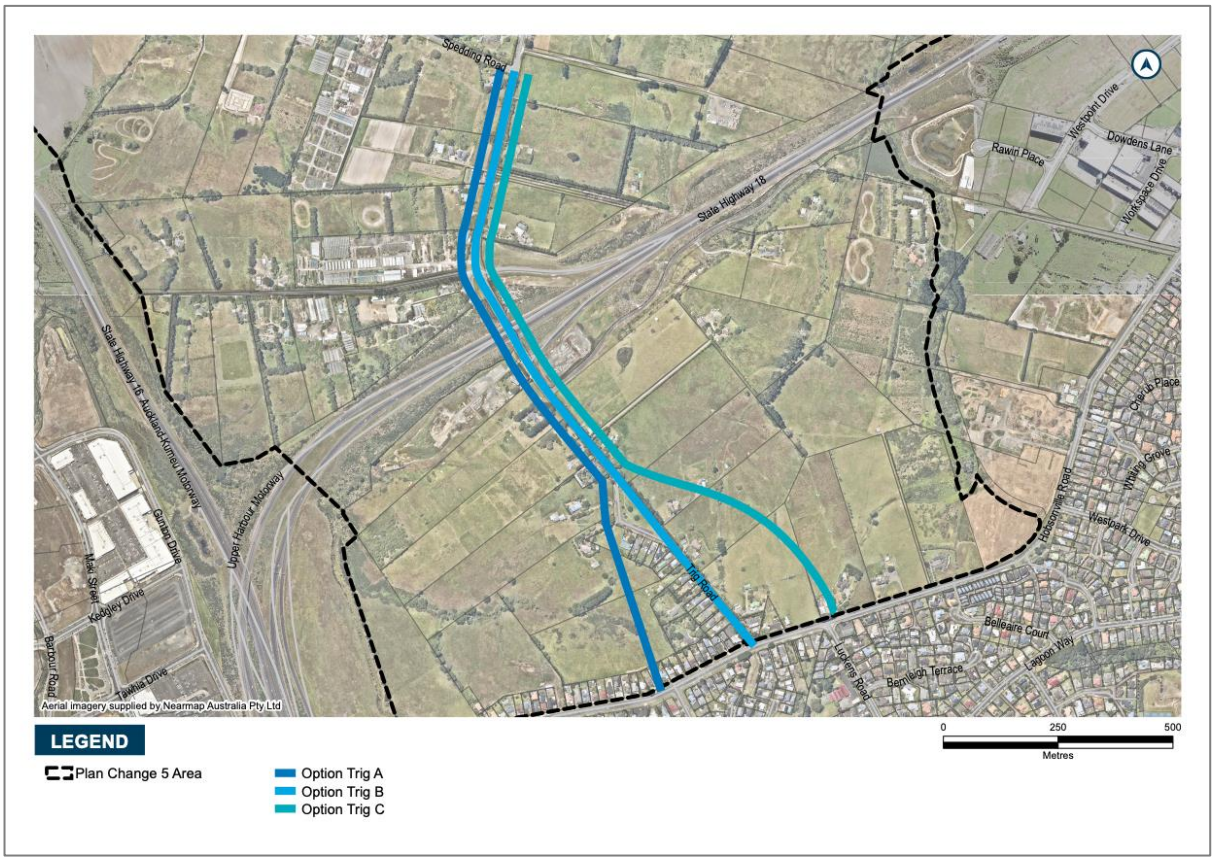


Figure 4: Reconsideration of Corridor Assessment Options

Option A was considered to be the least effective in achieving the investment objectives because it would result in less area available for housing, did not integrate well with the planned neighbourhood centre and provided the least effective connection to the local centre and ferry terminal. The connection point with Cyril Crescent was also assessed to be unsuitable for an arterial road. All of these concerns had been identified during the initial corridor assessment process and as such it was concluded that the previous work and conclusions as part of the AC DBC relating to Option A were still valid. Accordingly, it was reconfirmed that Option A was not a viable option and Option A was not considered further.

Option B had previously performed better than Option A and had performed similarly to Option C. It was not previously preferred over Option C however as the connection point at Hobsonville Road was considered to not be as direct as that provided by Option C with Luckens Road. Option B was also previously assessed as having higher potential construction effects due to the existing residential development towards the south of Trig Road. However Option B was assessed as having higher potential opportunities associated with improved access and amenity for the wider walking and cycling network.

Overall it was considered that Option B performed similarly to Option C and so may prove to be a viable alternative, subject to the construction impacts being able to be managed satisfactorily. In conjunction with the identification of potentially greater impacts as a result of Option C than was anticipated during the initial corridor assessment during the AC DBC, it was recommended that further development of route options for Option B should be undertaken alongside assessment of route options for Option C. This would allow further investigation of these options with particular

consideration being given to design geometrics, intersection connections with Hobsonville Road, stormwater design and costing.

4.3. Development of Options

In developing the route options for Options B and C, the known constraints and opportunities identified during the previous corridor assessment phase were examined to help refine the design and minimise potential impacts for each option.

The interface with approximately 25 existing private properties along the southern section of Trig Road was identified as a constraint to developing Option B. In particular, to avoid impacts on these dwellings widening would need to be predominately on the eastern side of the road corridor.

Furthermore, having existing vehicle accesses onto arterial corridors that are across pedestrian and/or cycle paths is also undesirable as this can reduce network efficiency and can create a safety risk for vulnerable road users. An Option B variant (Option Trig B1) was therefore developed which utilised service lanes along the road corridor to test the viability of removing direct access from existing dwellings onto the arterial corridor.

To minimise the potential impacts of Option C a refined alignment was developed to reduce the scale of earthworks required to establish this option. In particular, the gradients of the approach to the Luckens Road intersection were refined with particular consideration given to minimum engineering standards.

The intersection configuration of Hobsonville Road between Trig Road and Luckens Road had also been identified as a potential constraint, particularly for Option B. In response to this, the intersection configuration for all options was developed further with consideration of signalised intersections and roundabout sub-options for each option. Table 1 and Figure 5 outlines the three route options developed for the assessment. The alphabetic naming convention comes from the long list stage of the corridor assessment phase as part of the AC DBC, with the addition of a number for the slip lane variant identified above.

Table 1: Trig Corridor Assessment Options

Option Name	Option Description
Option B	Widening on the eastern side of the existing Trig Road corridor, with direct vehicle access from adjacent properties maintained.
Option B1	Widening on the eastern side of the existing Trig Road corridor, with a slip lane to provide vehicle access from adjacent properties.
Option C	Realignment of Trig Road to the east to tie in with Luckens Road and Hobsonville Road.

Figure 5: Route Refinement Options

4.4. Overview of Assessment Framework

4.4.1 Multi-Criteria Analysis

Following design refinements and further options development, specialists were engaged to assess route options using the MCA process. By this time, the Supporting Growth Programme had finalised a programme wide Supporting Growth Programme MCA framework, in consultation with AT, Waka Kotahi and Manawhenua. The MCA criteria included investment objectives (as discussed further below) and the four well-beings: Cultural, Social, Environmental and Economic. Several sub-criteria were developed under each well-being grouping.

The MCA was not the sole means of assessing options but was complementary to the decision-making process, which also incorporated input from AT, Manawhenua, feedback from the consultation and engagement process, subject-matter experts and the Project Team. The MCA criteria were tailored to suit the specific issues relevant to the Trig Road/Whenuapai area, consistent with the Supporting Growth Programme MCA and the earlier corridor assessment framework. A rationalisation process was undertaken to identify any criteria in the Supporting Growth Programme MCA criteria for which scoring may be inappropriate and/or unnecessary – either due to duplication of the criteria with the investment objectives or the inability of any particular criteria to differentiate between options. The criteria are set out at Appendix 2.

4.4.2 Scored Criteria

Technical experts were appointed to undertake assessments of the options in their area of expertise.

The Supporting Growth Programme MCA framework used a graduated scoring scale, ranging from -5 for Very High Adverse Effects to +5 Very High Positive Impacts to score options against the MCA framework.

Scoring was completed by technical experts and discussed at several MCA workshops. Prior to each workshop, experts were provided with a briefing pack, which contained the MCA criteria and scoring guidelines, an overview of each of the options, and a pre-scoring worksheet where they documented their approach and key assumptions that informed their scoring. On the day of a workshop, the draft scores and commentary were challenged in a group setting. The experts then considered the issues raised in discussion and finalised their scores.

4.4.3 Non-scored Criteria

In addition to the scored criteria, there are four non-scored criteria considered as part of the Supporting Growth Programme MCA framework. These criteria are less suited for scoring through the MCA scoring framework. Instead these criteria are considered through a descriptive (qualitative) assessment which can be used to help to direct decision making (in combination with the scored criteria). A description of the non-scored criteria (as specified by the Supporting Growth Programme MCA framework) is provided in Table 2.

Table 2: Non-scored Criteria

Criteria	Description
Stakeholder feedback	Stakeholder feedback for each option identifying scale/validity of objections, identified preference/proposed changes to options etc. Feedback provided by other key partners/stakeholders.
Policy analysis	Options alignment with the strategic policy framework including the AUP:OP and Auckland Plan with consideration to provisions that derive from section 6 of the RMA. Ensure the strategic framework assessment does not consider detailed issues raised in the effects criteria.
Value for money	Provide an estimate of likely value for money in conjunction with transport outcomes and construction costs.
Manawhenua	Optioneering commentary including (but not limited to) identification of cultural issues or any other matter related to an option, providing input commentary on criteria scoring, identification of cultural issues etc.

4.4.4 Investment Objectives

As described in section 2.3, for the purpose of undertaking an assessment of options, the investment objectives were refined for this phase of assessment. These investment objectives were developed with a view to supporting the NoR processes that would follow. Table 3 outlines the Trig Road specific investment objectives for this stage.

Table 3: Trig Road Investment Objectives

Investment Objectives	Sub-criteria
Investment Objective 1 Create appropriate access to the Whenuapai FUZ land that facilitates desirable urban form outcomes and enables the release of land for housing, initially by 2021, and over a 30-year period, in line with the FULSS.	• Network connectivity and integration • Intersection performance • Traffic performance • Housing yield • Timing of infrastructure • Severance effects • Direct access
Investment Objective 2 Reduce reliance on private vehicles by providing travel choices for all trip purposes, thereby contributing to region-wide mode shift targets, over a 30-year period.	• Mode share • Public transport prioritisation • Cycling provision • Gradient

4.4.5 Intersection Assessment

To assess the intersection design options with Hobsonville Road (signals v roundabouts) a further refined MCA framework was developed, comprised of a limited set of MCA criteria appropriate for the scale of variation in proposed intersection form. The key factors for assessment were the footprint and function of each option. Accordingly, along with the investment objective scoring, the criteria outlined in Table 4 were selected for their ability to differentiate between the proposed intersection forms.

Table 4: Intersection Options MCA Criteria

Criteria	Commentary
Urban design	Providing design insight between intersection forms and associated external impact on surrounding community.
Land requirement	Confirm the extent of impact on surrounding properties, including the number and type of properties affected.
Landscape/visual	Consider the visual impacts associated with the design variants.
Construction cost/risk	Detail the likely cost and risk profile between both intersection forms.
Safety	Safety for all transport users, including private vehicles, public transport, pedestrians, cyclists, and other road corridor users.

4.5. Assessment of Options

The options for Trig Road were assessed against the above framework. The results of that assessment are discussed in detail below.

4.5.1 Investment Objectives

Option C comprises a more efficient intersection layout connection to Luckens Road when compared against the dog-leg intersection in Options B/B1, as it requires traffic to turn onto Hobsonville Road before turning down Luckens Road. For Options B/B1, higher traffic volumes will require the

signalisation of both the Trig Road/Hobsonville Road intersection, and the Hobsonville Road/Luckens Road intersection to enable them to perform effectively. From a network performance perspective, Options B/B1 are less direct and less efficient for users travelling north-south along Trig Road and onto Luckens Road. Overall, Option C is assessed to perform slightly better than Options B/B1 for intersection and traffic performance, but both options still meet the sub-criteria of Investment Objective 1.

As discussed above, following further design and development of Option C, it has become apparent that significant earthworks would be required to achieve the alignment, and the corridor would have a larger than anticipated footprint on the greenfield land. This may result in potential housing yield in this area being lower than that anticipated at the previous phase of work. Therefore, Option B which retains direct access performs better against this criterion of Investment Objective 1 and may eventually enable a higher housing yield than that considered in the previous phase of work as it has a smaller footprint and leaves more available developable land. Option B1 with the slip lane access is likely to provide a greater housing yield than Option C, but a slightly lesser housing yield than Option B with direct access because of the larger corridor footprint required to establish services lanes.

From a severance perspective, Option C is assessed as performing poorly against this criterion. This is due to the height difference that would be created between the arterial corridor and the adjacent land, with embankments up to 15m above the surrounding land resulting in a significant physical impediment between land use on either side of the corridor. Option B is assessed as having less severance impacts than Option C and additionally would be an improvement over the existing situation as new walking and cycling crossings will be enabled – there are currently no crossings on Trig Road. Option B1 is assessed as having slightly greater severance effects than Option B, due to the greater footprint and cross section required to establish service lanes, although Option B1 still performs better than Trig C.

Option C is assessed as being slightly more favourable than the other options in terms of provisions for cycling. This is due to there being no direct private property access for the realigned section of the corridor, which means cycling infrastructure can safely be provided on both sides of the corridor. With Option B, if some direct accesses are maintained (particularly along the southern section of Trig Road), there are potential risks to people who cycle (and walk) due to the potential conflicts with vehicles requiring access across their paths. This may make walking and cycling less attractive due to the safety perception issues associated with driveways. Option B1 performs better than Option B in this regard as it avoids direct vehicle access along the corridor, instead utilising service lanes.

All options result in constraints to active modes from a gradient perspective, with Option C having a gradient of 8% over parts of the alignment and Option B/B1 having a gradient of 7.7% over parts of the alignment. This may discourage some active mode users from using this route, although as this only affects a limited section of the corridor for each option this constraint is considered to be minimal.

4.5.2 MCA Scoring

This section provides a summary of the key differentiators between each of the options based on the scoring from the MCA framework.

Cultural heritage and archaeology

Option C scored negatively for cultural heritage and archaeology due to the potential for accidental discovery of unknown archaeological and other heritage during construction. However it was noted

that this option largely traverses historically pastural/rural uses, therefore there is only low potential for European farming heritage to be discovered during construction. Options B/B1 scored neutrally as the works would largely be within the existing road corridor.

Social Economic

The direct access of Option B was preferred over the slip lanes of Option B1 as the longer-term impacts of a slip lane on the surrounding developing urban environment and the additional footprint that may be required could hinder provision of future access connections and land use patterns. Option B was also preferred over Option C due to the much larger area of land required for the re-alignment of Trig Road as part of Option C to connect into Luckens Road.

Option B was also the preferred option in relation to urban design matters, contributing positively to the amenity and quality of the future urban environment due to improved connectivity, safety and urban amenity. Conversely, Option C was less favoured due to Option C requiring large scale and physical presence (due to large fill volumes required) which was deemed to dominate the future urban landscapes. Option B1's slip lanes and subsequent wider cross section were also deemed to be a poorer outcome than Option B.

Option C was deemed to have marginally less adverse impacts on human health and wellbeing in relation to increases in noise/vibration and air quality for adjacent properties, largely due to Option B/B1's closer proximity to the existing dwellings along the southern section of Trig Road.

Natural Environment

Overall, Options B/B1 scored more favourably than Option C for the natural environment criteria. Climate change outcomes were largely similar across all options, with all options achieving positive climate change outcomes through the provision of walking and cycling facilities to encourage greater mode shift. Option C had greater impacts on stormwater and ecology largely because Option C was anticipated to have greater impact on existing watercourses and will require larger construction/earthworks.

There were more notable differences in landscape/visual outcomes due to the large scale of fill required for Option C and its prominent visual proximity to surrounding land uses and natural character values. Option C therefore scored a high adverse impact for the natural environment criteria.

Constructability and design

Option C was considered to have more positive outcomes in relation to user safety due to providing improved intersection arrangements, with Options B/B1 scoring less favourably as a greater number of existing vehicle accesses would need to be retained compared to a new alignment. Furthermore, Option C provided a marginally better outcome regarding construction impacts on utilities/infrastructure and construction disruption as it was largely greenfield, therefore avoiding existing utilities sites and having minimal impacts on properties along the existing road corridor.

Option C however was deemed to have greater negative construction costs and risk compared to Options B/B1, attributable to the much larger fill area/volume and additional land requirements.

4.5.2.1 Non-Scored Criteria

A range of non-scored criteria were assessed for the Trig Road route options.

Stakeholder Feedback

Overall, Option B was the stakeholders most preferable option as the alignment follows the existing road, reducing impacts on properties and land acquisition and resulting in far less construction and fill requirements compared to Option C. Furthermore, there was a preference for Option B's direct access over slip lanes as it allows a continuation of existing uses for existing properties, has a smaller footprint to establish and provides greater flexibility for access to adjacent land considering zoning is likely to transition to greater urban density in the future.

Most landowners along Trig Road would be impacted by frontage requirements or temporary occupation, and were therefore largely concerned with maintaining access, loss of amenity, construction works and timeframes. Most landowners were supportive of Option B and the subsequent safety improvements and walking and cycling opportunities it would provide, and whilst there are several properties impacted by full acquisition, Option C traverses greenfield land and impacts more properties than Options B/B1, including severing some large properties. Furthermore, most landowners expressed concern about the extent of fill and ecological impacts of Option C.

Policy Analysis

Policy E27.3 in the AUP:OP seeks to manage vehicle access onto arterial roads to maintain efficient movement of people and goods on the network. Option B's widening of Trig Road without slip lanes will provide a suboptimal outcome in the short term by maintaining the various existing road accesses, however this outcome is anticipated to be incrementally rectified as adjacent properties are developed and accesses amalgamated in accordance with AUP:OP access controls. In contrast, the implementation of slip lanes in Option B1 would provide short-term alignment with the road's arterial function, however does not align with the typical roading hierarchy for the long-term. As noted above, as a new corridor, the part of Option C that does not follow the existing Trig Road alignment would be able to manage vehicle access as there would be no existing accesses which need to be considered.

Value for Money

The cost of slip lanes as part of Option B1 are likely to be higher with additional land purchase and construction requirements, however from an economic perspective, slip lanes would have higher travel time benefits with less delays from turning movements.

It was concluded that overall, cost savings could be achieved by using the existing alignment over Option C, or Option B with slip lanes.

Manawhenua

Manawhenua supported Options B/B1 and were concerned with the environmental and ecological impacts of Option C due to earthworks and fill requirements.

4.6. Recommended Option

In terms of the investment objectives, Option C performed slightly better or equal to Option B1 in terms of network connectivity and integration, intersection performance, traffic performance, timing of infrastructure, direct access and cycling provision. Option B performed better than Option C and Option B1 in terms of housing yield and severance effects. Overall, Option C provided a marginally better contribution to achieving the investment objectives.

However, the MCA indicated that Option B and Option B1 when compared to Option C, had better outcomes on all of the natural environment criteria, the heritage/archaeology measures, and construction costs/risks criteria. Option B scored slightly better than Option B1 and Option C in terms of urban design and land requirements. By utilising an existing corridor as proposed in Option B/B1 there is a reduced impact on land acquisition. The proposed geometric design also reduces the amount of fill required compared to Option C. Given these elements, Options B and B1 have a significantly lower construction cost compared to Option C, even when allowance is made for the upgrade of two intersections on Hobsonville Road.

Overall, while Option C scored well against the investment objectives, the overall impact on the environment and the enduring urban form outcomes of Option C meant that Option B, an existing alignment option, also achieved the investment objectives, without the urban form and environmental impacts. As such Option B with direct access was the preferred option for the required upgrade of Trig Road.

4.7. Intersections

Following identification of the preferred option for the required upgrade of Trig Road, alternative intersection forms (signals or roundabouts) were assessed through a limited MCA assessment, as set out at section 4.4.5 of this report, at the two intersections between Trig and Hobsonville Roads and Luckens and Hobsonville Roads.

If a signalised intersection is chosen for the Trig and Hobsonville Roads intersection then a signalised intersection should be chosen at Hobsonville and Luckens Roads to enable co-ordination between the two intersections and to provide the best outcomes for safety, as well as accessibility for pedestrians, cyclists and people using public transport, particularly when considering adjacent land use.

Overall, signals are the preferred treatment for the intersections as they are more in keeping with the urban environment, take up less land, and create less severance for pedestrians. They are also perceived to be safer than roundabouts which will encourage use of active modes and can be prioritised for public transport.

Given the uncertainty around timing and delivery of rapid transit elsewhere on the North West network, the intersection of Trig Road and Hobsonville Road should be route protected for bus movements. This level of priority is not possible in a roundabout form without significant land requirements.

5 AC DBC and SG DBC Option Review

The options assessments in the AC DBC and SG DBC were undertaken prior to the introduction of the National Policy Statement for Freshwater Management 2020 (NPS-FM). A further review of options considered in each DBC was subsequently undertaken with a focus on the impacts on natural wetlands.

It was found:

AC DBC

- The three long-list route options (Option A, B and C) all scored equally in terms of ecological impacts in the MCA undertaken as part of the AC DBC. Option A performed significantly worse in other criteria due to provision of sub-optimal transport connections, land redundancy from the alignment and considerable effects to existing land use (e.g. alignment passes through an existing kindergarten) and was therefore discarded.
- On review, it was found Option A was likely to result in wetland impacts, as a wetland system runs in an east to west direction on the western side of Trig Road, where the Option A alignment would fall.
- It was not confirmed whether the wetland impacts resulting from Option A would be greater, comparable to, or less than those resulting from Options B and C. However, given the comparatively poor performance of Option A on other criteria (discussed above) and that wetland impacts would not be avoided by Option A, it was concluded that the decision to discard this option need not be revisited.

SG DBC

- Trig Road runs along a ridgeline, with wetland features located both to the east and west. The wetland features impacted by the preferred option (Option B) are located on the eastern side of the existing road alignment.
- Both Options B and B1 would impact the wetland located near the southern end of the Trig Road corridor, which extends to the eastern edge of the existing road formation. However, Option B1 would impact the wetland to a greater extent, as this option features a wider road corridor at the southern end of the alignment to accommodate the slip lane.
- Option C, which would divert the southern end of Trig Road to the east to meet Hobsonville Road at the Luckens Road / Hobsonville Road intersection, would have greater impacts on natural wetlands in comparison to Option B. Both Options B and C would impact the wetland located near the southern end of the Trig Road corridor, but at different locations. Option B would affect the upper reaches of the wetland feature, right at the top of the catchment, thereby having little effect on the hydrology of the wetland; the remainder of the wetland is downstream and would not be affected. In contrast, Option C would intersect the wetland feature approximately 100m further downstream, resulting in not only direct impact at the crossing location, but also impacting the hydrological function of the section of wetland upstream of the crossing. Additionally, Option C would impact an additional wetland as the alignment pushes further east.

On this basis, Option B remained the preferred option.

Additionally, an opportunity was identified to refine the design of the preferred option to reduce wetland impacts. Further ecological assessment was undertaken in 2022, resulting in the delineation of additional areas of natural wetland as directed by the NPS:FM. The dry stormwater attenuation pond, in its original location, would have encroached on this area of wetland. In response the dry pond was shifted further south, thereby avoiding the wetland, while still being located sufficiently close to the low point along the road corridor to maintain functionality.

6 Stormwater Assessment

Alternative stormwater designs were considered for the recommended option. The stormwater options considered were directed by minimum stormwater outcomes and the engineering constraints of the Project area. While the evaluation of stormwater alternatives involved technical input from a range of other (non-engineering) disciplines, the primary decision-making process was driven by key engineering considerations which directed the feasibility and suitability of the options available.

As such, the MCA framework was not considered to be an effective decision-making tool for this purpose. Instead the assessment of stormwater design alternatives used the following process:

1. Identification of the expected minimum stormwater outcomes for the Project (Stormwater Design Philosophy Principles);
2. Analysis of key (engineering and non-engineering) constraints and design considerations which influence the potential stormwater design solutions; and
3. Qualitative evaluation of the potential stormwater design options available to achieve the desired stormwater outcomes within the context of the key constraints and considerations.

The following sub-sections outline this process in relation to the Project.

6.1. Stormwater Design Philosophy Principles

The key principles of the Stormwater Design Philosophy that were adopted for the consideration of stormwater design alternatives are outlined in Table 5.

Table 5: Stormwater Design Philosophy Principles

Topic	Stormwater Design Philosophy Principles
Stormwater Quality	• Avoid the potential impacts of stormwater runoff from new high contaminant generating impervious areas through the treatment of stormwater in accordance with GD01: Stormwater Management Devices Guide (**GD01**), where practicable.
Stormwater Quantity	• Avoid adverse effects on the operation and structural integrity of other infrastructure in a 100 year rainfall event. • Avoid increase in inundation affecting upstream and downstream properties in a 100 year rainfall event. • Adopt on-site stormwater solutions for the retention/detention of runoff from new impervious areas where practicable.
Operation and Maintenance	• Adopt whole of life considerations in the selection and design of the treatment devices – including design life, maintenance cost, and operational effectiveness. • Adopt water sensitive design principles (as specified by GD04: Water Sensitive Design Guide (**GD04**)) where practicable.

Construction	• Minimise construction effects where practicable by:
	  ◦ Limiting cut/fill requirements by locating stormwater devices in locations which utilise the natural topography of the Project area; and
	  ◦ Minimising the construction footprint of the Project by locating stormwater devices as close as possible to the transport corridor.

Ecology and Hydrology	• Avoid direct impacts on existing watercourses by locating stormwater devices offline, where practicable. • Avoid indirect impacts on the catchment hydrology by minimising changes to the general flow of groundwater and overland flow within the catchment.
Climate Change	• Avoid the potential impacts of climate change by designing to account for increased Average Recurrence Interval storm events as outlined in the Auckland Council Code of Practice for Land Development and Subdivision Chapter 4 – Stormwater (2015).
Private Property	• Minimise permanent impacts on private property by locating stormwater devices within the transport corridor where practicable. • Minimise impacts on established urban areas by locating stormwater devices in greenfield areas where these are available.

6.2. Constraints and Considerations

Table 6 provides an analysis of the key (engineering and non-engineering) constraints and design considerations which have influenced the potential stormwater design alternatives.

Table 6: Key Constraints and Design Considerations

Constraint	Description

Corridor Width	• While the general cross-section for the Project corridor provides sufficient space to establish raingardens, sections of the corridor are constrained by adjacent land use limiting the practicality of establishing raingardens. This includes:
	  • Reduced berm width along the southern section of Trig Road and parts of Hobsonville Road to minimise impacts on adjacent properties; and
	  • A flush medium is required along Trig Road and Hobsonville Road to maintain access to adjacent residential properties.

Topography	• Trig Road is located along a ridgeline which undulates along the alignment. Sections of the alignment are in excess of 8% grade. This may restrict the practicality of using raingardens. • The topography of the surrounding catchment is undulating with numerous high and low points which limits the practicality of locating stormwater devices.
Infrastructure capacity	• There is limited existing stormwater infrastructure along Trig Road (mostly along the southern section of Trig Road). • The existing stormwater infrastructure along Hobsonville Road has limited capacity. • There is no existing stormwater network in the greenfield area surrounding Trig Road. • The existing stormwater network south of Hobsonville Road has limited existing capacity.
Watercourse and hydrology	• There are existing wetlands located on the periphery of the transport corridor. • There are overland flow paths crossing the Project area and the surrounding catchment. • There are groundwater flows around Trig Stream which feed into the watercourse.

Whenuapai Airbase	• Whenuapai Airbase is located approximately 1.5km north of the Project area and has operational requirements which seek to limit the potential for bird strike. This is reflected in the Whenuapai 3 Stormwater Management Plan which was developed by Auckland Council as part of the Whenuapai Structure Plan and has been adopted for PPC5. This includes restrictions on the use of stormwater devices which have the potential to attract bird settling or roosting which is required by Standard I616.6.12 of PPC5.
Land use	• The existing transport corridor along Hobsonville Road and the southern part of Trig Road is constrained by existing residential land use which limits the availability of space adjacent to the corridor. • The current land use along most of Trig Road and along the western part of Hobsonville Road is currently rural in character but has been identified for future urban land use. While this provides less of a constraint compared with the existing urban environment in the southern area of the Project area, the Project is seeking to support growth and therefore developable land adjacent to the corridors should be maximised. Additionally, Integration with the future urban land use in this greenfield area needs to be accommodated.

6.3. Stormwater Design Options

GD01 was used to guide the range of potential stormwater devices which were considered for the Project. The range of potential stormwater devices each provide differing methods for managing the effects of stormwater runoff with the aim of achieving one or more of the following:

- Managing the impacts of stormwater quality and quantity
- Mimicking or replicating natural runoff and flow
- Meeting the stormwater quality requirements of the AUP:OP
- Aligning with water sensitive design principles (GD04).

Stormwater devices can generally be considered to provide one or both of the following functions:

1. Treatment of stormwater runoff to manage contaminants; and/or
2. Retention and/or detention of stormwater runoff to manage flow.

Table 7 provides a list of the potential stormwater devices which were considered for the Project and identifies the primary function(s) of each device.

Table 7: Potential Stormwater Devices and Function

	Treatment	Retention/Detention
Stormwater Wetland(s)/Pond(s)	✓	✓
Rain Gardens/Swales	✓	✓
Filtration Devices	✓	×
Detention Tanks	×	✓
Pervious Paving	✓	✓
Existing Network	✓	✓

The following sub-sections provide an analysis of the suitability of each of the potential stormwater management device options with respect to the Project area and stormwater design philosophy.

6.3.1 Consideration of Treatment Options

Table 8 provides commentary outlining the consideration of potential stormwater treatment options.

Table 8: Consideration of potential stormwater treatment options

Treatment Options	Comments
Stormwater Wetland(s)/Pond(s)	Due to the restrictions on establishing stormwater wetlands/ponds which require permanent water bodies (Standard I616.6.12 Stormwater ponds/wetlands PPC5) the available options are limited to the use of dry detention basin devices (dry ponds). A dry pond does not provide retention or water quality management functions and additional stormwater management solutions would be required to provide this function.
Rain Gardens/Swales	Rain gardens/swales are generally a favourable stormwater treatment option for transport corridors as they can often be incorporated into the design of the transport corridor and provide an effective treatment option with relatively low maintenance cost. The general corridor cross-section for the Project provides sufficient space to incorporate rain gardens/swales into the corridor. However, there are constrained sections of the corridor, along the southern part of Trig Road and along the western section of Hobsonville Road, which have reduced berm widths which would be unsuitable for rain gardens/swales. Introducing swales in these areas would impact numerous existing dwellings on either side of the corridor and is therefore undesirable. Where there is suitable adjacent land, rain gardens/swales could be established outside the corridor. This is viable along the northern section of Trig Road and western section of Hobsonville Road where there is immediately available flat greenfield land. However, the Project is seeking to support growth and therefore developable land adjacent to the corridors should be maximised. Provision of wider corridors for swales would not be as supportive of this objective. Rain gardens/swales may be viable within the median strip of the corridor where there is sufficient space. While the general corridor cross-section provides an ample medium strip along most of the corridor, this area is required to be maintained as flush medium to enable access to adjacent properties, therefore this space cannot be used for rain gardens/swales. Rain gardens/swales are ineffective at providing treatment at grades which are in excess of 8%. As approximately 180m of Trig Road has a slope greater than 8%, rain gardens/swales will be ineffective along these sections of the alignment and alternative treatment options will be required.
Stormwater Filters	Stormwater filters can provide effective treatment where it is possible to provide a bypass for events greater than the water quality storm event. There is sufficient corridor width to provide underground stormwater filters within the corridor. These devices require ongoing maintenance in accordance with the manufacturers' specification. The devices have limited lifespans and need to be replaced periodically. In comparison to other treatment device options the ongoing maintenance cost and limited life span makes this option cost inefficient. Stormwater filters also do not provide any retention/detention function and additional stormwater devices will be required to provide this function.

	Accordingly, stormwater filters are generally less favourable unless there are significant constraints which prohibit the use of other devices.
Pervious Paving	Pervious pavement will not be suitable for traffic areas of high acceleration, decelerating or turning. This option will not comply with the pavement and structural requirements of the Project.
Existing Public Stormwater Network	There is no existing stormwater treatment along Trig Road, therefore this is not a viable option. The existing stormwater network in the southern catchment of Hobsonville Road has limited capacity. As this is an existing built out urban catchment there are limited opportunities to expand this network, and no known plans to do so. As such, this is not a viable option.

6.3.2 Consideration of Retention and Detention Options

Table 9 provides commentary outlining the consideration of potential stormwater retention/detention options.

Table 9: Consideration of potential stormwater detention and/or retention options

Retention and Detention Options	Comments
Stormwater Wetland(s)/Pond(s)	As outlined in Table 8 due to the restrictions on permanent water bodies the available options are limited to the use of dry detention basin devices. Dry ponds utilise the natural land topography or have a temporary pool formed by capturing water and releasing it at a slower rate. These devices allow for detention during rainfall events and act as green space during antecedent or dry periods. Dry ponds reduce downstream flooding potential, minimise downstream channel erosion and include extreme flow management. They can provide aesthetics and further benefits from accessible green space between storm events. Maintenance advantages are recognised for dry ponds over wetlands and wet ponds. The key constraint to the use of a dry pond is the availability of sufficient space (it is noted that this is also a constraint for wetlands/wet ponds). As much of Trig Road is surrounded by greenfield land which is identified for future urbanisation this area is considered suitable for locating a dry pond. A dry pond does not provide retention or water quality management functions and therefore additional stormwater management devices to provide this function will be required.
Rain Gardens/Swales	Rain gardens/swales provide a hydrological function by reducing runoff volumes (through retention) and detaining runoff flows. However, they generally have limited capacity to attenuate larger events (1% Annual Exceedance Probability (**AEP**), 20% AEP) and generally need to be supplemented with additional stormwater devices for this function. As outlined in Table 8, the general corridor cross-section for the Project provides sufficient space to incorporate rain gardens/swales into the corridor. However, the following constraints are noted: • Sections of the corridor which have reduced berm widths would be unsuitable for rain gardens/swales. • Where there is suitable adjacent land, rain gardens/swales could be established outside the corridor, however, this would not promote the

	objective to support growth, as developable land adjacent to the corridor would be occupied by stormwater infrastructure. • Use of the medium strip needs to be retained as a flush medium and therefore cannot be used for rain gardens/swales. Rain gardens/swales are ineffective at providing retention/detention at grades which are in excess of 4%. As approximately 180m of Trig Road has a slope greater than 4%, rain gardens/swales will be ineffective along these sections of the alignment and alternative retention/detention options will be required.
Detention Tanks	Rainwater tanks (with reuse) will be uneconomical and are not considered to be an effective stormwater management tool for the Project.
Pervious Paving	Pervious pavement will not be suitable for traffic areas of high acceleration, decelerating or turning. This option will not comply with the pavement and structural requirements of the Project.
Existing Public Stormwater Network	There is limited existing stormwater networks along Trig Road providing only rudimentary retention/detention, therefore this is not a viable option. The existing stormwater network in the southern catchment of Hobsonville Road has limited capacity. As this is an existing built out urban catchment there are limited opportunities to expand this network, and no known plans to do so. As such, this is not a viable option.

6.4. Stormwater Recommendations

Based on the above assessments, the recommended stormwater system is a series of raingardens and a dry pond to prevent downstream flooding.

7 Alternative Methods

7.1. Introduction

The Project has funding and is ready for construction once the necessary approvals and the required land are obtained. AT has decided to use a designation as the method to deliver the Project. Section 171 of the RMA requires an assessment of alternative methods, in addition to routes and sites.

Other possible methods to achieve the Project include:

- Obtaining district resource consents;
- Securing the Project through landowner/developer agreements;
- Including the Project within a plan change or Unitary Plan 'Corridor Overlay';
- Traditional property acquisition; or
- A combination of the above.

7.2. Route Protection Mechanisms

Table 10 provides an assessment of the strengths, weaknesses and suitability of each of the available methods. The planning context, key risks and considerations which may influence the preferred route protection method were reviewed and evaluated taking into account the planning environment and identified risks and considerations.

Table 10: Consideration of methods to achieve the Project

Method	Consideration	Suitability
Designation	A NoR to designate land for a public work under the RMA provides a strong level of route protection from incompatible development particularly where development pressure is anticipated along the corridor. Once confirmed it also provides authorisation to undertake and maintain the works. A NoR has interim route protection effect as soon as the notice is lodged with Council which ensures the corridors will be protected from incompatible development from that date, enabling a cohesive interim protection for linear networks like roads. This effectively manages risk of development within the corridor that may otherwise hinder the proposed work. This is particularly important as the corridor includes urban zoned areas around Hobsonville Road. A designation, if confirmed, is included in the relevant district plan as a publicly visible layer. This provides visibility to the public about the intended land use and project extent. It also provides certainty to other infrastructure providers, developers and landowners about the future network location, enabling coordinated development planning. A designation enables streamlined delivery of a corridor following detailed design, by consenting the project requirements under the district plan and allowing OPWs to be sought at a later date. Designations also provide landowners with particular rights under the RMA to require acquisition if they can no longer have reasonable use of their properties.	**Strong**

Resource consents	Resource consent granted under a district plan gives approval to use or develop land. A resource consent, if granted, is not shown publicly in a district plan meaning the public would have limited awareness of its existence. It does not protect land or provide rights of exclusion that would hinder incompatible land use. It would be possible to progress the Project via district resource consents (along with necessary regional consents). This process would require a complex assessment against a range of district plan rules, resulting in a more complex application process and less cohesive conditions set.	**Weak**
Landowner/ developer negotiation	Landowner or developer negotiations can include private parties purchasing land and vesting roads that support development, or development agreements whereby a developer agrees to "set aside land for future transport corridor" and/or construction at a future point. Infrastructure Funding Agreements (IFA) are the preferred form of landowner/ developer agreement to enable delivery of transport infrastructure. IFAs provide route protection where a developer agrees to design and implement a project. For landowner agreements to be efficient, the aspirations and timing of each party must be aligned. Landownership along the Project corridor is fragmented; therefore, this method relies on individual property owners, who may not be developers (with sufficient capital or expertise) to enter into agreements. Private property owners with no development aspirations that are not part of a broader scheme may not have capacity or desire to negotiate such agreements. Where numerous independent properties and landowners are involved, the final solution is likely to be delivered piecemeal due to the impracticalities and timeframes required to negotiate complex agreements with the landowners for the corridor. In this instance land will be required from an estimated 47 properties, the majority of which are under individual ownership. IFAs with a large number of parties are generally impractical to implement and unlikely to protect the corridors within a reasonable time period. Additionally, it is not compulsory for landowners to enter into agreements, for linear corridors requiring a consistent network, agreement must be secured along the length of the route. A piecemeal approach significantly reduces the utility of this method for route protection purposes.	**Weak**
Plan Change/ Unitary Plan 'Corridor Overlay'	Proposed Plan Change 5 was withdrawn on 6 June 2022, therefore cannot be relied upon. A new Corridor Overlay could be included in the Unitary Plan to provide for the transport corridors. AUP:OP overlays can provide certainty to the community by publicly identifying the network, however they do not protect the land necessary for the works. Any overlays would require a plan change, this may not be an approach accepted by Council as the AUP:OP overlays are generally focussed on RMA Section 6 and 5 matters (e.g., heritage, significant ecological areas). There are existing infrastructure overlays in the AUP:OP for noise (e.g., Airport Noise Overlay, City Centre Port Noise Overlay) as well as the National Grid Corridor Overlay, which is most reflective of how an overlay may appear for a transport corridor. However, it is noted that the National Grid is also served by the NPS on electricity transmission which sets out key protections from the adverse impacts of third-party development. There	**Weak**

	is currently no NPS which would provide the required protection for key transport corridors. Progressing a 'Transport Corridor Overlay' within the AUP:OP is not considered as a viable route protection method for the Project.	
Traditional property acquisition	Traditional property acquisition to acquire the necessary land for the Project was considered. Land is typically purchased a few years before a project goes to construction and delivery, based on detailed design plans. Purchasing property at this stage ahead of detailed design may result in too much or too little land being required and may not enable construction areas to be protected which are required temporarily to construct the corridors. Like developer negotiations, traditional property purchase would not provide route protection until acquisition, where multiple owners are present this is unlikely to be achieved in a timely or consistent manner.	**Weak**

7.3. Recommendations

A designation is the recommended method for delivering the Project. A designation is the most efficient and effective mechanism for enabling construction, operation and maintenance of the Project as it will:

- Provide certainty to all parties by defining use and extent of the Project corridor
- Set aside the required area and restrict activities or use that may prevent or hinder the identified Project being realised
- Enable ongoing interim use of the required land by owners where it will not hinder the Project
- Allow detailed design to be undertaken prior to project delivery
- Provides authorisation under the district plan to undertake the works, and maintain and operate the transport corridor.

8 Conclusions

A wide range of alternatives have been investigated for addressing the transport needs for the Project area. A key driver for the assessment of alternatives was to avoid adverse effects where practicable. That evaluation confirmed that the upgrade of Trig Road and Hobsonville Road (between the intersections at Trig Road and Luckens Road) would provide a balance of strong transport and urban outcomes while minimising potential adverse effects.

The assessment of alternatives has been based on a comprehensive and replicable optioneering process. As such it is concluded that adequate consideration has been given to alternative sites, routes, or methods for undertaking the work, satisfying the requirements of section 171(1)(b) of the RMA.

Appendix 1. MCA – corridor assessment

Investment Objectives	Measures	
Performance against objectives	Investment Objective 1 *Increase the supply of transport infrastructure serviced land for housing in Redhills and Whenuapai, appropriately integrated with adjacent land uses, initially by 2021 and over a 30-year period, in line with the Future Urban Land Supply Strategy.*	
	Investment Objective 2 *Develop liveable, connected communities at Redhills and Whenuapai through an integrated and resilient transport system which, over 30 years, will enable efficient access to jobs and core services, reduce private vehicle mode share and provide travel choices.*	
Implementability	**Sub-criteria**	**Measures**
Consentabilty	Consentabilty	What is the level of complexity in gaining statutory approvals and scale/significance/costs of mitigation? Is a new designation or alteration required? Consideration of conflicting/ overlapping designations. Qualitative assessment of the number of consents required and consideration of the zoning and Plan objectives and policies.
Affordability	Operational/ Maintenance	Are there any factors that might affect the ability to operate or maintain the option over its projected life without major additional costs?
	Financial	Funding and likely BCR.
Stakeholders/ Customers	Stakeholders/ Customers	Expectation of this option to relevant stakeholders/customers (how aligned or otherwise is the option with these expectations)? Scale/validity of anticipated objections from stakeholders/customers related to this option (risk)? Alignment to strategic plans and policies (Central Government, Auckland Council, CCOs).
Assessment of Effects		
Transport	User safety	Safety for all transport users, including: • Private vehicles • Walkers/cyclists
	Transport system integration	Are there any wider transport system effects (i.e. impacts on other strategic connections and/or the existing transport network) and how well does the option meet the forecast transport demand?
Construction (temporary impacts)	Construction impacts on utilities and lifeline infrastructure	Requirements for relocation/design of alternative major infrastructure, including consideration of Safety impacts of such requirements and risk of continuity of service over construction.
	Construction costs	Assessed cost for construction of options including: • Complexity and risk in construction • Complexity in programme

		• Cost and complexity of undertaking works on contaminated land (including health and safety)
	Construction impacts	Impacts on people and businesses from disruption from traffic, dust, noise (including from a quality of life/amenity point of view and economic impacts on businesses).
Socio-economic	Urban Design: Land use futures	To what extent will there be impacts on the orderly development of land (within the corridor, adjacent to it and impacted by it – i.e. consider all 3 scales), in relation to: • Underlying urban structure (block and street pattern) • Size and shape of potential development parcels to enable appropriate building typologies • Ability to consolidate residual land • Access that does not prevent neighbouring development
	Social cohesion	Will the option impact on Connectivity/Accessibility for the public including access to: • Jobs • Other communities or within the same community (i.e. social cohesion) • Shops/services/other community and cultural facilities/'attractors' Will the options impact on existing community facilities and open space?
	Human Health	Are there any sensitive land uses nearby or clearly planned (childcare centres, hospitals, rest homes, marae, schools)? Will the option impact human health relating to: • Air Quality • Contaminated land • Noise and vibration
	Economic	Impacts on existing economic opportunities that are anticipated for future development (consideration will be given to economic activities that will change because of planned land use development).
Natural Environment	Landscape/ visual	Will the option have visual effects on the environment? The extent of effects on: • the natural landscape and features such as streams, coastal edges, natural vegetation and underlying topography – acknowledging planned changes to area considering urban land use/zoning • natural character and outstanding natural features/landscapes including geological features (mapped and protected features)
	Water quality	Impact of operational stormwater in regard to quantity and quality (including life supporting capacity).
	Ecology	Extent of effects on: • significant indigenous vegetation • significant habitats of indigenous fauna • indigenous biodiversity • stream ecology (recognising integration of ecology with future urban land use zoning and realistic future of some elements, such as intermittent streams)
Heritage	Heritage	Extent of effects on:

		• sites and places of valued heritage buildings and places • sites and places of archaeological value • sites and places of cultural heritage value
	Manawhenua	Extent of effects on the relationship of Māori to their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other Taonga (tangible and intangible). Extent of effects on Māori landholdings which includes marae, papakāinga and Maori land.
Opportunity Outcomes		
Holistic socio-economic considerations	Urban Design: Access and amenity (of the walking and cycling network)	Do the connections feel safe? • Is the option well overlooked or isolated from other activities and casual surveillance? • To what extent does the option require CPTED measures (e.g. lighting, landscape pruning, straightening of paths, removal of obstacles)? • Does the option help overcome safety concerns (perceptual) associated with cycling? • Are connections direct? • Does the option follow direct routes with minimal detours and waiting times to key destinations and existing infrastructure? • Does the option create severance and delay for pedestrians at key destinations? • Does the option provide connections to key PT interchanges? Are connections comfortable? • Does the option provide an easy gradient for walking and cycling? • Is there shade, shelter from wind; are the edges soft or hard, low or high? • Are connections coherent? • Is the option well integrated into a continuous and consistent cycling network? • Are connections attractive? • Is the option aesthetically pleasing and attracts new users? • Does it integrate with open space and stream corridors?

	Urban Design: Quality of the urban environment	To what extent does the option support (both current and future planned state):
		• An inviting, pleasant and high amenity public realm
		• Active interface between public and private realm (appropriate building entries and openings, front setbacks, streetscape)
		• Open space integration, e.g.
		  • Strong physical and perceptual relationship between activity nodes/ public spaces/public streets
		  • Adequate space for services, street furniture and people
		  • A 'green web' of sustainable landscape planting
		  • Reinforcing landscape/vegetation patterns
		  • Context and planned place making considerations e.g.
		  • response to/reading of underlying topography

		• locating views to landmarks and distinctive natural and/or built features [from the corridor] • impact on the outlook, landscape setting and character of existing neighbouring uses • requirements for noise walls or other barriers that may visually close off places • Type and scale of new structures (e.g. Project may be out of scale now but appropriate for desired future character)
	Climate Change	Opportunity to reduce the vulnerability to effects of climate change through siting of the option, thereby reducing requirements for adaptation.
	Social Equitability	Opportunity to increase local training and employment for workplace upskilling and increasing support for disadvantaged communities.
	Greenhouse gas emissions (GHG)	Opportunity to reduce GHG emissions through mode choice; and to reduce GHG emissions through the design and construction phase (i.e. ease of constructability, significance of earthworks resulting in fuel use and GHG emissions generation).
	Use of materials/ waste	Opportunity to reduce the amount of energy-intensive materials used in construction (e.g. asphalt, concrete, steel etc) and reduce the amount of waste produced through materials reuse (e.g. demolition materials from existing roads and structures, waste spoil etc).

Appendix 2. MCA – route assessment

Scored criteria

Criteria	Sub-criteria	Description
Heritage	**Heritage**	Extent of effects on sites and places of: • Valued heritage buildings, trees (heritage value) and places • Archaeological value • European cultural heritage value
Socio-economic impacts	**Land use futures**	To what extent will the option impact on the future development of land (within the corridor, adjacent to it and impacted by it – i.e. consider all 3 scales), in relation to: • Underlying existing urban structure (block and street pattern) • Integration with the future land use scenario (aligning housing delivery with infrastructure delivery) • Size and shape of potential development parcels to enable appropriate building typologies • Ability to consolidate residual land • Access that does not prevent neighbouring development
	Urban design	To what extent does the option support (both current and future planned state) a quality urban environment, particularly relating to: • Context and planned place making considerations • An inviting, pleasant and high amenity public realm • Open space integration • Active interface between public and private realm • Scale of long-term impact on amenity and character
	Land requirement	Scale of public/private land (m^2/number of properties/unique status of impacted property) required to deliver the option.
	Social cohesion	Impact on access to: • Employment • Other communities or within the same community • Shops/services/other community and cultural facilities/'attractors' • Severance of the existing community (including consented) • Scale of effect on existing community facilities and open space
	Human health and wellbeing	Will the option potentially affect any sensitive land uses (adjacent residential, childcare centres, hospitals, rest homes, marae and schools)? Particularly: • Air quality • Contaminated land • Noise and vibration • Water quality
Natural environment	**Landscape/ visual**	The extent of effects on: • Streams, coastal edges, natural vegetation and underlying topography – acknowledging planned changes to area considering land use/ zoning

		• Natural character and outstanding natural features/landscapes including geological features (mapped and protected features)
	Stormwater	Impact of operational stormwater (both quantity and quality) on the receiving environment, including: • Life supporting capacity • Potential flooding effects of the option within the catchment • Extent and consequences of likely mitigation measures
	Ecology	Extent of effects on: • Significant indigenous flora • Significant habitats of indigenous fauna • Indigenous biodiversity • Stream/waterway ecology • Coastal environment (e.g. CMA)
Environmental opportunities	**Climate change outcomes**	• Opportunities to improve resilience to effects of climate change and requirement for adaptation e.g.: flooding, sea level rise, storm events, drought/heat wave • Climate Change risk assessment and adaptation options (not just an opportunity/treat as risk and opportunity) • Ability to mitigate greenhouse gas emissions (GHG) emissions – construction and operational; access to renewables; ability to use renewable
Transport	**User safety**	Safety for all transport users, including: • Private vehicles • Public transport • Pedestrian/cyclists/other road corridor users
Construction impacts	**Construction impacts on utilities/ infrastructure**	Requirements for relocation/design of infrastructure, including • Consideration of safety impacts • Risk of continuity of service over construction • Engagement with utility providers • Opportunities for integration with other bulk infrastructure
	Construction disruption	Construction impacts on people and businesses regarding: • Traffic & noise • Earthworks related effects including dust • Quality of life and amenity • Economic impacts on businesses/community/town centres
Construction cost and risk	**Construction costs and risks**	Assessed cost for construction of options including: • Complexity and risk in construction (including consideration of constructability) • Complexity in programme • Cost and complexity of undertaking works on contaminated land (including health and safety)

Criteria from the Supporting Growth Programme framework determined to be unnecessary for the Project specific MCA and reasons why:

Criteria	Commentary
Social equitability	Given the similarity of the options which were being assessed (location, scale, mode, etc.) it was determined that this criterion would not provide a differentiating score and was not assessed. All options have an equal ability to provide for local training and employment for workplace upskilling and apply sustainable procurement methods.
Ecological opportunities	Given the similarity of the options which were being assessed (location, scale, mode, etc.) it was determined that this criterion would not provide a differentiating score. All options have an equal ability to include ecological restoration opportunities.
Transport integration	This criterion was addressed in Investment Objective 1 with a more localised context. It was determined that this criterion would replicate the score of Investment Objective 1 and was not assessed.
Maintenance costs	Given the similarity of the options which were being assessed (location, scale, mode, etc.) it was determined that this criterion would not provide a differentiating score. All options would have comparable maintenance costs.
Operational costs	Given the similarity of the options which were being assessed (location, scale, mode, etc.) it was determined that this criterion would not provide a differentiating score. All options would have comparable operational costs.
Behavioural change/ future technology opportunities	This criterion was addressed in Investment Objective 2 with a more localised context. It was determined that this criterion would replicate the score of Investment Objective 2 and was not assessed.

ATTACHMENT 06

TRIG ROAD CORRIDOR UPGRADE
STATUTORY ASSESSMENT

1 Statutory Assessment

Theme	Key Objectives and Policies	Analysis
Enabling Infrastructure *Infrastructure is enabled and where appropriate protected.* *Benefits of infrastructure are recognised while adverse effects are avoided, remedied or mitigated.*	AUP:OIP RPS B2.2.1(1)(c), B2.2.1(1)(d), B2.2.1(5), B2.3.1(1)(d), B2.3.1(2). AUP:OIP RPS B3.2.1(1), B3.2.1(2), B3.2.1(3), B3.2.1(4), B3.2.1(5), B3.2.1(7), B3.2.1(8), B3.2.2(1), B3.2.2(2), B3.2.2(3), B3.2.2(6), B3.2.2(7), B3.2.2(8), B3.2.2(9), B3.3.1(1), B3.3.2(1), B3.3.2(2), B3.3.2(3), B3.3.2(4), B3.3.2(5), B3.3.2(7). AUP:OIP E17.2(1), E17.2(3), E17.3(1). AUP:OIP E26.2.1(1), E26.2.1(2), E26.2.1(4), E26.2.1(5), E26.2.1(9), E26.2.2(1), E26.2.2(2), E26.2.2(4), E26.2.2(5), E26.2.2(14), E26.2.2(15). AUP:OIP E27.2(1), E27.2(2), E27.2(5).	**Summary of Objectives and Polices** Objectives and policies in Chapters B2 and B3 of the AUP:OIP recognise the importance infrastructure plays in realising Auckland's full economic potential. This includes integrating the provision of infrastructure with urban growth, avoiding incompatible land uses and increasing resilience. The provisions recognise the importance of the transport network in the movement of people, goods and services, urban form, enabling growth, and providing choices. Objectives and policies in Chapter E26 of the AUP:OIP identify that infrastructure is critical to the social, economic, and cultural well-being of people and communities and the quality of the environment. The development, operation, use, repair, maintenance, upgrading and removal of infrastructure is anticipated, and the benefits infrastructure can have, as well as a range of adverse effects, are acknowledged within the objectives and policies. **Assessment** *Land Use Integration* The Project is surrounded by land that is either identified under the AUP:OIP for future urbanisation or is already zoned for residential purposes. As such the Project is an anticipated element of a future urban environment which requires efficient and effective transport infrastructure. The Project will have significant benefits for Whenuapai as it will help improve the resilience, efficiency, reliability and safety of the transport network, assisting to reduce travel times. The Project will support transport mode and route choice. The Project will also provide access to future urban land facilitating the planned urban development in Whenuapai and helping to enable the general social and economic growth of Whenuapai. The Project will therefore result in improvements to the transport network which will provide benefits to local communities and other users. *Infrastructure Integration* The RPS, the regional plan and district plan include objectives and policies that seek to enable infrastructure to be provided in an integrated manner, with both land use and existing infrastructure and networks. The Project will achieve appropriate transport-land use integration by providing an upgraded urban arterial corridor in Whenuapai which will support the anticipated urban growth of the area. This area is identified in the AUP:OIP inside the Rural Urban Boundary and has an urban, or future urban zoning. The Project also achieves appropriate integration with Auckland Council and other infrastructure providers. AT has been working closely with Auckland Council, Watercare, Transpower and other providers to ensure the future transport network, which the Project will be an integral part of, is delivered in an integrated way with existing and additional infrastructure.

Theme	Key Objectives and Policies	Analysis
		Trig Road provides on-ramp and off-ramp connections with State Highway 18. The upgrade of Trig Road will provide improved vehicles access to and from Whenuapai and the state highway network. This provides improved integration of the local and national transport networks. *Mode Choice* In addition to providing an upgraded arterial corridor for use by vehicles, the Project will also provide for public transport, walking and cycling. This will contribute to a transport network that is safe and efficient for users of all transport modes, not just private vehicle users. It will provide future communities with better connections to places of employment enabling economic growth in these areas and will help to encourage mode shift by specifically providing multi-modal transport options in a transport environment which currently prioritises private vehicles and freight (whilst continuing to provide for all users). Improved public transport operations in Whenuapai will be enabled by the Project through the provision of a high quality urban standard arterial corridor that incorporates public transport priority. The Project will also provide bus priority at key intersections to enable the operation of a more effective local bus network. The Project corridor is able to accommodate bus stops where needed, and therefore will be able to respond to the future land use of the surrounding area when it is developed. The Project will also provide improved walking and cycling facilities which will improve access for all sectors of the community and in turn will help to capture larger public transport catchments, further supporting the public transport network. Pedestrian safety and amenity will be prioritised through the design of public footpaths and cycle ways. All footpaths and cycle ways provided by the Project will be of sufficient width and capacity to appropriately provide for walking and cycling modes alongside the transport corridor, realising the benefits of an integrated transport network and, by providing for user safety and amenity, improving the quality of connections whilst minimising any potential adverse effects on users and adjoining activities . *Design Philosophy* The objectives and policies of the AUP:OIP recognise the benefits and the value of investment in infrastructure. They seek to enable the safe, efficient and secure provision of infrastructure where appropriate, while also acknowledging that there may be some adverse effects as a result of the provision of such infrastructure that cannot be completely avoided. Infrastructure has operational and functional needs that must be recognised to ensure that the infrastructure is effective. The Project has a functional and operational need to locate in Whenuapai. The options assessment demonstrated the need for an upgraded route through Whenuapai to meet the outcomes sought under the AUP:OIP. Without the infrastructure the needs of the existing and future community could not be met. The Project utilises existing transport corridors, making better and more efficient use of existing infrastructure. The optioneering process has balanced direct connectivity with environmental impacts to provide an efficient alignment,

Theme	Key Objectives and Policies	Analysis
		seeking to avoid adverse effects of the Project through design where practicable. In particular effects have been avoided on any scheduled landscape features or overlays under the AUP:OIP. Any adverse effects that could not be avoided through design have been mitigated or remedied where appropriate by the design and management framework which has been adopted for the Project. Innovative design has been encouraged from the outset of the Project and will continue to be encouraged during further detailed design to address any environmental effects. For example, the width of the proposed corridor provides flexibility in design which enables it to respond to the surrounding land use as needed. This is supported by the management framework which identifies key environmental outcomes and sets out appropriate measures to manage effects. *Construction Effects* Most of the Project's actual and potential environmental effects arise from construction activities, such as earthworks and associated noise and vibration or vegetation clearance and associated effects on landscape or ecology. Construction effects on the environment, the health and safety of the community and effects on existing amenity values will be mitigated. Mitigation measures will include construction noise management, traffic management, earthworks controls, mitigation planting, and erosion and sediment controls. Management plans will be developed and implemented where required to avoid, remedy or mitigate any adverse effects associated with construction. While the upgrade of Trig Road will involve the widening of the existing corridor which will impact two areas of wetland these works will be appropriately offset through wetland restoration and enhancement. *Operational Effects* Any effects associated with the operation of the Project will be remedied or mitigated through best practice principles which have been adopted in the design of the Project. The Project has considered existing and potential future natural hazards through the design process. This includes the evaluation of likely geotechnical and hydrological (flooding) risks including any likely effects of climate change such as rainfall events. Through this design evaluation process it has been concluded that there are no fundamental geotechnical constraints on the Project or hydrological hazards that are likely to result from the Project. The Project provides for appropriate stormwater management and treatment to avoid, remedy or mitigate any potential environmental effects of stormwater runoff from the transport corridor. The stormwater design incorporates appropriate stormwater attenuation and treatment to manage the potential adverse effects of runoff from the additional impervious area and avoid or mitigate new or exacerbated flood hazards or water quality issues. While the majority of the Project area is currently rural in nature, the Project area is identified under the AUP:OIP for urbanisation through its zoning. As the Project is an anticipated element of a future urban environment which requires efficient and effective transport infrastructure. Where noise on existing residential activities is identified to increase to unreasonable levels as a result of the Project's operation, appropriate interventions to mitigate effects are proposed.

Theme	Key Objectives and Policies	Analysis
Enabling infrastructure *within an overlay and in addition to the above* *Protect scheduled values but provide for infrastructure where:* • *There is functional or operational need; and* • *No practicable alternative.*	AUP:OIP RPS B3.2.1(4), B3.2.1(8), B3.2.2(3), B3.2.2(6), B3.2.2(7), B3.2.2(8), B3.2.2(9). AUP:OIP E26.2.1(9), E26.2.2(4).	**Summary of Objectives and Policies** The policies of Chapter B3 seek to enable the development and operation of infrastructure, even in sensitive areas that are scheduled in the AUP:OIP in relation to natural heritage, the coastal environment and historic heritage, provided adverse effects are avoided where practicable and an operational and functional need to locate in sensitive areas is demonstrated. While the objectives and policies of the AUP:OIP generally seek to recognise the benefits, functional and operational needs and value of investment in infrastructure and enable the safe, efficient and secure provision of infrastructure where appropriate, the objectives and policies also anticipate that there may be some adverse effects as a result of the provision of such infrastructure. However, the objectives and policies recognise that in some instances such adverse effects may be appropriate given the necessity of, and essential services provided by, infrastructure. **Assessment** The Project does not affect any overlays that protect scheduled values and require specific assessment in relation to land use and infrastructure integration (additional to the above assessment) but does include the following overlays, controls and designations - High Use Aquifer Management Area Overlay, Macroinvertebrate Community Index, Stormwater Management Area Control, Airspace Restriction Designation. The High Use Aquifer Management Area Overlay covers all of Whenuapai, as well as most of the wider North West area. This overlay seeks to manage the take and use of water from aquifers which is not relevant to the Project. The Macroinvertebrate Community Index also covers all of Whenuapai, as well as much of the wider North West area. This control is covered in the relevant Auckland wide provisions. The Stormwater Management Area Control covers the Hobsonville Road end of the Project. The Project includes an integrated stormwater solution to address any stormwater management issues. The Minister for Defence Airspace Restriction Designation covers all of Whenuapai, as well as much of the wider North West area. This designation protects the approach and departure paths of the Whenuapai airbase through height limit planes which require that “no obstacle shall penetrate the approach and departure path”. The Project is within the Inner Horizontal Surface plane. The Project does not require any structure which would exceed the maximum permitted altitude as specified by the Inner Horizontal Surface plane.
Urban growth and development capacity *Development capacity is planned and sequenced with infrastructure to meet the future needs of communities.*	National Policy Statement on Urban Development, O(1),(6), P(1)(c)(e)(f), (6). AUP:OIP B2.2.1(1), B2.4.1(5), B2.4.2(6), B3.2.1(5), B3.3.1(1)(b), B3.3.1(1)(c),	**Summary of Objectives and Policies** The National Policy Statement on Urban Development (NPS-UD) seeks to ensure urban environments are well-functioning and enable all people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety. Within the NPS-UD Auckland is recognised as a Tier 1 urban environment and therefore is subject to a greater policy direction in terms of intensification and density of urban form. The NPS-UD directs that urban development is integrated with infrastructure planning and funding decisions and is strategic over the medium to long term.

Theme	Key Objectives and Policies	Analysis
Urban growth and its associated infrastructure is provided for (and integrated) in appropriate locations, whilst recognising the values of highly productive rural land.	B3.3.2(4)(b), B3.3.2(5)(a), B9.2.1(2) AUP:OIP E27.2(1), E27.2(2), E27.2(5), E27.2(6).	The objectives and policies of the AUP:OIP seeks to provide sufficient feasible development capacity for housing with set dwelling targets over the next 30 years. In order to reach these targets adequate infrastructure must be existing or provided prior to or with development. Provisions in Chapter E27 Transport seek to ensure that land use and all modes of transport are integrated in a manner that realises the benefits of an integrated network and manages the adverse effects of traffic generation. **Assessment** The objectives and policies emphasise the importance of providing short, medium and long term residential and business capacity. This includes medium and long-term strategic planning for urban development. The Project area is identified under the AUP:OIP for urbanisation through both future urban zoning and "live" urban zoning. The Project directly responds to this future need for efficient and effective transport infrastructure to support urbanisation. The Project achieves the objectives and policies relating to appropriate transport-land use integration by planning, protecting and providing the required infrastructure to service growth in Whenuapai ahead of, or at the same time as development. AT has collaborated and integrated with other infrastructure providers and Auckland Council to facilitate planning and staging of a cohesive network to align with 'development ready' land. Funding is available for the Project, therefore AT is also seeking resource consents in conjunction with the notice of requirement to enable detailed design and construction of the Project to proceed in an efficient manner. The National Policy Statement on Urban Development and RPS recognise the contribution urban growth makes to peoples social, economic, cultural and environmental wellbeing. The Project will provide a high quality, effective, efficient and safe transport route that supports the movement of people, goods and services. Throughout design of the Project, consideration has been had to the potential intensity, scale, and resulting character and amenity of the future land uses of the surrounding land. The final design will therefore be integrated with and support the development of the surrounding area. This will enable people, communities and future generations in the wider Project area to provide for their social, economic, cultural and environmental wellbeing. Providing the relevant infrastructure to enable development to occur will provide housing benefits and will give the community access to high amenity public transport and active modes. This gives effect to the relevant objectives and policies under the National Policy Statement on Urban Development.
Manawhenua *Manawhenua values are to be recognised and protected.* *Manawhenua are to be included in resource*	AUP:OIP RPS B4.2.1(2). AUP:OIP RPS B6.2.1(1), B6.2.1(2), B6.2.2(1), B6.3.1(1), B6.3.1(2), B6.3.1(3), B6.3.2(1), B6.3.2(2), B6.3.2(3), B6.3.2(4),	**Summary of Objectives and Policies – Kaitiakitanga** The RPS requires recognition of and provision for the principles of Te Tiriti o Waitangi, in particular through Manawhenua participation in resource management processes. **Assessment – Kaitiakitanga** Recognition of Te Tiriti o, Waitangi partnerships is a key objective for the Programme and Manawhenua have been involved in the Programme from the start of the early IBC works. Manawhenua have since been actively involved throughout development of the early concepts, through alternatives assessment and identification of the preferred options.

Theme	Key Objectives and Policies	Analysis
management processes, particularly in decision making in their role as kaitiaki.	B6.3.2(6), B6.5.1(1), B6.5.1(2), B6.5.1(3), B6.5.1(5), B6.5.2(1), B6.5.2(4), B6.5.2(5), B6.5.2(6), B6.5.2(8), B6.5.2(9). AUP:OIP RPS B7.4.1(6), B7.4.2(7)(d). AUP:OIP E1.2(2). AUP:OIP E3.3(5), E3.3(6), E3.3(7)(e), E3.3(9)(c), E3.3(13)(c). AUP:OIP E11.2(1), E11.3(2)(c), E11.3(2)(d), E11.3(3). AUP:OIP E12.3(1), E12.3(2)(c), E12.3(4). AUP:OIP E20.2(4), E20.3(3), E20.3(9). AUP:OIP E21.2(5), E21.3(3), E21.3(10).	This partnership approach has allowed the incorporation of Manawhenua values and expression of kaitiakitanga throughout the Programme. This has included participation in identifying any opportunities for mitigation, and any opportunities for representing cultural features in the landscape. In relation to the Project, Manawhenua have provided input through MCA's, and CIAs were prepared by Te Kawerau ā Maki and Ngāti Whātua o Kaipara. Manawhenua consultation on the appropriate management of natural and physical resources has formed a significant part of the overall design of the Project. This approach has ensured that the mauri of, and the relationship of Manawhenua with, natural and physical resources has been provided for and enhanced overall. Consultation has ensured that Manawhenua values, mātauranga and tikanga have been properly considered and accorded sufficient weight when decisions have been made on the Project. This approach has allowed the incorporation of Manawhenua values and expression of kaitiakitanga throughout the Project. Manawhenua have provided input into the effects assessment of the Project on freshwater and particularly around earthworks including robust sediment control and management. Where possible the Project will limit the disturbance of land to the extent necessary for the delivery of the Project. This will help maintain the cultural and spiritual values of Manawhenua in terms of land and water quality, preservation of wāhi tapu, and kaimoana gathering. Combined with appropriate and robust sediment control measures, any adverse effects on waterways will be mitigated. Road runoff and stormwater treatment is included in the design along with long-term maintenance, to maintain water quality over time. Further, while the Project requires works in two wetlands, wetland restoration and enhancement will be undertaken to offset the adverse effects. Other adverse effects on Manawhenua values associated with freshwater resources, including wāhi tapu, wāhi taonga and mahinga kai will be avoided, remedied or mitigated. AT is committed to ongoing engagement with Manawhenua which aligns closely with the RPS' long term view. Manawhenua will continue to be involved in the Project to help maintain consistency with these objectives and policies. **Summary of Objectives and Policies – Māori Values** The principles of the Te Tiriti o Waitangi are recognised and provided for in the sustainable management of natural and physical resources, wāhi tapu and other taonga. Sites and places of significance to Manawhenua are recognised and provided for in the objectives and policies of the AUP:OIP. **Assessment – Māori Values** The partnership approach adopted with Manawhenua means that Manawhenua values are embedded in the Project which gives effect to the provisions of the AUP:OIP. Having involved Manawhenua in design development and decision-making, has resulted in a distinctive and transformational outcome for the social, cultural, and economic environment. In particular, the Programme has sought to avoid wāhi tapu and other taonga where possible in order to avoid destruction of sites of significance. The Programme has also recognised Manawhenua cultural values, particularly with regards to the mauri of, and the relationships of Manawhenua with natural and physical resources including freshwater, land, air and coastal resources. Significant adverse effects on these values are required to be avoided, with lesser adverse effects avoided, remedied or mitigated as appropriate.

Theme	Key Objectives and Policies	Analysis
		The Project does not affect any areas scheduled in the AUP:OIP in relation to natural heritage, natural resources or historic heritage values that require particular consideration. The Project area also does not include any Maori Land or Treaty Settlement Land. Designation and consent conditions are proposed to provide for ongoing consultation with manawhenua, opportunities for cultural monitoring, and accidental discovery protocols which require manawhenua involvement. Appropriate actions will be taken ensuring tikanga Māori is adhered to particularly where any kōiwi are accidentally discovered.
Indigenous Biodiversity and Ecological Values *The protection and enhancement of indigenous biodiversity and ecological values (including in degraded areas) is promoted.* *Protect scheduled values but provide for infrastructure in sensitive areas considering:* • *the benefits and value of providing that infrastructure;* • *the functional or operational need to locate or traverse that location;* • *whether any practicable alternatives would avoid or reduce*	AUP:OIP RPS B7.2.1(1), B7.2.1(2), B7.2.2(5), B7.3.1(1), B7.3.1(2), B7.3.1(3), B7.3.2(1), B7.3.2(4), B7.3.2(5), B7.3.2(6), B7.4.1(2), B7.4.1(4), B7.4.1(5), B7.4.2(1)(a), B7.4.2(1)(c), B7.4.2(1)(d), B7.4.2(7)(a), B7.4.2(7)(b), B7.4.2(7)(c), B7.4.2(7)(e), B7.4.2(8), B7.4.2(9), B7.5.1(2), B7.5.1(3), B7.5.2(1)(a), B7.5.2(1)(e), B7.5.2(1)(f). AUP:OIP E1.2(1), E1.2(3), E1.3(2), E1.3(3), E1.3(8), E1.3(9), E1.3(10), E1.3(11), E1.3(12), E1.3(13), E1.3(14), E1.3(26). AUP:OIP E3.2(1), E3.2(2), E3.2(3), E3.2(4), E3.2(5), E3.2(6), E3.3(1),	**Summary of Objectives and Policies** The AUP:OIP objectives and policies seek to protect and enhance ecological values across both terrestrial, freshwater and coastal environments. The primary method the AUP:OIP uses to protect biodiversity is the identification of SEAs. These areas receive the highest level of protection. Biodiversity values outside SEAs need to be considered and effects on them addressed. The permanent loss and significant modification or diversion of lakes, rivers, streams (excluding ephemeral streams), and wetlands are to be avoided unless, amongst other matters, it is necessary to provide for infrastructure and no practicable alternative exists. **Assessment** *Habitat Impacts* The Project does not affect marine SEAs scheduled under the AUP:OIP and has been developed through robust constraints mapping to avoid terrestrial SEAs scheduled under the AUP:OIP. Whenuapai has been identified as appropriate for urbanisation by the AUP:OIP. The natural values within this area will therefore be subject to significant change through urbanisation. Where it is not practicable to locate or design the alignment to avoid areas with indigenous biodiversity values the best practicable option has been chosen with the Project seeking to manage any adverse effects arising from the chosen alignments. The Project will still seek to maintain ecosystem services and indigenous biological diversity values where it is possible to do so, while recognising that some vegetation removal and works within two wetlands are required in order to provide for the infrastructure necessary to enable the development of future urban land identified in the AUP:OIP. Some native vegetation and exotic habitats will be permanently lost as a result of the Project. While the majority of the affected habitats are comprised of predominantly exotic plant species, there are examples of native plant species scatter throughout which will also be lost. The native vegetation is not of high botanical interest and does not form part of a consistent and contiguous ecological habitat. Mitigation/offsetting measures will be implemented to address any ecological effects, in particularly through wetland restoration and enhancement. *Stormwater Quality* The RPS also directs that where water quality is good or excellent it must be maintained and where it has been degraded, it must be progressively improved. The AUP:OIP requires activities/development above a certain threshold to provide treatment for discharges so that any significant adverse effects are avoided and all other effects are mitigated.

Theme	Key Objectives and Policies	Analysis
effects on the scheduled values; • *how the infrastructure contributes to the planned growth and intensification of Auckland.*	E3.3(2), E3.3(3), E3.3(4), E3.3(7), E3.3(8), E3.3(9), E3.3(13), E3.3(15). AUP:OIP E10.2(1), E10.3(1), E10.3(2), E10.3(3). AUP:OIP E11.2(1), E11.2(2), E11.2(3), E11.3(1), E11.3(2), E11.3(4), E11.3(5), E11.3(7). AUP:OIP E12.2(1), E12.3(1), E12.3(2)(c). AUP:OIP E14.2(1), E14.2(2), E14.2(4), E14.3(1), E14.3(2), E14.3(3), E14.3(8). AUP:OIP E15.2(1), E15.2(2), E15.3(1), E15.3(2), E15.3(3), E15.3(4)(b), E15.3(5), E15.3(6) E15.3(7).	The objectives and policies recognise full treatment will not be achievable in all circumstances. For infrastructure, treatment constraints can include space limitations, the need to accommodate other utility providers and the function of roads as overland flow paths for surrounding uses. In treating discharges, the BPO must be adopted, having regard to (among other things) the scale of effects, infrastructure investment priorities and operational requirements. Assessment of the BPO has been undertaken to inform the development of the Project. The BPO has been adopted in relation to stormwater design, mitigation and measures in conditions in order to minimise any potential adverse effects of stormwater discharges. An integrated approach to managing the Project and the surrounding freshwater systems has been taken. Stormwater modelling has been undertaken to determine the rate of runoff flows. This has been used to make sure there is adequate stormwater infrastructure incorporated within the design of the Project to ensure that all additional stormwater generated by the increase in impervious area and any contaminant runoff has been managed and controlled to minimise adverse effects as per the requirements of the AUP:OIP and Auckland Council's technical standards. Sufficient space has been provided within the corridor for adequate stormwater treatment to be located. Any resulting discharge into the environment will be controlled and managed via appropriate filtering to minimise any adverse effects such that any adverse effects on freshwater systems are not significant. *Erosion and Sediment Control* The draft Erosion and Sediment Control Plan prepared for the Project provides the framework for the purpose of managing any actual and potential adverse effects resulting from construction of the Project. It sets out erosion and sediment control measures and describes the methods and practices to be implemented to minimise and manage the actual and potential effects of erosion and sediment generation. The Erosion and Sediment Control Plan will require soil/sediment to be retained on site where possible and control measures implemented in accordance with the relevant Auckland Council guidelines. This will provide for the on-going safety of people and avoid, remedy or mitigate adverse effects on the environment. Sediment generation will be minimised by way of methods and measures set out in the Erosion and Sediment Control Plan. The Erosion and Sediment Control Plan incorporates the relevant requirements to avoid any significant adverse effects caused by land disturbance and minimise sediment discharge, to the extent practicable, in accordance with the best practice guidance. Disturbance of land is limited to the extent necessary for the delivery of the Project. The Project itself will ultimately provide for people and communities social, economic and cultural well-being as well as their health and safety with the provision of an upgraded, high standard transport corridor. The final design will incorporate measures to maintain the stability and safety of surrounding land, buildings and structures. *Stream Works* In relation to structures over or within freshwater bodies, the objectives and policies encourage the removal of structures and retaining and enhancing of freshwater values and systems. The establishment of structures and other significant invasive activities (i.e. permanent loss/significant modification/reclamation/diversion/ bridging or other structures) are to be avoided, however exceptions are made for infrastructure.

Theme	Key Objectives and Policies	Analysis
		While the Project has been designed to avoid the loss or significant modification of watercourses where possible, works within two wetland are required. It is not practicable to locate or design the alignment to completely avoid areas with indigenous biodiversity values therefore the best practicable option has been chosen, as demonstrated through the comprehensive alternatives assessment process and design refinement. The works are required for the operation, use and maintenance of infrastructure, and effects will be appropriately offset as set out in the AEE. *Air Quality* Any potential adverse effects resulting from the discharge of contaminants to air during the development of the Project will be managed, including the potential for dust arising from bulk earthworks. The operation of the transport corridor is not expected to generate significant air quality effects or limit the ability for surrounding sites to be developed for residential or other sensitive land use activities. The Project may have a slight positive effect on air quality by helping to alleviate congestion.
Freshwater *The health and well-being of water bodies and freshwater ecosystems is prioritised* *The permanent loss and significant modification or diversion of lakes, rivers, streams (excluding ephemeral streams), and wetlands are to be avoided unless, amongst other matters, it is necessary to provide for infrastructure and no practicable alternative exists.*	NPS-FW O(1), P(6),(7), (8),(9). AUP:OIP RPS: B7.2.1(2), B7.3.1(3), B7.3.2(1), B7.3.2(4), B7.3.2(5), B7.3.2(6), B7.4.1(4), B7.4.1(5), B7.4.2(1)(a), B7.4.2(1)(d), B7.4.2(7)(b), B7.4.2(9), AUP:OIP E12.2(1), E12.3(1), E12.3(2)(c).	**Summary of Objectives and Policies** The NPS-FW objective and policies seek to ensure that natural and physical resources are managed in a way that prioritises first, the health and well-being of water bodies and freshwater ecosystems followed by the health needs of people and then the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future. In particular, the NPS-FW seeks to protect natural wetlands, rivers, outstanding waterbodies and habitats of indigenous freshwater species. The relevant AUP:OIP objectives and policies seek to protect and enhance ecological values in freshwater environments. The permanent loss and significant modification or diversion of lakes, rivers, streams (excluding ephemeral streams), and wetlands are to be avoided unless, amongst other matters, it is necessary to provide for infrastructure and no practicable alternative exists. The objectives and policies seek to manage subdivision, use, development, including discharges and activities in the beds of lakes, rivers, streams, and in wetlands, to limit the establishment of structures within the beds of lakes, rivers and streams and in wetlands to those that have a functional need or operational requirement to be located there. **Assessment** The Project has sought to avoid or minimise impacts on streams and high value wetlands where possible. This is demonstrated through the comprehensive alternatives assessment process and design refinement. The alignment and design refinement process for the proposed designations have sought to avoid or minimise impacts on high value natural wetlands and streams, unless there is a functional requirement for any such impacts. There will be further opportunities to minimise any impacts within the transport corridor alignment during the detailed design. As discussed under the indigenous biodiversity assessment above, some freshwater environments have been impacted where there is a functional and operational need to do so. The Assessment of Ecological Effects identified that impacts on two areas of wetland can be appropriately offset through wetland restoration and enhancement, to achieve a slight net gain in wetland value and extent.

Theme	Key Objectives and Policies	Analysis
		The proposed transport infrastructure is critical to enable existing and future communities to provide for their social, economic, and cultural well-being.
Natural landscapes *Natural landscapes with outstanding values are to be protected by avoiding adverse effects on those areas.* *Significant adverse effects in other areas should also be avoided, and all other adverse effects are to be avoided, remedied or mitigated.*	AUP:OIP RPS B4.2.1(1), B4.2.1(3), B4.2.2(3), B4.2.2(6), B4.2.2(7), B4.2.2(8), B4.3.1(1), B4.3.1(2), B4.3.2(3), B4.5.1(1), B4.5.2(4).	**Summary of Objectives and Policies** The RPS seeks to recognise and protect natural heritage. In particular, the policies of the RPS seek to identify features with outstanding natural values, evaluate and schedule those outstanding natural features, protect the physical and visual integrity of those features from inappropriate subdivision use, and development, and, where practicable and appropriate, enhance outstanding natural features. The RPS identifies that the volcanic heritage of Auckland is a particularly notable feature across the region. The RPS also indicates that notable trees are a particularly important natural feature. Therefore, the RPS seeks to protect the values of both volcanic features and notable trees. **Assessment** The Project will not adversely affect any outstanding natural features, landscapes, areas, volcanic features, notable trees or other relevant natural landscapes identified in the AUP:OIP. Appropriate assessment has been undertaken to support the Project, which has confirmed that there are no such areas, trees or features within the Project's footprint.
Natural hazards and environmental risk *Avoid increasing risk of adverse effects in areas subject to natural hazards (including climate change).* *Where infrastructure and development is required in these areas, natural hazard risks must be managed.* *Natural hazard areas include:*	NPS-UD O(8), P(1)(e)(f), (6)(e). AUP:OIP RPS B2.3.1(1)(f). AUP:OIP RPS B10.2.1(1), B10.2.1(2), B10.2.1(3), B10.2.1(4), B10.2.1(5), B10.2.1(6), B10.2.2(5), B10.2.2(7), B10.2.2(8), B10.2.2(10), B10.4.1(1), B10.4.2(3).	**Summary of Objectives and Policies** The NPS-UD directs that urban environments support reductions in greenhouse gas emissions and are resilient to the current and future effects of climate change. The objectives and policies of Chapter B10 of the AUP:OIP enable and recognise the importance of infrastructure to support urban growth which includes integrating the provision of resilient transport networks and infrastructure in these areas and avoiding effects in areas subject to natural hazards and risk and adapting to the effects of climate change. Specific AUP:OIP objectives and policies reinforce the unique requirements of infrastructure and that it can have an operational or functional need to locate within a natural hazard area. Where infrastructure is required to locate within a hazard area significant adverse effects on people and property are sought to be first avoided, and otherwise mitigated to the extent practicable. **Assessment** The Project will deliver better accessibility and mode choice by providing a corridor that supports public transport as well as walking and cycling facilities, therefore reducing the reliance on low occupancy vehicles. This provides an important component to realising the regional emissions benefits of an integrated network. This shows alignment with the objectives and policies, and a positive contribution towards a reduction in greenhouse gas emissions.

Theme	Key Objectives and Policies	Analysis
• *Coastal erosion hazard area* • *Coastal storm inundation 1 per cent annual exceedance probability area* • *Coastal storm inundation 1 per cent annual exceedance probability plus 1m sea level rise area* • *Flood hazards – overland flow paths and 1 per cent annual exceedance probability floodplain* • *Land instability* • *Wildfires*	AUP:OIP E1.2(3), E1.3(11)(c), E1.3(15)(b), E1.3(16). AUP:OIP E11.2(1), E11.3(6). AUP:OIP E12.2(1), E12.3(5), E12.3(6). AUP:OIP E30.2(1), E30.3(2). AUP:OIP E36.2(1), E36.2(2), E36.2(4), E36.2(5), E36.3(4), E36.3(18), E36.3(20), E36.3(21), E36.3(23), E36.3(24), E36.3(27), E36.3(28), E36.3(29), E36.3(30), E36.3(32), E36.3(33), E36.3(35).	The Project has been designed, and an options assessment undertaken, in recognition of the existing environment, including its constraints and opportunities, specific engineering requirements and implementation of integrated water principles. Assessment has been undertaken in relation to the risk of adverse effects, arising from the Project, to people, property, infrastructure and the environment from natural hazards. This assessment has taken into account the appropriateness and eventual establishment of development in new growth areas and the requirement to avoid where practicable and otherwise manage the effects of climate change and natural hazards on urban communities and infrastructure. Consequently, areas subject to natural hazards have been avoided in determining the extent of the Project and its associated works. *Climate Change* The Project has taken into account the potential risks of adverse effects arising from climate change. The Project design includes an integrated stormwater management system which will respond and adapt to the potential adverse effects of increased rainfall/flooding. Effects have been avoided as far as practicable through design and consideration of the BPO. Where effects of stormwater diversion and discharge cannot be avoided, they have been minimised or mitigated having particular regard to the potential for the diversion and discharge to create or exacerbate flood risks. This has been done by providing adequate space for stormwater infrastructure within the designation footprint to allow stormwater runoff to be captured and any discharges to meet Auckland Council's technical standards. *Flood Hazard* The AUP:OIP objectives and policies also seek to manage the effects of development and land disturbance from urbanisation on natural systems such as overland flow paths and floodplains and the management of water quality and water systems. As Trig Road and Hobsonville Road are both generally situated along ridgelines there are only limited areas of the Project which are subject to the 1% AEP floodplain or intercept with overland flow paths. The Project appropriately manages and provides for these through the integrated stormwater management solution noted above. Any temporary diversions of overland flow paths due to construction will be managed to avoid any flooding risks to downstream sites and the finished Project will appropriately manage surface runoff through the proposed stormwater management system, such that the Project does not generate any new or exacerbated flood risks that result in significant adverse effects. *Land stability* The Project has considered existing and potential future land stability issues through the design process. This evaluation process has concluded that there are no fundamental land stability constraints for the Project which cannot be appropriately managed through detailed design. *Contaminated Land* Consent has been sought under the NES: Soil and conditions have been proposed requiring the preparation of a DSI and a Contaminated Land Management Plan. As such the adverse effects associated with contaminated land will be appropriately managed.

Theme	Key Objectives and Policies	Analysis
Urban form and quality design *Transport networks support a quality urban form and are designed to achieve high levels of amenity and safety for users. The place function of transport networks is balanced with the functional movement purpose.*	AUP:OIP RPS B2.2.1(1)(e), B2.3.1(3), B2.3.2(1)(d) - (f), B2.3.2(2), B2.3.2(4), B2.3.2(5). AUP:OIP RPS B3.3.1(1)(d), B3.3.2(4)(a), B3.3.2(7). AUP:OIP E12.2(1), E12.3(2). E12.3(3) AUP:OIP E17.2(1), E17.2(2), E17.2(3), E17.3(1), E17.3(4). AUP:OIP E24.2(1), E24.2(2), E24.3(1), E24.(2). AUP:OIP E25.2(1), E25.2(2), E25.2(4), E25.3(2), E25.3(5), E25.3(10).	**Summary of Objectives and Policies** The objectives and policies seek to create and protect urban environments that are both functional and enjoyable for people, by balancing the place and movement function of transport networks. To achieve balance between place and movement, the objectives and policies recognise a necessary mode shift, minimising private vehicle travel in favour of public transport, walking and cycling. **Assessment** The Project is consistent with these objectives and policies as the upgraded corridor will provides for active modes. The Project footprint also provides sufficient room for the inclusion of public transport and the associated requirements of public transport such as bus stops. The Project retains sufficient flexibility to adapt to future land use as and when required. For example, the location of bus stops can be identified in the future when it becomes clear from the development of the surrounding land where those bus stops are required. *Health and Safety* The health and safety of people and communities is promoted as the Project balances the function of a road as a place for people with the function of being a route for the movement of people and vehicles. This is done by providing sufficient room within the Project footprint for both active modes and vehicles providing safe access and use for pedestrians and cyclists of all ages and abilities. The Project footprint also provides sufficient room for relevant street furniture and landscape planting to enhance the amenity values for pedestrians and cyclists. In this way the Project achieves its intended use as a high quality, multi-modal, arterial transport corridor. *Transport-Land Use Integration* Most of the Project area is zoned FUZ under the AUP:OIP. The FUZ identifies the land as earmarked for urbanisation, whilst effectively providing for existing rural uses. The nature of the future urbanisation is therefore uncertain i.e. the future urban form may contain different activities such as commercial, industrial, residential. AT has worked with Auckland Council to develop an understanding of the likely future urban environment and to provide a future transport network that will be of a suitable scale and form in response. The Project has been designed with sufficient adaptability to enable integration with the likely adjacent residential land uses which are expected to be developed in the Project area. This adaptability takes into account the current and planned land use, intensity, scale, character and amenity of the surrounding environment. Overall the Project will provide for better social, cultural and economic outcomes, through providing improved transport connections for the surrounding Whenuapai area and therefore assisting with and facilitating the planned urban growth of the Project area. *Construction Effects* The objectives and policies require that the impacts of construction on amenity are managed (dust, noise and vibration) whilst acknowledging that some disturbance and reduced amenity is inevitable. The Project provides for the coordinated

Theme	Key Objectives and Policies	Analysis
		and efficient delivery of infrastructure which is required to facilitate development. Land disturbance associated with the Project is necessary in order to provide the transport infrastructure that will benefit people and communities by enabling them to provide for their social, economic and cultural well-being. Any adverse effects on the environment and on community health and safety associated with the construction of the Project will be avoided, remedied or mitigated including through the development of a Construction Environmental Management Plan for the Project, which includes a suite of specific management plans and frameworks to manage specific effects including plans for construction noise management, traffic management and earthworks controls. For example, construction noise management may include the implementation of a CNVMP to manage noise and vibration during the construction period. This may include directing contractors to utilise measures, where practicable, to reduce noise. The appropriate mitigation measures will be determined on a case-by-case basis throughout construction using the CNVMP as the management and implementation tool. *Operational Effects* Operational effects of the Project will be mitigated where possible through best practice safety in design principles which have been adopted in the design of the Project. Any mitigation undertaken will take into consideration surface material, noise barriers and building modification. The Project will include the necessary lighting required when constructed. This will achieve the relevant objectives and policies by facilitating the safety and security of pedestrians and cyclists using the Project and the safety of vehicle users. Such measures will be confirmed through the detailed design stage.
Built heritage and archaeology *Recognises the importance of heritage to the identity of Auckland by avoiding significant adverse effects on scheduled historic heritage, where practicable, and encouraging new development to have due regard to significant historic heritage.*	AUP:OIP RPS B5.2.1(1), B5.2.2(6), B5.2.2(7), B5.3.1(2), B5.3.2(4)(c), B5.3.2(4)(d).	**Summary of Objectives and Policies** The RPS recognises the importance of heritage to the identity of Auckland, and the importance of active stewardship to protect it from inappropriate subdivision use and development. The provisions seek to avoid significant adverse effects on scheduled historic heritage, where practicable, and to encourage new development to have due regard to significant historic heritage. The RPS objectives and policies enable the development, operation and maintenance of infrastructure, in circumstances where it is necessary and appropriate, in areas with natural and physical resources that have been scheduled in the AUP:OIP in relation to natural heritage, historic heritage and special character. **Assessment** The Project will not adversely affect any identified historic heritage places. Appropriate assessment has been undertaken to support the Project, which has confirmed that there are no identified heritage places within the Project's footprint. Accidental Discovery Protocol and cultural monitoring will be implemented as part of the Project to manage the unlikely event that a previously unknown archaeological and/or cultural heritage feature is discovered during construction.

Theme	Key Objectives and Policies	Analysis
Future Urban Zone	AUP:OIP H18.2(3), H18.3(6)(b) – (g).	Majority of the land surrounding the existing Trig Road corridor is zoned FUZ under the AUP:OIP. It is therefore identified as appropriate for urbanisation in the future. The Project will not compromise future urban development nor undermine the form or nature of such development. The Project does not compromise or inhibit the efficient and effective operation of the local and wider transport network. The Project will instead complement and support future urban development and directly contributes to the efficient and effective operation of the transport network. The Project will include its own stormwater infrastructure such that it can integrate with the existing network. The Project is anticipated as part of a future urban environment where transport infrastructure is required to achieve efficient and effective access to urban areas. Any effects will be managed appropriately.
Residential Zones	AUP:OIP H5.2(1), H5.2(3), H5.2(4), H5.3(7), H5.3(8), H5.3(10). AUP:OIP H6.2(1), H6.2(3), H6.2(4), H6.3(8), H6.3(9), H6.3(10).	The land affected by the Project adjacent to Hobsonville Road, is zoned Residential – Mixed Housing Urban Zone. The transport infrastructure in Whenuapai requires upgrades in order to service the new development that will occur in accordance with the Whenuapai Structure Plan. Improving the transport infrastructure in Whenuapai will help to unlock the development capacity of the surrounding land in a coordinated and efficient way. Providing for development will support and provide for the social, economic and cultural well-being of foreseeable, future communities and people who will live in them. The Project will enable access to effective public transport and provide for future needs of the surrounding area when developed . The Project also has sufficient room within the Project footprint for relevant street furniture and landscape plantings to enhance safety and amenity values for all users. Footpaths and cycle ways will be safe and accessible for pedestrians and cyclists of all ages and abilities. Adverse effects on water quality, quantity and amenity values due to an increase in impervious area have been avoided or mitigated. The Project includes provision for appropriate stormwater management and treatment systems to deal with any significant actual and potential adverse effects of stormwater runoff.

ATTACHMENT 07

TRIG ROAD CORRIDOR UPGRADE
RULES ASSESSMENT

Rules Assessment

Once a designation is included in a district plan, then consent is not required pursuant to section 9(3) of the RMA for the activities authorised by the designation. However, other activities, which are necessary for the construction, operation and maintenance of the Project which cannot be provided for by a designation, still require consent.

The following table provides an assessment of those activities associated with the Project which cannot be provided for by a designation. This assessment is provided against the applicable rules of the AUP:OIP and the NES Soil.

Activity	Rule		Commentary	Activity Status	Assessment Criteria, Matters of Discretion and Standards
AUP:OIP					
Activities involving planting and the associated diversion of water	E3.4.1 (A2)	Conservation planting complying with the standards in E3.6.1.2	The application includes planting to ensure no net loss to Wetland. The planting will meet the PA standards specified in E3.6.1.2	**Permitted**	N/A
Works on structures lawfully existing on or before 30 September 2013 and the associated bed disturbance or depositing of any substance, diversion of water and incidental temporary damming of water– Sections 13 and 14 RMA **New structures and the associated bed**	E3.4.1 (A26) E3.4.1 (A44)	Any activities not complying with the general permitted activity standards in E3.6.1.1 or the specific activity standards in E3.6.1.10 – E3.6.1.13 Any activities not complying with the general permitted activity standards in E3.6.1.1 or the specific activity standards in E3.6.1.14 to E3.6.1.23	TR-W1 – The proposal involves earthworks and batterslopes within the wetland resulting in a loss of approximately .1h (1000m2) of natural wetland. TR-W4 – The proposal involves batterslope and culvert extension within the wetland resulting in a loss of approximately .078h (780m2) of natural wetland. As the total length of the extended culvert exceeds 30m, this does not comply with the permitted activity standard (E3.6.1.12).	**Discretionary**	N/A

disturbance or depositing of any substance, reclamation, diversion of water and incidental temporary damming of water – Sections 13 and 14 RMA					
Stormwater outfall – Sections 14(1) and 14(3) RMA	E3.4.1 (A39)	Stormwater or wastewater outfall complying with the standards in E3.6.1.14	The existing stormwater outfalls at chainage 430 and 640 are proposed are proposed to be replaced. The outfalls discharge into ephemeral streams and have been designed to comply with the permitted activity standards in E3.6.1.14: • The outfall structure lengths will not exceed 30m in length measured parallel to the direction of water flow. Erosion and scour management works will not exceed 5m in length on either side of the extended structure. No new structures will be erected or placed in individual length of 30m or less where this will progressively encase or otherwise modify the bed of a river or stream. • During construction bed disturbance upstream or downstream of the structure will not exceed 10m either side, excluding the length of the structure. • The structure will not prevent the passage of fish upstream and downstream in waterbodies that contain fish, except that temporary restrictions to fish passage may occur (if fish are present) to enable construction work to be carried out.	**Permitted**	

			• The structure will not cause more than minor bed erosion, scouring or undercutting immediately upstream or downstream. • Construction material and ancillary structures will be removed from the bed following the completion of the activity. • The 1% annual exceedance probability flood will be accommodated by the structure and/or by an overland flow path without increasing flood levels up stream or downstream of the structure, beyond the land or structures owned or controlled by the person undertaking the activity. • Calculation of flow rates have been undertaken using the Auckland Council Technical Publication 108: Guideline for stormwater runoff modelling in the Auckland Region, April 1999.		
Take and use of Groundwater - Sections 14(1) and 14(3) RMA	E7.4.1 (A17)	Dewatering or groundwater level control associated with a groundwater diversion permitted under the AUP:OP	Limited dewatering may be required as part of construction. However, the Project does not require any significant cut therefore dewatering is anticipated to be discrete and is not expected to result in any long-term changes to groundwater patterns. The Project is likely to comply with the permitted standards outlined in E7.6.1.6. Should during the detailed design, it be determined that consent is required for Groundwater dewatering, consent will be sought at a later date.	**Permitted**	
Diversion of Groundwater – Sections 14(1) and 14(3) RMA	E7.4.1 (A27)	Diversion of groundwater caused by any excavation (including trench) or tunnel	Any construction works involving diversion of groundwater caused by any excavations (including trenches) will comply with the permitted standards in E7.6.1.10: • Any excavation that extends below natural groundwater level will not exceed 1ha in total	**Permitted**	

			area or 6m in depth below the natural ground level. • The natural groundwater level will not be reduced by more than 2m on the boundary of any adjoining site. • Any structure (excluding sheet piling) that remains in place for more than 30 days that physically impedes the flow of groundwater through the site will not impede the flow of groundwater over a length of more than 20m or extend more than 2m below the natural groundwater level. The distance to any existing building or structure (excluding timber fences and small structures on the boundary) on an adjoining site from the edge of any: (a) trench or open excavation that extends below natural groundwater level will be at least equal to the depth of the excavation; (b) tunnel or pipe with an external diameter of 0.2 - 1.5m that extends below natural groundwater level will be 2m or greater; or (c) a tunnel or pipe with an external diameter of up to 0.2m that extends below natural groundwater level will have no separation requirement. • The distance from the edge of any excavation that extends below natural groundwater level will not be less than 50m from the Wetland Management Areas Overlay, less than 10m from a scheduled Historic Heritage Overlay or less than 10m from a lawful groundwater take, as there are no Wetland Management Areas Overlays, scheduled Historic Heritage Overlays		

			or lawful groundwater takes within close proximity to the Project area. Should during the detailed design, it be determined that consent is required for Groundwater dewatering, consent will be sought at a later date.		
Take and use of Groundwater – Sections 14(1) and 14(3) RMA	E7.4.1 (A18)	Infiltration and leakage into stormwater and sewer pipes	Groundwater seepage has been identified in the upper branch of the Trig Stream (classified as a wetland). To accommodate the widening of the existing Trig Road corridor, fill embankment is required over this seepage area. If required, appropriate groundwater management to capture and convey the constant groundwater feed out of the fill embankment will be provided. This will comply with the permitted standards in E7.6.1.3: • The water take will not be geothermal water. • The water take will not be from the Omaha Waitematā High-Use Aquifer Management Area. • The water take will not be for the purpose of dewatering or groundwater level control. • Notice on the prescribed form will be received by the Council 15 working days before undertaking the ground water management. Should during the detailed design, it be determined that consent is required for Groundwater dewatering, consent will be sought at a later date.	**Permitted**	
Drilling and use of holes and bores - Sections 14(1) and 14(3) RMA	E7.4.1. (A36)	Holes for geotechnical investigation/ geological investigation/ contaminated site investigation.	Drilling and the use of boreholes will be required for geotechnical investigations and will comply with the permitted standards in E7.6.1.16 and E7.6.1.17. Permitted standards E7.6.1.16: • The drilled holes will not be in a Wetland Management Areas Overlay.	**Permitted**	

			• The drilled holes will not be for the taking of groundwater, and if required, will only remove samples for groundwater quality analysis. • The drilled holes will not destroy, damage or modify any places scheduled in the Historic Heritage Overlay. Permitted standards E7.6.1.17: • The drilled holes will meet the standards in E7.6.1.16 (above). • The drilled hole will be decommissioned within three months of the start of drilling. • Before being decommissioned, the drilled hole will be secured to ensure no contaminants can enter the ground through the hole. • If more than one aquifer is penetrated, the drilled hole will be decommissioned on completion of the drilling investigation and the drilled hole will be secured so there is no hydraulic connection between the aquifers. • The drilling, construction and decommissioning of the holes will comply with section 1 and 2 of New Zealand Standard on the Environmental Standard for Drilling of Soil and Rock (NZS 4411:2001), except that bores for stormwater disposal need not be constructed and maintained to prevent the authorised disposal of surface water entering the bore.		
Land use (vegetation removal) – Section 9(2) RMA	E26.3.3.1 (A77)	Vegetation alteration or removal (riparian margins) that does not comply with Standards E26.3.5.1 to E26.3.5.4	Trees which are greater than 6 m in height and located within the riparian yard setback of Trig Stream (wetland) require removal.	**Restricted Discretionary**	E26.3.7.1. Matters of discretion

					E26.3.7.2. Assessment Criteria
Land use (earthworks) – Section 9(2) RMA	E26.5.3.2 (A107)	Greater than 2,500m^2 within the Sediment Control Protection Area[1] other than for maintenance, repair, renewal, minor infrastructure upgrading – Road and Residential zones	The Trig Stream (wetland) is located adjacent to part of the Project area, and therefore the site is considered to be within the Sediment Control Protection Area. The total earthworks area is estimated to be 61000m2·resulting in greater than 2,500m^2 within the Sediment Control Protection zone.	**Restricted Discretionary**	E26.5.5.2. General standards E26.5.7.1. Matters of discretion
Discharge of contaminants (contaminated land) – Section 15 RMA	E30.4.1(A7)	Discharges of contaminants into air, or into water, or onto or into land not meeting controlled activity Standard E30.6.2.1	The PSI prepared for the Project has identified land which may have been impacted by contaminant generating activities. As a precautionary measure it is assumed that these soils are contaminated. As a Detailed Site Investigation has not been completed for the Project, resource consent is required under Rule E30.4.1(A7) of the AUP:OP.	**Discretionary**	N/A
NES Soil					
Disturbing the soil of a piece of land – Section 5(4) and 11 NES: Soil	NES: Soil 11	An activity described in any of regulation 5(2) to (6) on a piece of land described in regulation 5(7) or (8) that is not a permitted activity, controlled activity, or restricted discretionary activity.	Soil materials scheduled for land disturbance as part of the Project may have been impacted by contaminants. As a precautionary measure it is assumed that the works may encounter soils that are contaminated. A DSI has not yet been undertaken for the Project (to be completed as part of detailed design) and provided as a condition of consent.	**Discretionary**	N/A

			As a DSI has not been completed for the Project, resource consent is required under sub-clause 11 of the NES Soil.		
NES:FW					
NES:FW **Regulation 38** **Permitted Activities**	NES:FW 38	Vegetation clearance within, or within a 10 m setback from, a natural wetland is a permitted activity if it— (a) is for the purpose of natural wetland restoration; and (b)complies with the conditions. (2) Earthworks or land disturbance within, or within a 10 m setback from, a natural wetland is a permitted activity if it— (a) is for the purpose of natural wetland restoration; and (b)complies with the conditions. … However, the condition in subclause (4)(b) does not apply if the earthworks or land disturbance is for planting.	The applications include natural wetland restoration to ensure no net loss. This meets the requirements of NES:FW 38 as a Permitted Activity.	**Permitted**	N/A
NES:FW	NES:FW 45		The proposal will result in earthworks, vegetation clearance and land disturbance for specified infrastructure, within and within 100m of natural wetlands (as defined by NPS:FW).	**Discretionary**	N/A

Regulation 45 Construction of specified infrastructure					
NES:FW **Regulation 57** **Reclamation**	NES:FW 57		The Project involves the partial reclamation of two watercourses connected to wetlands.	**Discretionary**	N/A
Regulation 71 Culvert/Piping Wetland and associated disturbance	NES:FW 71		The proposal involves extension of culverts and associated structures and disturbance, within two wetlands	**Discretionary**	N/A

ATTACHMENT 08

TRIG ROAD CORRIDOR UPGRADE
MATTERS OF DISCRETION
AND ASSESSMENT CRITERIA

Matters of Discretion and Assessment Criteria

Regional Consent	AUP:OIP Rule	Activity	Standards
Land use (vegetation removal) – Section 9(2) RMA	E26.3.3.1 (A77)	Vegetation alteration or removal (riparian margins) that does not comply with Standards E26.3.5.1 to E26.3.5.4	**E26.3.5 Standards - Regional (rp)** **E26.3.5.2. Vegetation alteration or removal** (1) Vegetation alteration or removal must not include trees over 6m in height, or 600mm in girth unless their removal is otherwise permitted by a rule in this Plan. (2) Must not result in the removal of more than 20m2 of vegetation within a significant ecological area, except within the formation width of the road. (3) Must not result in the removal of more than 50m2 of vegetation within a coastal area or riparian margin not identified as a significant ecological area. (4) Must not result in the removal of more than 20m2 of vegetation within the legal road or the formation width of the road in the Waitakere Ranges Heritage Area Overlay. (5) Must not result in the removal of more than 500m2 of vegetation within the legal road or the formation width of the road in a rural zone. (6) Must not result in the removal of more than 250m2 of vegetation outside the legal road or the formation width of the road in a rural zone. (7) Vegetation alteration or removal from a significant ecological area must be for the purpose of maintaining the safety of the network utility and must be undertaken in any of the following: (a) within the formation width of existing roads; (b) within 1m of the network utility, or existing access track; (c) in accordance with the Electricity (Hazards from Trees) Regulations 2003; (d) within state highway designations as at 30 September 2013; or (e) within railway designations as at 30 September 2013. (8) Standards E26.3.5.2(1)-(7) do not apply to vegetation alteration or removal required to maintain the visibility of road safety signage, vehicle sightlines, carriageway clearance heights and widths as follows: (a) clearance of 4.5m height above the road carriage way or up to 5.3m where there is an overhead road signage above the road carriageway; (b) clearance of a 0.5m width back from the road kerb;

			(c) clearance of a 0.6m width back from the un-kerbed road; or (d) clearance for any over dimension route requirement. **E26.3.7. Assessment – restricted discretionary activities** **E26.3.7.1. Matters of discretion** The Council will reserve its discretion to all of the following matters when assessing a restricted discretionary resource consent application: (1) regional rules - vegetation management in rural zones, coastal areas, riparian margins and the Significant Ecological Areas Overlay that do not comply with the permitted activity standards [rp]: (a) ecological values: (i) the effects that the vegetation alteration or removal will have on ecological values, including on threatened species andecosystems. (b) sediment, water quality and hydrology: (i) the effects the vegetation alteration or removal will have on soil conservation, water quality and the hydrological function of the catchment. (c) use: (i) the extent to which the vegetation alteration or removal is necessary to provide for the functional and operational needs of infrastructure. (d) methods and location: (i) the minimisation of effects from alteration or removal of vegetation and land disturbance through alternative locations on the site and/or methods of undertaking the works. (e) mitigation measures: (i) the remedy or mitigation of adverse effects, including through revegetation, restoration of other areas of vegetation and ongoing maintenance. (f) bonds and covenants: (i) the benefit of imposing bonds, covenants or similar instruments as conditions of consent in implementing any of the matters of discretion. (g) Mana Whenua values: (i) the effects on Mana Whenua values associated with a Significant Ecological Areas Overlay. **E26.3.7.2. Assessment criteria**

			The Council will consider the relevant assessment criteria below for restricted discretionary activities: (1) regional rules - vegetation management in rural zones, coastal areas, riparian margins and the D9 Significant Ecological Areas Overlay that do not comply with the permitted activity standards [rp]: (a) ecological values: (i) the extent to which the vegetation alteration or removal is minimised and adverse effects on the ecological and indigenous biodiversity values of the vegetation are able to be avoided, remedied or mitigated; (ii) whether vegetation removal will have an adverse effect on threatened species or ecosystems; and (iii) the extent to which the proposal for vegetation alteration or removal has taken into account relevant objectives and policies in D9 Significant Ecological Areas Overlay, D10 Outstanding Natural Features Overlay and Outstanding Natural Landscapes Overlay and E15 Vegetation management and biodiversity. (b) sediment, water quality and hydrology: (i) the extent to which vegetation alteration or removal will adversely affect soil conservation, water quality and the hydrological function of the catchment and measures to avoid remedy or mitigate any adverse effects. (c) use: (i) whether the vegetation alteration or removal will improve the reliance and security of the network utility; (ii) whether the vegetation alteration or removal is necessary for a structure that has a functional or operational need to be in the proposed location; and (iii) the extent of the benefits derived from infrastructure. (d) methods and location: (i) whether there are practicable alternative locations and methods including consideration of an application to infringe development control where this would result in retention and enhancement of vegetation on the site; and (ii) whether the effects from the alteration or removal of vegetation and land disturbance can be minimised through works being undertaken on an alternative location on the site, and/or method of undertaking the works. (e) mitigation measures: (i) the extent to which revegetation can remedy or mitigate adverse effects, including eco-sourcing and the ongoing maintenance of revegetation measures. (f) bonds and covenants:

			(i) whether conditions of consent can avoid remedy or mitigate adverse effects including the imposition of bonds, covenants or similar instruments. (g) Mana Whenua values: (i) the extent to which any adverse effects on Mana Whenua values can be avoided, remedied or mitigated, and having regard to the objectives and policies in E20 Māori Land whether the proposed works are appropriate to provide for Mana Whenua, mātauranga and tikanga values.
Land use (earthworks) – Section 9(2) RMA	E26.5.3.2 (A107)	Greater than 2,500m^2 within the Sediment Control Protection Area1 other than for maintenance, repair, renewal, minor infrastructure upgrading	**E26.5.7. Assessment – restricted discretionary activities** **E26.5.7.1. Matters of discretion** The Council will reserve its discretion to all of the following matters when assessing a restricted discretionary resource consent application: (1) all regional restricted discretionary activities [rp]: (a) compliance with the standards; (b) the design and suitability of erosion and sediment control measures to be implemented; (c) adverse effects of land disturbance and sediment discharge on water bodies, particularly sensitive receiving environments; (d) effects on cultural and spiritual values of Mana Whenua including water quality, preservation of wāhi tapu, and kaimoana gathering; (e) the proportion of the catchment which is exposed; (f) staging of works and progressive stabilisation; (g) timing and duration of works; (h) term of consent; (i) potential effects on significant ecological and indigenous biodiversity values; (j) the treatment of stockpiled materials on the site including requirements to remove material if it is not to be reused on the site; and (k) information and monitoring requirements. (2) all district restricted discretionary activities [dp]: (a) compliance with the standards; (b) effects of noise, vibration, odour, dust, lighting and traffic on the surrounding environment; (c) effects on the stability and safety of surrounding land, buildings and structures; (d) effects on overland flow paths and flooding; (e) protocol for the accidental discovery of kōiwi, archaeology and artefacts of Māori origin; (f) the treatment of stockpiled materials on the site including requirements to remove material if it is not to be reused on the site; (g) staging of works and progressive stabilisation;

			(h) information and monitoring requirements; (i) timing and duration of works; (j) term of consent; (k) potential effects on significant ecological and indigenous biodiversity values; (l) risk that may occur as a result of natural hazards; (m) protection of or provision of network utilities and road networks. potential effects on the natural character and values of the coastal environment, lakes, rivers and their margins, where works encroach into riparian or coastal yards; and (n) positive effects enabled through the land disturbance. **E26.5.7.2. Assessment criteria** The Council will consider the relevant assessment criteria below for restricted discretionary activities: (1) all regional restricted discretionary activities [rp]: (a) whether applicable standards are complied with; (b) the proximity of the earthworks to any water body and the extent to which erosion and sediment controls and the proposed construction methodology will adequately avoid or minimise adverse effects on: (i) water quality including of the coastal marine area; (ii) ecological health including of the coastal marine area; (iii) riparian margins; (iv) the mauri of water; (c) the quality of taiāpure or mahinga mātaitai; (d) the extent to which the earthworks minimises soil compaction, other than where it benefits geotechnical or structural performance; (e) the proximity of the earthworks to areas of significant ecological value and the extent the design, location and execution of the works provide for the maintenance and protection of these areas; (f) whether monitoring the volume and concentration of sediment that may be discharged by the activity is appropriate within the scale of the proposed land disturbance; or whether the extent or impacts of adverse effects from the land disturbance can be mitigated by managing the duration, season or staging of such works. (g) the extent to which appropriate methods are used to prevent the spread of total control pest plants or unwanted organisms (as listed under the Biosecurity Act 1993), such as kauri dieback disease. (2) general district assessment criteria [dp]:

			(a) whether applicable standards are complied with; (b) the extent to which the earthworks will generate adverse noise, vibration, odour, dust, lighting and traffic effects on the surrounding environment and the effectiveness of proposed mitigation measures; (c) whether the earthworks and any associated retaining structures are designed and located to avoid adverse effects on the stability and safety of surrounding land, buildings, and structures; (d) whether the earthworks and final ground levels will adversely affect overland flow paths or increase potential volume or frequency of flooding within the site or surrounding sites; (e) whether a protocol for the accidental discovery of kōiwi, archaeology and artefacts of Māori origin has been provided and the effectiveness of the protocol in managing the impact on Mana Whenua cultural heritage if a discovery is made; (f) whether the extent or impacts of adverse effects from the land disturbance can be mitigated by managing the duration, season or staging of such works; (g) the extent to which the area of the land disturbance is minimised, consistent with the scale of development being undertaken; (h) the extent to which the land disturbance is necessary to provide for the functional or operational requirements of the network utility installation, repair or maintenance; (i) the extent of risks associated with natural hazards and whether the risks can be reduced or not increased; (j) whether the land disturbance and final ground levels will adversely affect existing utility services; (k) the extent to which the land disturbance is necessary to accommodate development otherwise provided for by the Unitary Plan, or to facilitate the appropriate use of land in the open space environment, including development proposed in a relevant operative reserve management plan or parks management plan; (l) for land disturbance near Transpower New Zealand Limited transmission towers: (i) the outcome of any consultation with Transpower New Zealand Limited; and (ii) the risk to the structural integrity of transmission lines; or (m) the extent to which earthworks avoid, minimise, or mitigate adverse effects on any archaeological sites that have been identified in the assessment of effects.

ATTACHMENT 09

TRIG ROAD CORRIDOR UPGRADE
PROPOSED DESIGNATION CONDITIONS

TE TUPU NGĀTAHI
SUPPORTING GROWTH

Trig Road Corridor Upgrade

Proposed Designation Conditions

Purpose: The construction, operation and maintenance of a transport corridor.

Abbreviations and definitions

Acronym/Term	Definition
Activity sensitive to noise	Any dwelling, visitor accommodation, boarding house, marae, papakāinga, integrated residential development, retirement village, supported residential care, care centre, lecture theatre in a tertiary education facility, classroom in an education facility and healthcare facility with an overnight stay facility.
ARI	Annual Recurrence Interval
Average increase in flood hazard	Flow depth times velocity.
AUP	Auckland Unitary Plan.
BPO or Best Practicable Option	Has the same meaning as in section 2 of the RMA 1991.
CEMP	Construction Environmental Management Plan
Certification	Confirmation from the Manager that a plan or material change to a plan or CNVMP Schedule plan has been prepared in accordance with the condition to which it relates. A management plan shall be deemed certified: (a) where the Requiring Authority has received written confirmation from Council that a management plan is certified; or (b) five working days from the submission of a management plan where no written confirmation of certification has been received. A material change to a management plan or CNVMP Schedule shall be deemed certified: (a) where the Requiring Authority has received written confirmation from Council that the material change to the management plan is certified; or (b) ten working days from the submission of the material change to the management plan where no written confirmation of certification has been received. (c) five working days from the submission of the material change to a CNVMP Schedule where no written confirmation of certification has been received.
CNVMP	Construction Noise and Vibration Management Plan
CNVMP Schedule or Schedule	A schedule to the CNVMP
Completion of Construction	When construction of the Project (or part of the Project) is complete and it is available for use.
Construction Works	Activities undertaken to construct the Project excluding Enabling Works.
Council	Auckland Council
CTMP	Construction Traffic Management Plan
Enabling works	Includes, but is not limited to, the following and similar activities: • geotechnical investigations (including trial embankments) • archaeological site investigations • formation of access for geotechnical investigations • establishment of site yards, site entrances and fencing • constructing and sealing site access roads • demolition or removal of buildings and structures • relocation of services

Acronym/Term	Definition
	• establishment of mitigation measures (such as erosion and sediment control measures, temporary noise walls, earth bunds and planting)
Existing authorised habitable floor	The floor level of any room (floor) in a residential building which is authorised by building consent and exists at the time the outline plan is submitted, excluding a laundry, bathroom, toilet or any room used solely as an entrance hall, passageway or garage.
Flood prone area	A potential ponding area that relies on a single culvert for drainage and does not have an overland flow path.
Manager	The Manager – Resource Consents of the Auckland Council, or authorised delegate.
Mana whenua	Mana Whenua as referred to in the conditions is considered to be (as a minimum but not limited to) the following (in no particular order), who at the time of Notice of Requirement expressed a desire to be involved in the Project: • Te Kawerau a Maki • Ngāti Whātua o Kaipara • Te Ākitai Waiohua • Ngāti Whanaunga **Note**: Other iwi and hapu not identified above may have an interest in the Project and should be consulted.
Maximum Probable Development	Design case for consideration of future flows allowing for development within a catchment that takes into account the maximum impervious surface limits of the current zone or, if the land is zoned Future Urban in the Auckland Unitary Plan, the probable level of development arising from zone changes.
Network Utility Operator	Has the same meaning as set out in section 166 of the RMA.
NOR	Notice of Requirement
NZAA	New Zealand Archaeological Association
Outline Plan	An outline plan prepared in accordance with section 176A of the RMA.
Pre-Project development	Existing site condition prior to the Project (including existing buildings and roadways).
Post-Project development	Site condition after the Project has been completed (including existing and new buildings and roadways).
Project Liaison Person	The person or persons appointed for the duration of the Project's Construction Works to be the main point of contact for persons wanting information about the Project or affected by the Construction Works.
Protected Premises and Facilities (PPF)	Protected Premises and Facilities as defined in New Zealand Standard NZS 6806:2010: *Acoustics – Road-traffic noise – New and altered roads.*
Requiring Authority	Has the same meaning as section 166 of the RMA and, for this Designation is Auckland Transport.
RMA	Resource Management Act (1991)

Acronym/Term	Definition
SCEMP	Stakeholder Communication and Engagement Management Plan
Stage of Work	Any physical works that require the development of an Outline Plan.
Start of Construction	The time when Construction Works (excluding Enabling Works) start.
Suitably Qualified Person	A person (or persons) who can provide sufficient evidence to demonstrate their suitability, experience and competence in the relevant field of expertise.
ULDMP	Urban and Landscape Design Management Plan

Proposed Designation Conditions

No.	Condition
General Conditions	
1.	**Activity in General Accordance with Plans and Information** (a) Except as provided for in the conditions below, and subject to final design and Outline Plan(s), works within the designation shall be undertaken in general accordance with the following plans and information Project description and concept plan in schedule 1: (b) Where there is inconsistency between: (i) the documents listed in condition 1(a) above Project description and concept plan in schedule 1 and the requirements of the following conditions, the conditions shall prevail; (ii) the documents listed in condition 1(a) above Project description and concept plan in schedule 1, and the management plans under the conditions of the designation, the requirements of the management plans shall prevail.
2.	**Project Information** (a) A project website, or equivalent virtual information source, shall be established within 12 months of the date on which this designation is included in the AUP. All directly affected owners and occupiers shall be notified in writing once the website or equivalent information source has been established. The project website or virtual information source shall include these conditions and shall provide information on: (i) the status of the Project; (ii) anticipated construction timeframes; and (iii) contact details for enquiries. (iv) a subscription service to enable receipt of project updates by email; and (v) how to apply for consent for works in the designation under s176(1)(b) of the RMA. (b) At the start of detailed design for a Stage of Work, the project website or virtual information source shall be updated to provide information on the likely date for Start of Construction, and any staging of works.
3.	**Designation Review** (a) The Requiring Authority shall within 6 months of Completion of Construction or A as soon as otherwise practicable following Completion of Construction the Requiring Authority shall: (i) review the extent of the designation to identify any areas of designated land that it no longer requires for the on-going operation, maintenance or mitigation of effects of the Project; and (ii) give notice to Auckland Council in accordance with section 182 of the RMA for the removal of those parts of the designation identified above.
4.	**Lapse**

No.	Condition
	(a) In accordance with section 184(1)(c) of the RMA, this designation shall lapse if not given effect to within 15 years from the date on which it is included in the AUP.
5.	**Network Utility Operators (Section 176 Approval)** (a) Prior to the start of Construction Works, Network Utility Operators with existing infrastructure located within the designation will not require written consent under section 176 of the RMA for the following activities: (i) operation, maintenance and urgent repair works; (ii) minor renewal works to existing network utilities necessary for the on-going provision or security of supply of network utility operations; (iii) minor works such as new service connections; and (iv) the upgrade and replacement of existing network utilities in the same location with the same or similar effects as the existing utility. (b) To the extent that a record of written approval is required for the activities listed above, this condition shall constitute written approval.
Pre-construction Conditions	
6.	**Outline Plan** (a) An Outline Plan (or Plans) shall be prepared in accordance with section 176A of the RMA. (b) Outline Plans (or Plan) may be submitted in parts or in stages to address particular activities (e.g. design or construction aspects), or a Stage of Work of the Project. (c) Outline Plans shall include any management plan or plans that are relevant to the management of effects of those activities or Stage of Work, which may include: (i) Construction Environmental Management Plan; (ii) Construction Traffic Management Plan; (iii) Construction Noise and Vibration Management Plan; (iv) Urban and Landscape Design Management Plan; (v) Tree Management Plan
7.	**Management Plans** (a) Any management plan shall: (i) Be prepared and implemented in accordance with the relevant management plan condition; (ii) Be prepared by a Suitably Qualified Person(s); (iii) Include sufficient detail relating to the management of effects associated with the relevant activities and/or Stage of Work to which it relates. (iv) Summarise comments received from Mana Whenua and other stakeholders as required by the relevant management plan condition, along with a summary of where comments have: a. Been incorporated; and b. Where not incorporated, the reasons why. (v) Be submitted as part of an Outline Plan pursuant to s176A of the RMA, with the exception of SCEMPs CEMPs, CTMPs and CNVMP Schedules. (vi) Once finalised, uploaded to the Project website or equivalent virtual information source. (b) Any management plan developed in accordance with Condition 7 may: (i) Be submitted in parts or in stages to address particular activities (e.g. design or construction aspects) a Stage of Work of the Project, or to address specific activities authorised by the designation. (ii) Except for material changes, be amended to reflect any changes in design, construction methods or management of effects without further process. (iii) If there is a material change required to a management plan which has been submitted with an Outline Plan, the revised part of the plan shall be submitted to the Council as an update to the Outline Plan or for Certification as soon as practicable following identification of the need for a revision; (c) Any material changes to the SCEMPs, CEMPs or CTMPs are to be submitted to the Council for information.
8.	**Cultural Advisory Report** (a) At least six (6) months prior to the start of detailed design for a Stage of Work, Mana Whenua shall be invited to prepare a Cultural Advisory Report for the Project.

No.	Condition
	(b) The objective of the Cultural Advisory Report is to assist in understanding and identifying Ngā Taonga Tuku Iho ('treasures handed down by our ancestors') affected by the Project, to inform their management and protection. To achieve the objective, the Requiring Authority shall invite Mana Whenua to prepare a Cultural Advisory Report that: (i) Identifies the cultural sites, landscapes and values that have the potential to be affected by the construction and operation of the Project; (ii) Sets out the desired outcomes for management of potential effects on cultural sites, landscapes and values; (iii) Identifies traditional cultural practices within the area that may be impacted by the Project; (iv) Identifies opportunities for restoration and enhancement of identified cultural sites, landscapes and values within the Project area; (v) Taking into account the outcomes of (i) to (iv) above, identify cultural matters and principles that should be considered in the development of the Urban and Landscape Design Management Plan, Stakeholder and Communication and Engagement Management Plan, and the Cultural Monitoring Plan referred to in Condition 14. (vi) Identifies and (if possible) nominates traditional names along the Project alignment. Noting there may be formal statutory processes outside the project required in any decision-making. (c) The desired outcomes for management of potential effects on cultural sites, landscapes and values identified in the Cultural Advisory Report shall be discussed with Mana Whenua and those outcomes reflected in the relevant management plans where practicable. (d) Conditions 8(b) and (c) above will cease to apply if: (i) Mana Whenua have been invited to prepare a Cultural Advisory Report by a date at least 6 months prior to start of Construction Works; and (ii) Mana Whenua have not provided a Cultural Advisory Report within six months prior to start of Construction Works.
9.	**Urban and Landscape Design Management Plan (ULDMP)** (a) A ULDMP shall be prepared prior to the Start of Construction for a Stage of Work. (b) Mana Whenua shall be invited to participate in the development of the ULDMP(s) to provide input into relevant cultural landscape and design matters including how desired outcomes for management of potential effects on cultural sites, landscapes and values identified and discussed in accordance with Condition 8(c) may be reflected in the ULDMP. The objective of the ULDMP(s) is to: (i) Enable integration of the Project's permanent works into the surrounding landscape and urban context; and (ii) Ensure that the Project manages potential adverse landscape and visual effects as far as practicable and contributes to a quality urban environment. (c) The ULDMP shall be prepared in general accordance with: (i) Auckland Transport's Urban Roads and Streets Design Guide; (ii) Waka Kotahi Urban Design Guidelines: Bridging the Gap (2013) or any subsequent updated version; (iii) Waka Kotahi Landscape Guidelines (2013) or any subsequent updated version; (iv) Waka Kotahi P39 Standard Specification for Highway Landscape Treatments (2013) or any subsequent updated version; and (v) Auckland's Urban Ngahere (Forest) Strategy or any subsequent updated version. (d) To achieve the objective, the ULDMP(s) shall provide details of how the project: (i) Is designed to integrate with the adjacent urban (or proposed urban) and landscape context, including the surrounding existing or proposed topography, urban environment (i.e. centres and density of built form), natural environment, landscape character and open space zones; (ii) Provides appropriate walking and cycling connectivity to, and interfaces with, existing or proposed adjacent land uses, public transport infrastructure and walking and cycling connections; (iii) Promotes inclusive access (where appropriate); and (iv) Promotes a sense of personal safety by aligning with best practice guidelines, such as: a. Crime Prevention Through Environmental Design (CPTED) principles; b. Safety in Design (SID) requirements; and c. Maintenance in Design (MID) requirements and anti-vandalism/anti-graffiti measures. (e) The ULDMP(s) shall include: (i) a concept plan – which depicts the overall landscape and urban design concept, and explain the rationale for the landscape and urban design proposals;

No.	Condition
	(ii) developed design concepts, including principles for walking and cycling facilities and public transport; and (iii) landscape and urban design details – that cover the following: a. Road design – elements such as intersection form, carriageway gradient and associated earthworks contouring including cut and fill batters and the interface with adjacent land uses, benching, spoil disposal sites, median width and treatment, roadside width and treatment; b. Roadside elements – such as lighting, fencing, wayfinding and signage; c. architectural and landscape treatment of all major structures, including bridges and retaining walls; d. Architectural and landscape treatment of noise barriers; e. Landscape treatment of permanent stormwater control wetlands and swales; f. Integration of passenger transport; g. Pedestrian and cycle facilities including paths, road crossings and dedicated pedestrian/ cycle bridges or underpasses; and h. Re-instatement of construction and site compound areas, driveways, accessways and fences. (f) The ULDMP shall also include the following planting details and maintenance requirements: (i) planting design details including: a. identification of existing trees and vegetation that will be retained with reference to the Tree Management Plan. Where practicable, mature trees and native vegetation should be retained; b. street trees, shrubs and ground cover suitable for berms; c. treatment of fill slopes to integrate with adjacent land use, streams, riparian margins and open space zones; d. planting of stormwater wetlands; e. identification of vegetation to be retained and any planting requirements under Condition 20; f. integration of any planting requirements required by conditions of any resource consents for the project; and g. re-instatement planting of construction and site compound areas as appropriate. (ii) a planting programme including the staging of planting in relation to the construction programme which shall, as far as practicable, include provision for planting within each planting season following completion of works in each Stage of Work; and (iii) detailed specifications relating to the following: a. weed control and clearance; b. pest animal management (to support plant establishment); c. ground preparation (top soiling and decompaction); d. mulching; and e. plant sourcing and planting, including hydroseeding and grassing, and use of eco-sourced species.
	Advice Note: *This designation is for the purpose of construction, operation and maintenance of a transport corridor and it is not for the specific purpose of "road widening". Therefore, it is not intended that the front yard definition in the Auckland Unitary Plan which applies a set back from a designation for road widening purposes applies to this designation. A set back is not required to manage effects between the designation boundary and any proposed adjacent sites or lots.*
Specific Outline Plan Requirements	
10.	**Flood Hazard** (a) The Project shall be designed to achieve the following flood risk outcomes: (i) no increase in flood levels for existing authorised habitable floors that are already subject to flooding; (ii) no more than a 10% reduction in freeboard for existing authorised habitable floors; (iii) no increase of more than 50mm in flood level on land zoned for urban or future urban development where there is no existing dwelling; (iv) no new flood prone areas; and (v) no more than a 10% average increase of flood hazard (defined as flow depth times velocity) for main access to authorised habitable dwellings existing at time the Outline Plan is submitted.

No.	Condition
	(b) Compliance with this condition shall be demonstrated in the Outline Plan, which shall include flood modelling of the pre-Project and post-Project 100 year ARI flood levels (for Maximum Probable Development land use and including climate change). (c) Where the above outcomes can be achieved through alternative measures outside of the designation such as flood stop banks, flood walls, raising existing authorised habitable floor level and new overland flow paths or varied through agreement with the relevant landowner, the Outline Plan shall include confirmation that any necessary landowner and statutory approvals have been obtained for that work or alternative outcome.
Construction Conditions	
11.	**Construction Environmental Management Plan (CEMP)** (a) A CEMP shall be prepared prior to the Start of Construction for a Stage of Work. (b) The objective of the CEMP is to set out the management procedures and construction methods to be undertaken to, avoid, remedy or mitigate any adverse effects associated with Construction Works as far as practicable. To achieve the objective, the CEMP shall include: (i) the roles and responsibilities of staff and contractors; (ii) details of the site or project manager and the Project Liaison Person, including their contact details (phone and email address); (iii) the Construction Works programmes and the staging approach, and the proposed hours of work; (iv) details of the proposed construction yards including temporary screening when adjacent to residential areas, site layouts (including construction yards), locations of refuelling activities and construction lighting; (v) methods for controlling dust and the removal of debris and demolition of construction materials from public roads or places; (vi) methods for providing for the health and safety of the general public; (vii) procedures for incident management; (viii)procedures for the refuelling and maintenance of plant and equipment to avoid discharges of fuels or lubricants to Watercourses; (ix) measures to address the storage of fuels, lubricants, hazardous and/or dangerous materials, along with contingency procedures to address emergency spill response(s) and clean up; (x) procedures for responding to complaints about Construction Works; and (xi) methods for amending and updating the CEMP as required. (c) Any CEMP prepared for a Stage of Work shall be submitted to Council for information at least ten working days before the Start of Construction for a Stage of Work.
12.	**Stakeholder and Communication and Engagement Management Plan (SCEMP)** (a) A SCEMP shall be prepared prior to the Start of Construction for a Stage of Work. The objective of the SCEMP is to identify how the public and stakeholders (including directly affected and adjacent owners and occupiers of land) will be engaged communicated with throughout the Construction Works. To achieve the objective, the SCEMP shall include: (i) the contact details for the Project Liaison Person. These details shall be on the Project website, or equivalent virtual information source, and prominently displayed at the main entrance(s) to the site(s); (ii) the procedures for ensuring that there is a contact person available for the duration of Construction Works, for public enquiries or complaints about the Construction Works; (iii) methods for engaging with Mana Whenua, to be developed in consultation with Mana Whenua; (iv) a list of stakeholders, organisations (such as community facilities) and businesses and persons who will be engaged communicated with; (v) Identification of the properties whose owners will be engaged with; (vi) methods to communicate key project milestones and the proposed hours of construction activities including outside of normal working hours and on weekends and public holidays, to the parties identified in (iv) and (v) above; and surrounding businesses and residential communities; (vii) linkages and cross-references to communication and engagement methods set out in other conditions and management plans where relevant. (b) Any SCEMP prepared for a Stage of Work shall be submitted to Council for information ten working days prior to the Start of Construction for a Stage of Work.

No.	Condition
13.	**Complaints Register** (a) At all times during Construction Works, a record of any complaints received about the Construction Works shall be maintained. The record shall include: (i) The date, time and nature of the complaint; (ii) The name, phone number and address of the complainant (unless the complainant wishes to remain anonymous); (iii) Measures taken to respond to the complaint (including a record of the response provided to the complainant) or confirmation of no action if deemed appropriate; (iv) The outcome of the investigation into the complaint; (v) Any other activities in the area, unrelated to the Project that may have contributed to the complaint, such as non-project construction, fires, traffic accidents or unusually dusty conditions generally. (b) A copy of the Complaints Register required by this condition shall be made available to the Manager upon request as soon as practicable after the request is made.
14.	**Cultural Monitoring Plan** (a) Prior to the start of Construction Works, a Cultural Monitoring Plan shall be prepared by a Suitably Qualified Person(s) identified in collaboration with Mana Whenua. (b) The objective of the Cultural Monitoring Plan is to identify methods for undertaking cultural monitoring to assist with management of any cultural effects during Construction works. (c) The Cultural Monitoring Plan shall include: (i) Requirements for formal dedication or cultural interpretation to be undertaken prior to start of Construction Works in areas identified as having significance to Mana Whenua; (ii) Requirements and protocols for cultural inductions for contractors and subcontractors; (iii) Identification of activities, sites and areas where cultural monitoring is required during particular Construction Works; (iv) Identification of personnel to undertake cultural monitoring, including any geographic definition of their responsibilities; and (v) Details of personnel to assist with management of any cultural effects identified during cultural monitoring, including implementation of the Accidental Discovery Protocol (d) If Enabling Works involving soil disturbance are undertaken prior to the start of Construction Works, an Enabling Works Cultural Monitoring Plan shall be prepared by a Suitably Qualified Person identified in collaboration with Mana Whenua. This plan may be prepared as a standalone Enabling Works Cultural Monitoring Plan or be included in the main Construction Works Cultural Monitoring Plan. **Advice Note:** *Where appropriate, the Cultural Monitoring Plan shall align with the requirements of other conditions of the designation and resource consents for the Project which require monitoring during Construction Works.*
15.	**Construction Traffic Management Plan (CTMP)** (a) A CTMP shall be prepared prior to the Start of Construction for a Stage of Work. (b) The objective of the CTMP is to avoid, remedy or mitigate, as far as practicable, adverse construction traffic effects. To achieve this objective, the CTMP shall include: (i) methods to manage the effects of temporary traffic management activities on traffic; (ii) measures to ensure the safety of all transport users; (iii) the estimated numbers, frequencies, routes and timing of traffic movements, including any specific non-working or non-movement hours to manage vehicular and pedestrian traffic near schools or to manage traffic congestion; (iv) site access routes and access points for heavy vehicles, the size and location of parking areas for plant, construction vehicles and the vehicles of workers and visitors; (v) identification of detour routes and other methods to ensure the safe management and maintenance of traffic flows, including pedestrians and cyclists, on existing roads; (vi) methods to maintain vehicle access to property and/or private roads where practicable, or to provide alternative access arrangements when it will not be; (vii) the management approach to loads on heavy vehicles, including covering loads of fine material, the use of wheel-wash facilities at site exit points and the timely removal of any material deposited or spilled on public roads; (viii) methods that will be undertaken to communicate traffic management measures to affected road users (e.g. residents/public/stakeholders/emergency services);

No.	Condition
	(c) Any CTMP prepared for a Stage of Work shall be submitted to Council for information ten working days prior to the Start of Construction for a Stage of Work.
16.	**Construction Noise Standards** (a) Construction noise shall be measured and assessed in accordance with NZS6803:1999 Acoustics – Construction Noise and shall comply with the noise standards set out in the following table as far as practicable: **Table 17.1: Construction noise standards**

Day of week	Time period	$L_{Aeq(15min)}$	L_{AFmax}
Occupied activity sensitive to noise			
Weekday	0630h - 0730h 0730h - 1800h 1800h - 2000h 2000h - 0630h	55 dB 70 dB 65 dB 45 dB	75 dB 85 dB 80 dB 75 dB
Saturday	0630h - 0730h 0730h - 1800h 1800h - 2000h 2000h - 0630h	55 dB 70 dB 45 dB 45 dB	75 dB 85 dB 75 dB 75 dB
Sunday and Public Holidays	0630h - 0730h 0730h - 1800h 1800h - 2000h 2000h - 0630h	45 dB 55 dB 45 dB 45 dB	75 dB 85 dB 75 dB 75 dB
Other occupied buildings			
All	0730h – 1800h 1800h – 0730h	70 dB 75 dB	

(b) Where compliance with the noise standards set out in Table [above] is not practicable, and unless otherwise provided for in the CNVMP as required by Condition 18(c)(x), then the methodology in Condition 19 shall apply.

<table>
<tr><th>No.</th><th>Condition</th></tr>
<tr><td>17.</td><td>
Construction Vibration Standards
(a) Construction vibration shall be measured in accordance with ISO 4866:2010 Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures and shall comply with the vibration standards set out in the following table as far as practicable.
Table CNV2 Construction vibration criteria
<table>
<tr><th>Receiver</th><th>Details</th><th>Category A</th><th>Category B</th></tr>
<tr><td rowspan="2">Occupied Activities sensitive to noise</td><td>Night-time 2000h - 0630h</td><td>0.3mm/s ppv</td><td>2mm/s ppv</td></tr>
<tr><td>Daytime 0630h - 2000h</td><td>2mm/s ppv</td><td>5mm/s ppv</td></tr>
<tr><td>Other occupied buildings</td><td>Daytime 0630h - 2000h</td><td>2mm/s ppv</td><td>5mm/s ppv</td></tr>
<tr><td>All other buildings</td><td>At all other times</td><td colspan="2">Tables 1 and 3 of DIN4150-3:1999</td></tr>
</table>
*Category A criteria adopted from Rule E25.6.30.1 of the AUP
**Category B criteria based on DIN 4150-3:1999 building damage criteria for daytime
(b) Where compliance with the vibration standards set out in Table [above] is not practicable, and unless otherwise provided for in the CNVMP as required by Condition 18(c)(x), then the methodology in Condition 19 shall apply
</td></tr>
<tr><td>18.</td><td>
Construction Noise and Vibration Management Plan (CNVMP)
(a) A CNVMP shall be prepared by a Suitably Qualified Person prior to the Start of Construction for a Stage of Work.
(b) A CNVMP shall be implemented during the Stage of Work to which it relates.
(c) The objective of the CNVMP is to provide a framework for the development and implementation of the Best Practicable Option for the management of construction noise and vibration effects to achieve the construction noise and vibration standards set out in Conditions 16 and 17 to the extent practicable. To achieve this objective, the CNVMP shall be prepared in accordance with Annex E2 of the New Zealand Standard NZS6803:1999 'Acoustics – Construction Noise' (NZS6803:1999) and shall as a minimum, address the following:
i. Description of the works and anticipated equipment/processes;
ii. Hours of operation, including times and days when construction activities would occur;
iii. The construction noise and vibration standards for the project;
iv. Identification of receivers where noise and vibration standards apply;
v. A hierarchy of management and mitigation options, including any requirements to limit night works and works during other sensitive times, including Sundays and public holidays as far practicable and identification of the Best Practicable Option;
vi. Methods and frequency for monitoring and reporting on construction noise and vibration;
vii. Procedures for communication and engagement with nearby residents and stakeholders, including notification of proposed construction activities, the period of construction activities, and management of noise and vibration complaints.
viii. Contact details of the Project Liaison Person;
ix. Procedures for the regular training of the operators of construction equipment to minimise noise and vibration as well as expected construction site behaviours for all workers;
x. Identification of areas where compliance with the noise [Condition 16] and/or vibration standards [Condition 17 Category A or Category B] will not be practicable and the specific management controls to be implemented and consultation requirements with owners and occupiers of affected sites.
xi. Procedures and requirements for the preparation of a Schedule to the CNVMP (Schedule) for those areas where compliance with the noise [Condition 16] and/or vibration standards [Condition 17 Category B] will not be practicable and where sufficient information is not available at the time of the CNVMP to determine the area specific management controls Condition 18(c)(x).
xii. Procedures for:
A. communicating with affected receivers, where measured or predicted vibration from construction activities exceeds the vibration criteria of Condition 17;
B. assessing, mitigating and monitoring vibration where measured or predicted vibration from construction activities exceeds the Category AB vibration criteria of Condition 17, including the requirement to undertake building condition surveys
</td></tr>
</table>

No.	Condition
	before and after works to determine whether any damage has occurred as a result of construction vibration; and xiii. Requirements for review and update of the CNVMP
19.	**Schedule to a CNVMP** (a) An updated Schedule to the CNVMP (Schedule) shall be prepared prior to the start of the construction to which it relates by a Suitably Qualified Person, in consultation with the owners and occupiers of sites subject to the Schedule, when: (i) Construction noise is either predicted or measured to exceed the noise standards in Condition 16, except where the exceedance of the L_{Aeq} criteria is no greater than 5 decibels and does not exceed: A. 0630 – 2000: 2 period of up to 2 consecutive weeks in any 2 months, or B. 2000 - 0630: 1 period of up to 2 consecutive nights in any 10 days. (ii) Construction vibration is either predicted or measured to exceed the Category B standard at the receivers in Condition 17. (b) The objective of the Schedule is to set out the Best Practicable Option measures to manage for the management of noise and/or vibration effects of the construction activity beyond those measures set out in the CNVMP. The Schedule shall include details such as: (i) Construction activity location, start and finish dates; (ii) The nearest neighbours to the construction activity; (iii) The predicted noise and/or vibration level for all receivers where the levels are predicted or measured to exceed the applicable standards and predicted duration of the exceedance; (iv) The proposed mitigation options that have been selected, and the options that have been discounted as being impracticable and the reasons why; (v) The consultation undertaken with owners and occupiers of sites subject to the Schedule, and how consultation has and has not been taken into account; and proposed communications with neighbours. (vi) Location, times and types of monitoring; (c) The Schedule shall be submitted to the Manager Council for certification at least 5 working days (except in unforeseen circumstances) in advance of Construction Works that are covered by the scope of the Schedule and shall form part of the CNVMP. (d) Where material changes are made to a Schedule required by this condition, the Requiring Authority shall consult the owners and/or occupiers of sites subject to the Schedule prior to submitting the amended Schedule to the Manager for certification in accordance with (c) above. The amended Schedule shall document the consultation undertaken with those owners and occupiers, and how consultation outcomes have and have not been taken into account.
Accidental Discoveries *Advice Note: The Requiring Authority is advised of the requirements of Rule E11.6.1 of the AUP for "Accidental Discovery" as they relate to both contaminated soils and heritage items.* *The requirements for accidental discoveries of heritage items are set out in Rule E11.6.1 of the AUP [and in the Waka Kotahi Minimum Standard P45 Accidental Archaeological Discovery Specification, or any subsequent version].*	
20.	**Tree Management Plan** (a) Prior to the Start of Construction for a Stage of Work, a Tree Management Plan shall be prepared. (b) The objective of the Tree Management Plan is to avoid, remedy or mitigate effects of construction activities on trees identified as protected or notable in the Auckland Unitary Plan. (c) The Tree Management Plan shall: (i) confirm the trees that will be affected by the project work and are identified as protected or notable in the Auckland Unitary Plan; and (ii) demonstrate how the design and location of project works has avoided, remedied or mitigated any effects on any tree identified in (i) above. This may include:

No.	Condition
	A. planting to replace trees that require removal (with reference to the ULDMP planting design details in Condition 9); B. tree protection zones and tree protection measures such as protective fencing, ground protection and physical protection of roots, trunks and branches; and C. methods for work within the rootzone of trees that are to be retained in line with accepted arboricultural standards. (iii) demonstrate how the tree management measures (outlined in A – C above) are consistent with conditions of any resource consents granted for the project in relation to managing construction effects on trees.
Operational Conditions	
21.	**Low Noise Road Surface** (a) The following condition only applies where an upgrade or extension to an existing road is within or adjacent to urban zoning as identified in the nesting tables within the AUP OP. (b) Asphaltic concrete surfacing (or equivalent low noise road surface) shall be implemented within 12 months of Completion of Construction of the project. (c) Any future resurfacing works of the Project shall be undertaken in accordance with the Auckland Transport Reseal Guidelines, Asset Management and Systems 2013 or any updated version and asphaltic concrete surfacing (or equivalent low noise road surface) shall be implemented where: (i) The volume of traffic exceeds 10,000 vehicles per day; or (ii) The road is subject to high wear and tear (such as cul de sac heads, roundabouts and main road intersections); or (iii) It is in an industrial or commercial area where there is a high concentration of truck traffic; or (iv) It is subject to high usage by pedestrians, such as town centres, hospitals, shopping centres and schools. (d) Prior to commencing any future resurfacing works, the Requiring Authority shall advise the Manager if any of the triggers in Condition 21(c)(i) – (iv) are not met by the road or a section of it and therefore where the application of asphaltic concrete surfacing (or equivalent low noise road surface) is no longer required on the road or a section of it. Such advice shall also indicate when any resealing is to occur.
22.	**Traffic Noise** For the purposes of Conditions 23 to 35: (a) Building-Modification Mitigation – has the same meaning as in NZS 6806; (b) Design year has the same meaning as in NZS 6806; (c) Detailed Mitigation Options – means the fully detailed design of the Selected Mitigation Options, with all practical issues addressed; (d) Habitable Space – has the same meaning as in NZS 6806; (e) Identified Noise Criteria Category – means the Noise Criteria Category for a PPF identified in *Schedule 2: Identified PPFs Noise Criteria Categories*; (f) Mitigation – has the same meaning as in NZS 6806:2010 Acoustics – Road-traffic noise – New and altered roads; (g) Noise Criteria Categories – means the groups of preference for sound levels established in accordance with NZS 6806 when determining the Best Practicable Option for noise mitigation (i.e. Categories A, B and C); (h) NZS 6806 – means New Zealand Standard NZS 6806:2010 Acoustics – Road-traffic noise – New and altered roads; (i) Protected Premises and Facilities (PPFs) – means only the premises and facilities identified in green, orange or red in *Schedule 2: PPFs Noise Criteria Categories*; (j) Selected Mitigation Options – means the preferred mitigation option resulting from a Best Practicable Option assessment undertaken in accordance with NZS 6806; and (k) Structural Mitigation – has the same meaning as in NZS 6806.

No.	Condition
23.	The Noise Criteria Categories identified in Schedule 2: PPFs Noise Criteria Categories at each of the PPFs shall be achieved where practicable and subject to Conditions 23 to 35 (all traffic noise conditions). Achievement of the Noise Criteria Categories for PPFs shall be by reference to a traffic forecast for a high growth scenario in a design year at least 10 years after the programmed opening of the Project.
24.	As part of the detailed design of the Project, a Suitably Qualified Person shall determine the Selected Mitigation Options for the PPFs identified on *Schedule 2: PPFs Noise Criteria Categories.*
25.	Prior to construction of the Project, a Suitably Qualified Person shall develop the Detailed Mitigation Options for the PPFs identified in *Schedule 2: PPFs Noise Criteria Categories*, taking into account the Selected Mitigation Options.
26.	If the Detailed Mitigation Options would result in the Identified Noise Criteria Category changing to a less stringent Category, e.g. from Category A to B or Category B to C, at any relevant PPF, a Suitably Qualified Person shall provide confirmation to the Manager that the Detailed Mitigation Option would be consistent with adopting the Best Practicable Option in accordance with NZS 6806 prior to implementation.
27.	The Detailed Mitigation Options shall be implemented prior to completion of construction of the Project, with the exception of any low-noise road surfaces, which shall be implemented within twelve months of completion of construction.
28.	Prior to the Start of Construction, a Suitably Qualified Person shall identify those PPFs which, following implementation of all the Detailed Mitigation Options, will not be Noise Criteria Categories A or B and where Building-Modification Mitigation might be required to achieve 40 dB $L_{Aeq(24h)}$ inside Habitable Spaces ('Category C Buildings').
29.	Prior to the Start of Construction in the vicinity of each Category C Building, the Requiring Authority shall write to the owner of the Category C Building requesting entry to assess the noise reduction performance of the existing building envelope. If the building owner agrees to entry within three months of the date of the Requiring Authority's letter, the Requiring Authority shall instruct a Suitably Qualified Person to visit the building and assess the noise reduction performance of the existing building envelope.
30.	For each Category C Building identified, the Requiring Authority is deemed to have complied with Condition 29 above if: (a) The Requiring Authority's Suitably Qualified and Experienced Person has visited the building and assessed the noise reduction performance of the building envelope; or (b) The building owner agreed to entry, but the Requiring Authority could not gain entry for some reason (such as entry denied by a tenant); or (c) The building owner did not agree to entry within three of the date of the Requiring Authority's letter sent in accordance with Condition 29 above (including where the owner did not respond within that period); or (d) The building owner cannot, after reasonable enquiry, be found prior to completion of construction of the Project. If any of (b) to (d) above apply to a Category C Building, the Requiring Authority is not required to implement Building-Modification Mitigation to that building.
31.	Subject to Condition 30 above, within six months of the assessment undertaken in accordance with Conditions 29 and 30, the Requiring Authority shall write to the owner of each Category C Building advising: (a) If Building-Modification Mitigation is required to achieve 40 dB LAeq(24h) inside habitable spaces; and (b) The options available for Building-Modification Mitigation to the building, if required; and (c) That the owner has three months to decide whether to accept Building-Modification Mitigation to the building and to advise which option for Building-Modification Mitigation the owner prefers, if the Requiring Authority has advised that more than one option is available.

No.	Condition
32.	Once an agreement on Building-Modification Mitigation is reached between the Requiring Authority and the owner of a Category C Building, the mitigation shall be implemented, including any third party authorisations required, in a reasonable and practical timeframe agreed between the Requiring Authority and the owner.
33.	Subject to Condition 29, where Building-Modification Mitigation is required, the Requiring Authority is deemed to have complied with Condition 31 if: (a) The Requiring Authority has completed Building Modification Mitigation to the building; or (b) An alternative agreement for mitigation is reached between the Requiring Authority and the building owner; or (c) The building owner did not accept the Requiring Authority's offer to implement Building-Modification Mitigation within three months of the date of the Requiring Authority's letter sent in accordance with Condition 31 (including where the owner did not respond within that period); or (d) The building owner cannot, after reasonable enquiry, be found prior to completion of construction of the Project.
34.	The Detailed Mitigation Options shall be maintained so they retain their noise reduction performance as far as practicable
35.	The Noise Criteria Categories at the PPFs identified in *Schedule 2: Identified PPFs Noise Criteria Categories* do not need to be complied with where: (a) the PPF no longer exists; or agreement of the landowner has been obtained confirming that the Noise Criteria Category level does not need to be met.

Proposed Designation Condition Schedules

Schedule 1: General Accordance Plans and Information

Project Description

The proposed work is the construction, operation, and maintenance of a transport corridor on Trig Road in Whenuapai between State Highway 18 and Hobsonville Road, including active transport facilities and associated infrastructure. The proposed work is shown in the following Concept Plan and includes:

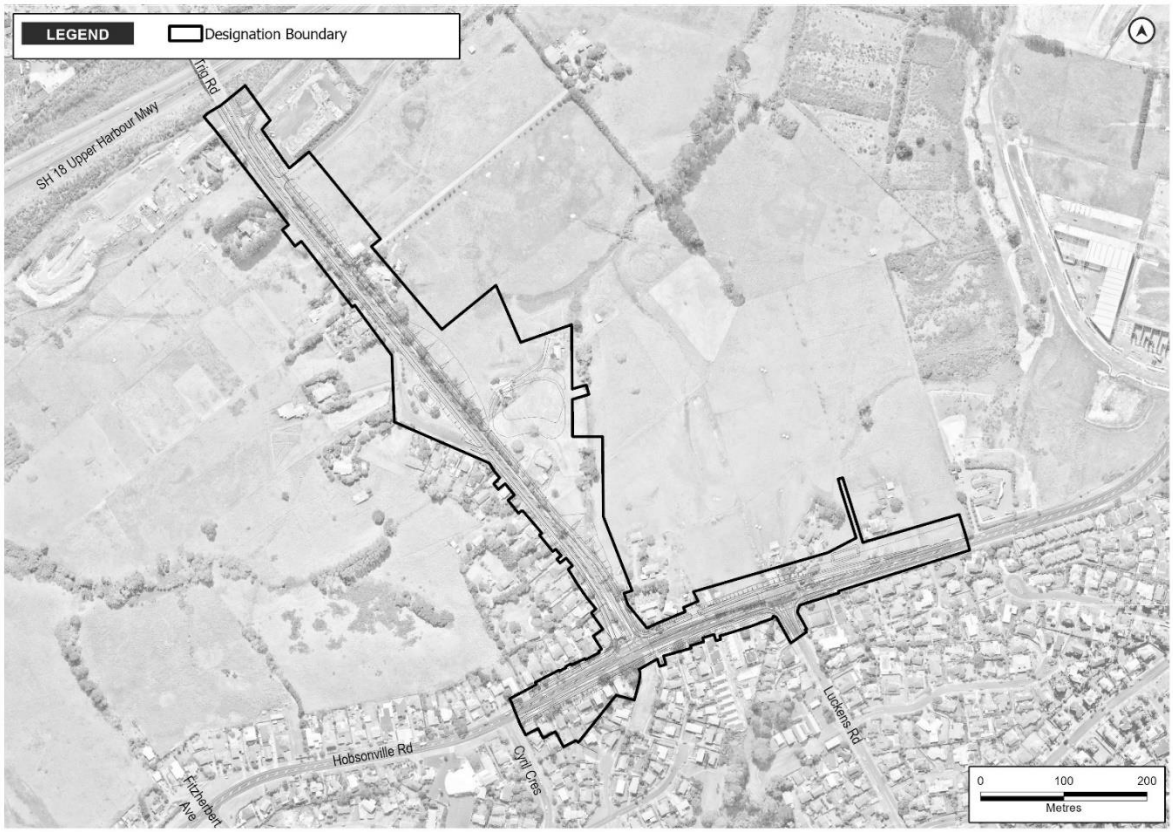
(a) An upgraded and new transport corridor, including public transport and active transport facilities;

(b) Associated works including intersections, bridges, embankments, retaining, culverts, stormwater management systems;

(c) Changes to local roads, where the proposed work intersects with local roads; and

(d) Construction activities, including vegetation removal, construction compounds, laydown areas, bridge works area, construction traffic management and the re-grade of driveways.

NOR Concept Plan



Schedule 2: Identified PPFs Noise Criteria Categories

Address	New or Altered Road	Noise Criteria Category
72 Hobsonville Road	Altered	Category C
26 Trig Road	Altered	Category C
64 Hobsonville Road	Altered	Category C
66 Hobsonville Road	Altered	Category C
40 Trig Road	Altered	Category C
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category B
16 Trig Road	Altered	Category B
97 Hobsonville Road	Altered	Category B
6 Trig Road	Altered	Category B
22 Trig Road	Altered	Category B
62 Hobsonville Road	Altered	Category B
18, 2 Luckens Road	Altered	Category B
72B Hobsonville Road	Altered	Category B
16 Luckens Road	Altered	Category B
8 Trig Road	Altered	Category A
12 Trig Road	Altered	Category A
60 Hobsonville Road	Altered	Category A
119 Hobsonville Road	Altered	Category A
10 Luckens Road	Altered	Category A
1B Luckens Road	Altered	Category A
28 Trig Road	Altered	Category A
70 Hobsonville Road	Altered	Category A
24 Belleaire Court	Altered	Category A
30 Trig Road	Altered	Category A
7 Trig Road	Altered	Category A
75 Hobsonville Road	Altered	Category A
32 Trig Road	Altered	Category A
56 Hobsonville Road	Altered	Category A
76 Hobsonville Road	Altered	Category A
1/111, 2/111 Hobsonville Road	Altered	Category A
133 Hobsonville Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
72A Hobsonville Road	Altered	Category A
8 Luckens Road	Altered	Category A
52 Hobsonville Road	Altered	Category A
127 Hobsonville Road	Altered	Category A
5 Luckens Road	Altered	Category A
34 Trig Road	Altered	Category A
50 Hobsonville Road	Altered	Category A
46 Trig Road	Altered	Category A

54 Hobsonville Road	Altered	Category A
26 Belleaire Court	Altered	Category A
48 Hobsonville Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
107 Hobsonville Road	Altered	Category A
79A Hobsonville Road	Altered	Category A
68 Hobsonville Road	Altered	Category A
58 Hobsonville Road	Altered	Category A
19 Luckens Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
80 Hobsonville Road	Altered	Category A
5 Louise Place	Altered	Category A
22A Trig Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
2/12, 1/12 Mona Vale	Altered	Category A
34A Trig Road	Altered	Category A
8A, 10, 8 Louise Place	Altered	Category A
8A, 10, 8 Louise Place	Altered	Category A
3A Louise Place	Altered	Category A
18 Trig Road	Altered	Category A
6 Louise Place	Altered	Category A
10 Mona Vale	Altered	Category A
78 Hobsonville Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
33 Cyril Crescent	Altered	Category A
70A Hobsonville Road	Altered	Category A
97 Hobsonville Road	Altered	Category A
10 Trig Road	Altered	Category A
22 Cyril Crescent	Altered	Category A
99 Hobsonville Road	Altered	Category A
147F Hobsonville Road	Altered	Category A
29 Cyril Crescent	Altered	Category A
8A, 10, 8 Louise Place	Altered	Category A
1A Luckens Road	Altered	Category A
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	Altered	Category A
3A Louise Place	Altered	Category A
131 Hobsonville Road	Altered	Category A
31 Cyril Crescent	Altered	Category A
145A Hobsonville Road	Altered	Category A
8 Bernleigh Terrace	Altered	Category A
4 Louise Place	Altered	Category A

127A Hobsonville Road	Altered	Category A
14 Luckens Road	Altered	Category A
121 Hobsonville Road	Altered	Category A
145B Hobsonville Road	Altered	Category A
2/95, 1/95, 95 Hobsonville Road	Altered	Category A
12 Luckens Road	Altered	Category A
123 Hobsonville Road	Altered	Category A
20 Belleaire Court	Altered	Category A
20A Belleaire Court	Altered	Category A
3A Luckens Road	Altered	Category A
3B Luckens Road	Altered	Category A
133A Hobsonville Road	Altered	Category A
131A Hobsonville Road	Altered	Category A
129 Hobsonville Road	Altered	Category A
129C Hobsonville Road	Altered	Category A
129B Hobsonville Road	Altered	Category A
22 Belleaire Court	Altered	Category A
121B Hobsonville Road	Altered	Category A
18 Belleaire Court	Altered	Category A
4 Bernleigh Terrace	Altered	Category A
133A Hobsonville Road	Altered	Category A
2/95, 1/95, 95 Hobsonville Road	Altered	Category A
121A Hobsonville Road	Altered	Category A
123A Hobsonville Road	Altered	Category A
123B Hobsonville Road	Altered	Category A
19 Belleaire Court	Altered	Category A

PPF Location Plans


Ryans Rd
Trig Rd
34A Trig Road
34 Trig Road
32 Trig Road
30 Trig Road
28 Trig Road
26 Trig Road
22 Trig Road
22A Trig Road
16 Trig Road
18 Trig Road
12 Trig Road
8 Trig Road
6 Trig Road
10 Trig Road
76 Hobsonville Road
70A Hobsonville Road
72A Hobsonville Road
Legend
NZS 6806 Assessment Area
Protected Premises and Facilities
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Not to be used for construction.


Legend
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Trig Rd
Hobsonville Rd
Cyril Cres
Louise Pl
Mona Vale
8 Trig Road
6 Trig Road
10 Trig Road
72B Hobsonville Road
72A Hobsonville Road
70A Hobsonville Road
70 Hobsonville Road
68 Hobsonville Road
66 Hobsonville Road
62 Hobsonville Road
60 Hobsonville Road
58 Hobsonville Road
56 Hobsonville Road
54 Hobsonville Road
52 Hobsonville Road
50 Hobsonville Road
48 Hobsonville Road
75 Hobsonville Road
79A Hobsonville Road
97 Hobsonville Road
99 Hobsonville Road
5 Louise Place
8A, 10, 8 Louise Place
6 Louise Place
4 Louise Place
3A Louise Place
10 Mona Vale
33 Cyril Crescent
31 Cyril Crescent
29 Cyril Crescent
22 Cyril Crescent


Hobsonville Rd
Trig Rd
Luckens Rd
Bernleigh Ter
Legend
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Hobsonville Rd
Hobsonville Rd
Hobsonville Rd
Hobsonville Rd
80 Hobsonville Road
78 Hobsonville Road
26 Belleaire Court
147F Hobsonville Road
145A Hobsonville Road
145B Hobsonville Road
24 Belleaire Court
133 Hobsonville Road
127 Hobsonville Road
133A Hobsonville Road
22 Belleaire Court
19 Belleaire Court
Belleaire Ct
119 Hobsonville Road
127A Hobsonville Road
133A Hobsonville Road
20A Belleaire Court
18 Belleaire Court
121 Hobsonville Road
123 Hobsonville Road
123A Hobsonville Road
129 Hobsonville Road
129C Hobsonville Road
131A Hobsonville Road
20 Belleaire Court
121A Hobsonville Road
131 Hobsonville Road
129B Hobsonville Road
121B Hobsonville Road
123B Hobsonville Road
8 Luckens Road
12 Luckens Road
10 Luckens Road
8 Bernleigh Terrace
Legend
NZS 6806 Assessment Area
Protected Premises and Facilities
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ATTACHMENT 10

TRIG ROAD CORRIDOR UPGRADE
PROPOSED CONSENT CONDITIONS

Trig Road Corridor Upgrade

Proposed Consent Conditions

Abbreviations and definitions

Acronym/Term	Definition
AUP	Auckland Unitary Plan.
CEMP	Construction Environmental Management Plan
Certification	Confirmation from the Council that a plan or material change to a plan has been prepared in accordance with the condition to which it relates. A management plan shall be deemed certified: (a) where the applicant has received written confirmation from Council that a management plan is certified; or (b) fifteen working days from the submission of a management plan where no written confirmation of certification has been received.
Construction Works	Activities undertaken to construct the Project excluding Enabling Works.
Council	Auckland Council
CTMP	Construction Traffic Management Plan
Enabling works	Includes, but is not limited to, the following and similar activities: • geotechnical investigations (including trial embankments) • archaeological site investigations • formation of access for geotechnical investigations • establishment of site yards, site entrances and fencing • constructing and sealing site access roads • demolition or removal of buildings and structures • relocation of services • establishment of mitigation measures (such as erosion and sediment control measures, temporary noise walls, earth bunds and planting)
Flood prone area	A potential ponding area that relies on a single culvert for drainage and does not have an overland flow path.
Mana whenua	Mana Whenua as referred to in the conditions is considered to be (as a minimum but not limited to) the following (in no particular order), who at the time of Notice of Requirement expressed a desire to be involved in the Project: • Te Kawerau a Maki • Ngāti Whātua o Kaipara • Te Ākitai Waiohua • Ngāti Whanaunga **Note**: Other iwi and hapu not identified above may have an interest in the Project and should be consulted.
Project Liaison Person	The person or persons appointed for the duration of the Project's Construction Works to be the main point of contact for persons wanting information about the Project or affected by the Construction Works.
RMA	Resource Management Act (1991)
Stage of Work	Any physical works that require the development of an Outline Plan.
Start of Construction	The time when Construction Works (excluding Enabling Works) start.

Acronym/Term	Definition
Suitably Qualified Person	A person (or persons) who can provide sufficient evidence to demonstrate their suitability, experience and competence in the relevant field of expertise.

Proposed Consent Conditions

REGIONAL CONSENT CONDITIONS	
1.	**Activity in General Accordance with Plans and Information** (a) Except as provided for in the conditions below, , works within the designation shall be undertaken in general accordance with Project description and concept plan in schedule 1: (b) Where there is inconsistency between: (i) Project description and concept plan in schedule 1 and the requirements of the following conditions, the conditions shall prevail; (ii) the documents listed in condition 1(a) above Project description and concept plan in schedule 1, and the management plans under the conditions of the designation, the requirements of the management plans shall prevail.
2.	**Lapse** Under section 125 of the RMA, these consents lapse fifteen years after the date they are granted unless: (a) The consents are given effect to; or (b) The council extends the period after which the consents lapse.
3.	**Expiry** (a) Under section 123(c)The consents for earthworks, stream works, and discharge of contaminants to land will expire 10 years from the date of commencement (b) Under section 123(a) of the RMA, the consent for reclamation of the wetland has an unlimited duration. The consents for reclamation shall be unlimited.
4.	**Monitoring charge** The consent holder shall pay the council an initial consent compliance monitoring charge of xx (inclusive of GST), plus any further monitoring charge or charges to recover the actual and reasonable costs incurred to ensure compliance with the conditions attached to these consents *Advice note:* *The initial monitoring deposit is to cover the cost of inspecting the site, carrying out tests, reviewing conditions, updating files, etc., all being work to ensure compliance with the resource consent(s). In order to recover actual and reasonable costs, monitoring of conditions, in excess of those covered by the deposit, shall be charged at the relevant hourly rate applicable at the time. The consent holder will be advised of the further monitoring charge. Only after all conditions of the resource consent(s) have been met, will the council issue a letter confirming compliance on request of the consent holder.*
	Pre Construction
5.	Prior to the commencement of Construction activity, the consent holder must hold a pre-start meeting that: • is located on the subject site; • is scheduled not less than five days before the anticipated commencement of earthworks; • includes Auckland Council compliance monitoring representatives; and • includes representation from the contractors and the supervising engineers who will undertake the works. The meeting must discuss the erosion and sediment control measures, the earthworks methodologies and must ensure all relevant parties are aware of and familiar with the necessary conditions of this consent. The following information must be made available at the pre-start meeting: • Timeframes for key stages of the works authorised under this consent; • Name and contact details for key contractors and supervising engineers;

	• Resource consent conditions; • The Stage Specific Erosion and Sediment Control Plan (ESCP) required by condition 9; • The Wetland Restoration and Enhancement Plan (WREP) required by conditions 8; and • The Chemical Treatment Management Plan (ChTMP) required by condition 10. A pre-start meeting shall be held prior to the commencement of any earthworks activity associated with stage of the project.
6.	**Management Plans** (a) Any management plan shall: (i) Be prepared and implemented in accordance with the relevant management plan condition; (ii) Be submitted to Council for certification at least 20 working days prior to the relevant stage of works; (iii) Be prepared by a Suitably Qualified Person(s); (iv) Include sufficient detail relating to the management of effects associated with the relevant activities and/or Stage of Work to which it relates. (v) Summarise comments received from Mana Whenua and other stakeholders as required by the relevant management plan condition, along with a summary of where comments have: a. Been incorporated; and b. Where not incorporated, the reasons why. (vi) Once finalised, uploaded to the Project website or equivalent virtual information source. (vii) Any management plan developed in accordance with Condition 6 may: (viii) Be submitted in parts or in stages to address particular activities (e.g. design or construction aspects) a Stage of Work of the Project, or to address specific activities authorised by the designation. (ix) If the Consent Holder has not received a response from the Council within 15 working days, then the management plan will be deemed to be certified. (x) Except for material changes, be amended to reflect any changes in design, construction methods or management of effects without further process. (xi) Any approved or certified Management Plan may be amended if necessary to reflect any minor changes in construction methods or management of effects. (xii) Any changes to an approved or certified Management Plan involving a materially different outcome shall be submitted to the Council to certify that they comply with the applicable requirements of these conditions. Any material change must be consistent with the purpose of the relevant Management Plan and the requirements of the relevant conditions of these consents (xiii) Any material changes to the CEMPs, WREP and ESCP are to be submitted to the Council for information.
7.	**Construction Environmental Management Plan (CEMP)** (a) A CEMP shall be prepared prior to the Start of Construction for a Stage of Work. (b) The objective of the CEMP is to set out the management procedures and construction methods to be undertaken to, avoid, remedy or mitigate any adverse effects associated with Construction Works as far as practicable. To achieve the objective, the CEMP shall include: (i) the roles and responsibilities of staff and contractors; (ii) details of the site or project manager and the Project Liaison Person, including their contact details (phone and email address); (iii) the Construction Works programmes and the staging approach, and the proposed hours of work; (iv) details of the proposed construction yards including temporary screening when adjacent to residential areas, site layouts (including construction yards), locations of refuelling activities and construction lighting; (v) methods for controlling dust and the removal of debris and demolition of construction materials from public roads or places; (vi) methods for providing for the health and safety of the general public; (vii) procedures for incident management; (viii) procedures for the refuelling and maintenance of plant and equipment to avoid discharges of fuels or lubricants to Watercourses; (ix) measures to address the storage of fuels, lubricants, hazardous and/or dangerous materials, along with contingency procedures to address emergency spill response(s) and clean up; (x) procedures for responding to complaints about Construction Works; and (xi) methods for amending and updating the CEMP as required.
8.	**Wetland Restoration and Enhancement Plan (WREP)**

	(a) Prior to works commencing, the Consent Holder shall submit to Council for certification a Wetland Restoration and Enhancement Plan (WREP). The purpose of the WREP shall be to: (i) confirm the accurate extent of wetland loss due to the project; (ii) detail the measures proposed to minimise the loss of any wetland habitat as far as practicable; and (iii) identify measures to mitigate any loss that cannot be minimised through wetland enhancement/planting. (b) The WREP shall be prepared by a Suitably Qualified Person and shall be in accordance with the 'Indicative Wetland Offset Plan' in Schedule 1. (c) The WREP shall use the Biodiversity Offset Accounting Model as developed by Maseyk et al. (2015)[1] to establish the quantum of wetland enhancement/planting that is required to achieve no net loss in ecological value. (d) The WREP shall include: (i) Confirmation of the extent of wetland loss due to the project (ii) Details of the measures proposed to minimise the loss of wetland habitat – including any wetland enhancement/planting (iii) Confirmation in detailed design that the wetland hydrological system for any offset mitigation allows for a wide range of facultative and obligate indigenous wetland plants to establish and become a self-sustaining native wetland system; (iv) Measures to protect the wetland so it is protected in perpetuity and excludes stock; (v) Initial and ongoing plant pest control for a period of five years from establishment to minimise exotic plant cover in the wetland; and (vi) Initial and infill planting of an array of wetland and wetland edge native plants (including a mosaic of permanently submerged wetland vegetation and low-growing shrubby species with thick, strong root systems) to achieve a minimum 80% native wetland plant cover three years from establishment. *Advice Notes:* *The certification and amendment of the WREP is covered by Condition 6 above.*
Advice note	***Freshwater Fish*** *Advice Note:* *Prior to the commencement of works in the vicinity of the wetland headwaters of Trig Stream and the Waiarohia Stream, a suitably qualified freshwater ecologist shall complete a survey to determine whether there is any water present in the waterways that requires fish salvage to be undertaken in accordance with the Freshwater Fisheries Regulations 1983. If water is present then fish salvage will be undertaken to ensure the works comply with the Freshwater Fisheries Regulations 1983.*
9.	**Finalised Erosion and Sediment Control Plans (ESCP)** Prior to the commencement of a specific stage of earthworks activity on the subject site, a finalised Erosion and Sediment Control Plan(s), specific to that stage of earthworks, must be prepared in accordance with Auckland Council Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, June 2016, Incorporating Amendment 1 (GD05), and submitted to the Council for written certification. No earthworks activity on the subject site must commence until the Council has certified that that the ESCP satisfactorily meets the requirements of GD05. The plan(s) must contain sufficient details to address the following matters: (a) Specific erosion and sediment control measures for the earthworks (location, dimensions, capacity) including the location of any sediment retention ponds or decanting earth bunds, silt fences, super silt fences, clean and dirty water diversion bunds and stabilised construction entrances, in accordance with GD05; (b) supporting calculations and design drawings, as necessary; (c) details of construction methods; (d) monitoring and maintenance requirements; (e) catchment boundaries and contour information as necessary; and, (f) details relating to the management of exposed areas (e.g. grassing, mulching).
10.	**Chemical Treatment Management Plan (ChTMP)**

[1] Maseyk, F. J. F., Maron, M., Dutson, G., Maron, M., Possingham, H., Seaton, R., Carlyon, G. & Beveridge, A. (2015). A Biodiversity Offsets Accounting Model for New Zealand - User Manual. The Catalyst Group. Prepared for the Department of Conservation, Hamilton.

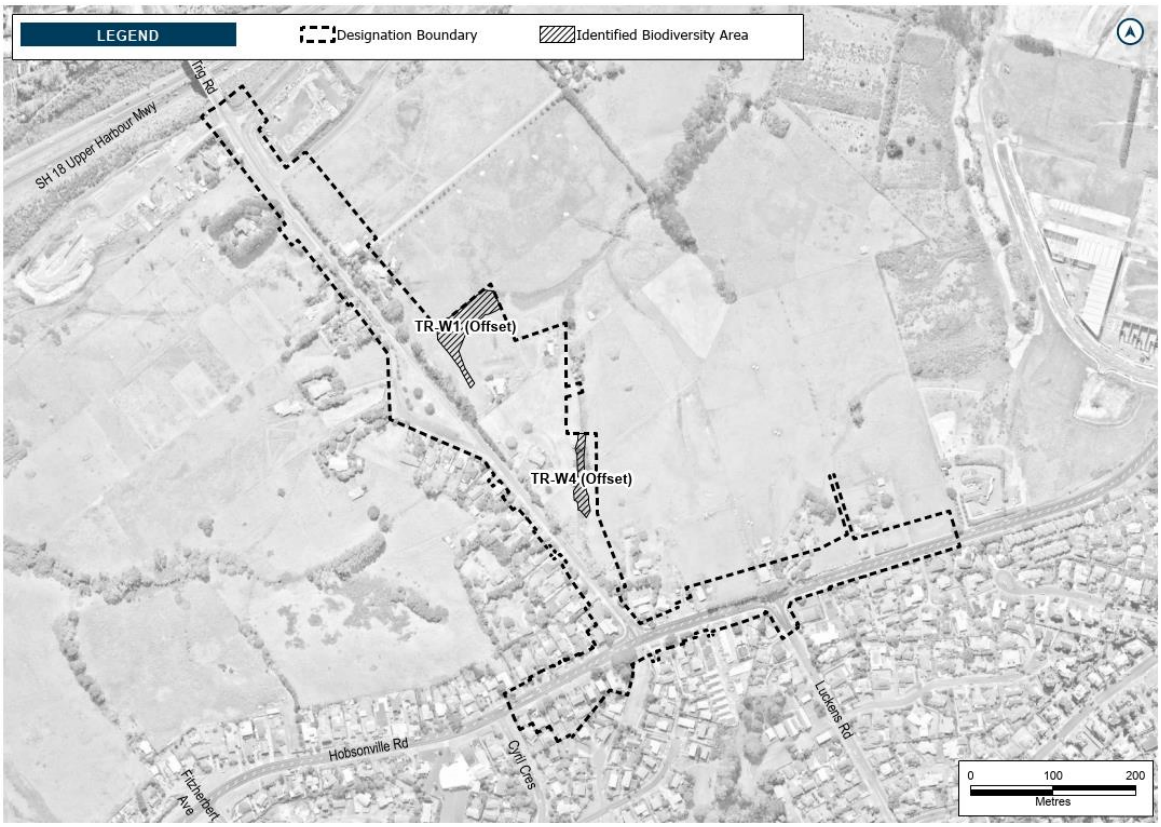
	(a) If required, a ChTMP shall be submitted for the certification of the Council. The plan shall include as a minimum: (i) Specific design details of the chemical treatment system based on a rainfall activated methodology for the site's sediment retention ponds, decanting earth bunds, and any other impoundment systems; (ii) Monitoring, maintenance (including post storm) and contingency programme (including a record sheet); (iii) Details of optimum dosage (including assumptions); (iv) Results of initial chemical treatment trial; (v) A spill contingency plan; and (vi) Details of the person or bodies that will hold responsibility for long term operation and maintenance of the chemical treatment system and the organisational structure which will support this system. (b) The ChTMP referred to under Condition 10 above, shall be implemented prior to the start of any earthworks at areas of the site where decanting earth bunds or the sediment retention pond are established.
11.	The sediment retention ponds, decanting earth bunds, and / or other approved impoundment systems must be chemically treated in accordance with the certified Chemical Treatment Management Plan required by condition 10. All measures required by the ChTMP must be put in place prior to commencement of the earthworks activity and be maintained for the duration of the earthworks activity.
	During Construction
12.	Within ten (10) working days following implementation and completion of the specific erosion and sediment control works referred to in the stage specific Erosion and Sediment Control Plans, and prior to the commencement of earthworks activity on the subject site, a Suitably Qualified Person must provide written certification to the Council that the erosion and sediment control measures have been constructed and completed in accordance with the certified plan referred to in that plan. Written certification must be in the form of a report or any other form acceptable to the Council. *Advice Note: Suitable documentation for certification of erosion and sediment control devices, can be obtained in Appendix C of Guidance Document 005, Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, June 2016, Incorporating Amendment 1 (GD05): Erosion and Sediment Control construction quality checklists.*
13.	**Contaminated Land Management Plan (CLMP)** (a) A Contaminated Land Management Plan (CLMP) shall be prepared prior to the commencement of land disturbance activities associated with the Project. (b) The CLMP shall be informed by a Detailed Site Investigation (DSI) undertaken in general accordance with the *Ministry for the Environment Contaminated Land Management Guideline No 5, Site Investigation and Analysis of Soils* (revised 2021). (c) The purpose of the CLMP is to set out measures to be implemented to control the discharge of contaminants from land disturbance. (d) The CLMP shall be prepared by a Suitably Qualified Person in accordance with the *Ministry for the Environment Contaminated Land Management Guidelines No. 1, Reporting on Contaminated Sites in New Zealand* (revised 2021), and shall include: (i) Detail of land disturbance activities to be carried out. (ii) Summary of relevant site information and known contaminant conditions. (iii) Completed DSI (iv) Details of the roles and responsibilities (including contact details) for parties involved in the land disturbance activities (v) Summary of health and safety protection measures to be implemented; (vi) identification of specific environmental management procedures including for: a. soil and groundwater during disturbance; b. stockpiles (if relevant); c. erosion, sediment, dust and odour; and d. offsite soil transport and disposal, including additional testing as required to confirm disposal to an appropriately licensed facility. e. contingency measures in the event of an accidental discovery (for example asbestos, unknown fill, odour, staining). f. post development controls (if required). (e) This CLMP shall also identify: (i) locations of contaminated land within the Project area; and (ii) any non-contaminated land, which may be treated as clean fill. (f) Mana Whenua (via the Mana Whenua Engagement Forum established under the designation conditions) shall be invited to participate in the development of the CLMP and any comments

	received from Mana Whenua shall be summarised along with a summary of where comments have: (i) Been incorporated; and (ii) Where not incorporated, the reasons why.
14.	The site must be progressively stabilised against erosion throughout the earthworks phase of the project and must be sequenced to minimise the discharge of contaminants to surface water in accordance with the certified, stage specific Erosion and Sediment Control Plans. ***Advice Note:*** *Stabilisation measures may include:* • *the use of waterproof covers, geotextiles, or mulching;* • *top-soiling and grassing of otherwise bare areas of earth;* • *aggregate or vegetative cover that has obtained a density of more than 80% of a normal pasture sward.* *It is recommended that you discuss any potential measures with the Council's monitoring officer who may be able to provide further guidance on the most appropriate approach to take. Alternatively, please refer to Auckland Council Guideline Document 005, Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, June 2016, Incorporating Amendment 1 (GD05).*
15.	The operational effectiveness and efficiency of all erosion and sediment control measures specifically required by the stage specific Erosion and Sediment Control Plans required by condition 9, must be maintained throughout the duration of earthworks activity, or until the site is permanently stabilised against erosion. A record of any maintenance work must be kept and be supplied to the Council on request.
16.	Earthworks must be managed to avoid deposition of earth, mud, dirt or other debris on any public road or footpath resulting from earthworks activity on the subject site. In the event that such deposition does occur, it must immediately be removed. In no instance must roads or footpaths be washed down with water without appropriate erosion and sediment control measures in place to prevent contamination of the stormwater drainage system, watercourses or receiving waters.
Advice note	***Advice Note:*** *In order to prevent sediment laden water entering waterways from the road, the following methods may be adopted to prevent, or address discharges should they occur:* • *provision of a stabilised entry and exit(s) point for vehicles* • *provision of wheel wash facilities* • *ceasing of vehicle movement until materials are removed* • *cleaning of road surfaces using street-sweepers* • *silt and sediment traps* • *catchpit protection* *In no circumstances should the washing of deposited materials into drains be advised or otherwise condoned. It is recommended that you discuss any potential measures with the Council's monitoring officer who may be able to provide further guidance on the most appropriate approach to take. Alternatively, please refer to Auckland Council Guideline Document 005, Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, June 2016, Incorporating Amendment 1 (GD05).*
Advice Note	***Accidental Discoveries*** *Advice Note: The Consent Holder is advised of the requirements of Rule E11.6.1 of the AUP for "Accidental Discovery" as they relate to both contaminated soils and heritage items.* *The requirements for accidental discoveries of heritage items are set out in Rule E11.6.1 of the AUP [and in the Waka Kotahi Minimum Standard P45 Accidental Archaeological Discovery Specification, or any subsequent version]*
	Completion
17.	**Earthworks - Completion or Abandonment of Works** Immediately upon completion or abandonment of earthworks on the subject site, all areas of bare earth associated with the works must be permanently stabilised against erosion to the satisfaction of the Council.
Advice note	***Advice Note:*** *Stabilisation Measures may include:* • *The use of mulching or natural fibre matting.* • *Top-soiling, grassing and mulching of otherwise bare areas of earth.*

	• *Aggregate or vegetative cover that has obtained a density of more than 80% of a normal pasture sward.* *The on-going monitoring of these measures is the responsibility of the consent holder. It is recommended that you discuss any potential measures with the Council's monitoring officer who will guide you on the most appropriate approach to take. Alternatively, please refer to Auckland Council, Auckland Council Guidance Document 005, Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, June 2016, Incorporating Amendment 1 (GD05).*
18.	**Post Land Disturbance Works – Contaminated Land** (a) Within three months of the completion of land disturbance associated with the Project, a Works Completion Report (WCR) relating to the management of contaminated land as required by condition 13 shall be submitted to the Council. The WCR shall be prepared by a Suitably Qualified Person and shall include the following: (i) A summary of land disturbance works undertaken, including the location and dimensions of the excavations carried out and the volume of soil excavated; (ii) Details and results of any soil testing completed in association with the land disturbance activities; (iii) Records/evidence of the appropriate disposal for any soil material removed from the site; and Records of any unexpected contamination encountered during the works and response actions, if applicable.

Proposed Consent Condition Schedules

Schedule 1: Indicative Wetland Offset Plan



ATTACHMENT 11

TRIG ROAD CORRIDOR UPGRADE
RESPONSE TO SOFT LODGEMENT REQUEST
FOR FURTHER INFORMATION

TE TUPU NGĀTAHI
SUPPORTING GROWTH

22 December 2022

Te Tupu Ngātahi
Supporting Growth
PO Box 105218
Auckland 1143

Todd Elder and Jo Hart
Auckland Council
135 Albert Street
Auckland
Private Bag 92300, Auckland 1142

Dear Todd and Jo

Re: Response to soft lodgement requests for further information - North West HIF – Redhills Arterial Transport Network and Trig Road Corridor Upgrade Projects

Thank you for engaging with Te Tupu Ngātahi prior to lodgement of the above Projects. This letter contains our responses to the questions and comments provided by Auckland Council's specialists through the soft lodgement process. Refer to points 1 – 6 below.

The documentation has been updated in response to feedback where possible. Due to programme constraints some feedback has been responded to in this letter, which therefore should be considered part of the supporting documentation for the NORs.

The requests for information are set out in Table 1 below. Please let us know if any correspondence is not listed below.

Table 1: Requests for Information

Date	Topic
12 October 2022	*Supporting Growth Northwest Soft-lodgement – Response 1* • Built Heritage • Archaeology and Historic Heritage • Arboriculture
26 October 2022	*RE: SGA NW Local - Soft Lodgement* • Transport
28 October 2022	*Healthy Waters - Initial comments* • Stormwater and Flooding

Date	Topic
31 October 2022	*Supporting Growth NW - HIF planning review (Notices of requirement)* • Planning
14 December 2022	*NoR NW HIF Redhills and Trig Rd: Urban Design Comment* • Urban Design

Yours sincerely

Bridget O'Leary
Planning Lead, North West HIF – Redhills and Trig Road
info@supportinggrowth.nz
0800 4769 255

Response to soft lodgement requests for further information

1. Planning and General Matters

Ref	NOR	Request	Response	Relevant Document / Section
1	All	**Statutory Assessment** I haven't been able to do a full statutory assessment for either Redhills or Trig Road HIF as Appendix B has not been included with the draft AEE and technical documents.	Noted.	**Redhills and Trig Road:** AEE Appendix B
2	All	**Conditions** • While I can see the types of conditions/management plans that are anticipated, a draft set of conditions has not been included • Will there be an OPW condition which sets out the management plans that need to be submitted • Will there be a condition which relates to the amendment of the designation boundary post construction to remove areas of the designation which are no longer required.	• Refer to Redhills - AEE Appendix C and Trig Road – AEE Appendix E for proposed designation conditions. Proposed consent conditions for Trig Road are contained in AEE Appendix D. • Management plan requirements are set out in proposed designation conditions 6 and 7. • Proposed designation condition 3 requires review and amendment of the designation boundary post-construction.	**Redhills:** AEE Appendix C **Trig Road:** AEE Appendix E
3	All	**Memo – HIF Gap Analysis** In regards to planning review, it sufficiently identifies parts of the AEE that need to be updated.	Noted.	
4	Trig	**AEE** • Section 4.2 Planning context - Designation 4667 (Ministry of Education – Trig Road Primary School) will need to be included • Section 9 Section 171(1)(d) Any other matters - Should the Hauraki Gulf Marine Park Act also be included? The definition of catchments means any area of land where the surface water drains into the Hauraki Gulf. Map in act includes Whenuapai/upper reaches of the Waitematā Harbour.	• Designation 4667 included in Section 5.2 Planning Context. • Refer to Sections 13.2.4 and 13.3 of the AEE.	AEE Section 5.2 AEE Section 13.2.4 and 13.3

2. Transport

Ref	NOR	Request	Response	Relevant Document / Section
1	All	**Scope of Stakeholder Engagement** • Has engagement been undertaken with Royal New Zealand Defence Force (RNZDF), with regards to proximity and resulting transport effects of NOR proposals on the Whenuapai Airbase area? • Are there any height or obstacle limitation controls in the vicinity of the airbase which impact upon the NOR proposals?	• Engagement has been undertaken with the Ministry of Defence and the designs shared with them. The key matter raised during engagement was the potential bird strike risk at Trig Road if stormwater ponds were to contain standing water. In response a dry stormwater pond has been selected for attenuation of peak stormwater flows, mitigating this risk. Overall the Ministry of Defence were broadly comfortable with the Projects. • Whenuapai airbase controls on landuse and subdivision are set out under their Designation 4311 Whenuapai Airfield Approach and Departure Path Protection and Chapter D23 of the AUP:OIP. Designation 4311 conditions state that restrictions do not apply to obstacles under 9m. The NOR designs do not include fixtures such as lighting, however, these would be built as per the AT Transport Design Manual which notes that lighting masts are up to 6m in height. These detailed matters will be confirmed at delivery and detailed design. On this basis there are no height or obstacle limitation controls that will impact on the NORs.	**Trig Road:** AEE Section 11.2.4 **Trig Road:** AEE Section 3.1.4.2.1
2	All	**Assessment of Transport Effects – Introduction (Chapter 2)** • Paragraph 2 of the Introduction refers to the Whenuapai area being expected to be development ready by 2018-2022 with approximately 400 hectares to accommodate 6,000 dwellings. • As the above timescale has already lapsed, please confirm, or update the above statement accordingly	• The Whenuapai area is expected to be staged for delivery. Whenuapai (SHA) was programmed to deliver approximately 1,150 dwellings in 2012, and Whenuapai Stage 1 between 2018 -2022. This area was planned to be released as part of Proposed Plan Change 5 as proposed by Council. This has recently been withdrawn. • The overall expectation is that while this land release has been delayed, the longer-term intention for urbanisation remains and as such does not impact on the transport assessment.	
3	All	**Assessment of Construction Traffic Effects** • All Assessments of Transport Effects refer to the requirement for Auditing, monitoring and reporting requirements relating to traffic management activities to be undertaken in accordance with Waka Kotahi's incoming Code of Practice for Temporary Traffic Management. • Please can this reference be updated to refer to the NZ Guide to Temporary Traffic Management (NZGTTM)?	• The standard referred to is still under development. See https://www.nzta.govt.nz/roads-and-rail/new-zealand-guide-to-temporary-traffic-management/.	

4	**All**	**Assessment of Construction Traffic Effects** Consideration of options to implement dynamic lanes	The necessity or requirement for dynamic lanes will be considered as part of future implementation business cases. The request links this to the assessment of Construction Traffic Effects. If dynamic lanes are considered appropriate to manage traffic during construction this will be detailed as part of the Construction Traffic Management Plan (condition 15).	**Redhills:** AEE Appendix C **Trig Road:** AEE Appendix E
5	**Redhills**	**Scope of Assessment in Assessment of Transport Effects Report, Section 2.1** Scope of key transport features does not cover proposed improvements to Don Buck Road/ Royal Road, which are included in NOR1 (Redhills North-South Arterial Corridor). Please include these.	The intersection of Don Buck Road and Royal Road is included. The scope of works on Royal and Don Buck is related to intersection tie ins – rather than dedicated upgrades to these corridors. The corridor of Don Buck Road is included within the North West Local Redhills Riverhead Package. Royal Road is currently not proposed to be designated.	
6	**Redhills**	**Scope of Assessment in Assessment of Transport Effects Report, Section 2.1** The south-eastern end of NOR1 adjoins NORs for RE1 (Don Buck Road) and for Royal Road. Clarity is required in relation to key transport characteristics and consistency in form with adjoining upgrade works.	There is no adjoining design for Royal Road at this stage. The indicative design has been developed to integrate back with the existing Royal Road corridor. The final design of these transitions will be confirmed prior to implementation and will be detailed in the Urban Landscape Design Management Plan (ULDMP) (condition 9). The facilities on Don Buck Road will tie in with the existing corridor to the south of the Royal Road intersection. To the north of the Royal Road intersection, the tie in point with RE1 is a midblock location. This point has been provided to enable either the NOR1 Royal Road intersection upgrade to occur first, or the Don Buck Road upgrade (RE1).	**Redhills:** AEE Appendix C
7	**Redhills**	**Scope of intersection performance assessment in Assessment of Transport Effects Report Table 10** Please expand intersection performance assessment in Table 10 to additionally cover the proposed signalised intersections of: • Dunlop Road (extended) / Baker Lane (extended) / East-West arterial corridor • East-West arterial corridor / North-South arterial corridor	Refer to attached memo (Appendix 1).	
8	**Redhills**	**Table 10 of Assessment of Transport Effects Report indicates forecast LoS D at intersection of Royal Road / Don Buck Road** • Please undertake further assessment of adverse effects and how these can be appropriately managed or mitigated against and confirm if queue clears in one traffic phase. • Both roads are required to facilitate strategic movements by public transport and freight. While it is understood that AT may tolerate a Level of Service at low as D, further	The intersection of Don Buck Road and Royal Road has been assessed utilising peak commuter flows. This has been balanced against direction from the Urban Street and Road Design Guide – Design Hour which specifies that consideration is also to be given to the needs of users and functions for the rest of the day. Addressing only the performance of the peak hour can lead to very wide streets with excess capacity for the residual periods in the day. In addition to this, the impact of widening an intersection to provide for capacity has been balanced against urban design outcomes and	

		assessment is required to understand whether the intersection and wider network can still facilitate efficient movements of both freight and public transport. Further assessment may include analysis of journey and delay times, further analysis of queue lengths on individual approaches and performance during interpeak periods in addition to peak periods. • Also, please confirm whether the SIDRA models made allowances for pedestrian and cycle movements.	proposed impacts. Additional capacity will also be counter to wider objectives to encourage mode shift to walking, cycling and public transport. As such, it is considered that the performance of the intersection provides an appropriate balance of vehicle efficiency and a safe and attractive environment for cyclists and pedestrians. In addition to the above, the intersection of Royal Road and Don Buck Road has been designed to provide sufficient space for public transport priority measures. As noted in the Transport Assessment (refer Volume 4), whilst queuing for private vehicles is predicted at this intersection in the future, it is also experienced at the current roundabout. With projected growth levels, no improvement to the intersection would further exacerbate this current poor performance, and buses would also experience poor reliability and longer travel times. There will be periods in the peak commuter hour, where vehicles may not clear the intersection in one phase. As mentioned in the Transport Assessment, this is not unexpected in the peak hour and not considered to be a significant delay. Performance in the interpeak is expected to be better than in the peak hour. The SIDRA models have made allowances for pedestrian and cycle movements.	**Redhills:** Volume 4
9	**Redhills**	**Project Interdependencies** • The Assessment of Transport Effects does not identify any projects with interdependencies upon the subject NORs. Please identify and assess projects with interdependencies, such as NORs for upgrade works on adjoining sections of road. • Interdependent projects could result in key transport effects upon the subject NORs and vice versa, which need to be understood. It may be appropriate to align timing and phasing of upgrade works on associated with adjoining NORs.	Two main interrelationships exist for the Redhills network in terms of network delivery. These exist at the main intersection points where the new offline network integrates with the existing online network at Fred Taylor Drive and Don Buck Road. The implementation of these intersections will be necessary to connect with the existing road network. These have been designed to include a designation footprint sufficient to integrate with the roading network, should the staging mean the new corridors occur before or after the existing road upgrades. There is also in particular a condition of the ULDMP (condition 9) to provide appropriate walking and cycling connectivity to, and interface with, existing or proposed adjacent land uses, public transport infrastructure and walking and cycling connections. At a wider network level, upgrades to Royal Road were identified as part of the North West DBC to provide future connectivity to the North West Rapid Transit Corridor. This interdependency was considered to be integral to the form and function of Royal Road, and as such further	**Redhills:** AEE Appendix C

			design to inform a potential NOR has been delayed until further design detail for the NWRTC is available. The proposed designation for the intersection of Royal Road and Don Buck Road as such integrates back into the existing Royal Road corridor. No other specific interdependencies have been identified, and the other operational assessments in the Transport Assessment assume that the long-term full network is in place. It is noted that the rate and sequencing of land use growth, wider growth pressures and timing of individual projects will change and evolve. This means that at the time of implementation the project will need to demonstrate how it will integrate with the prevailing urban form and surrounding road network.	**Redhills:** Volume 4
10	**Redhills**	**Road Design Speeds** Please can you confirm the design and posted speed limits of relevant roads.	The design speed used to inform the indicative design was 60kph, with a posted speed of 50kph on all corridors. This is provided in Section 2.1 of the Transport Assessment.	**Redhills:** Volume 4
11	**Redhills**	**Assessment against AT Roads & Streets Framework (RASF)** • The Assessment of Transport Effects does not include an assessment of the southern section of Trig Road against AT's RASF, with regards to 'Place' and 'Movement' functions and modal priorities. Please provide assessment. • An assessment against the RASF would be consistent with the scope of assessment undertaken for the other NORs and would be expected to confirm whether place, movement and transport functions are consistent with those for adjoining NOR upgrade proposals.	A RASF assessment that considers place and movement has been completed for the corridors and included in Section 6.6 of the Transport Assessment. A modal priority assessment, a separate component of the RASF, has not been completed for these corridors. It is noted that a full RASF assessment is based on information available at the time of the assessment, and that the assessments are intended to also respond to land use context. As such, the modal priority assessments will be completed prior to implementation, and iteratively updated as land use becomes more certain. The RASF assessment is a live process. Within the context of the designation, the indicative cross section enables space for the implementation of a corridor that can respond to a range of modal priorities.	
12	**Trig**	**Forecast LoS D at intersections of Trig Road / Hobsonville Road / Luckens Road in Table 10 of Assessment of Transport Effects** • Please undertake further assessment of adverse effects and how these can be appropriately managed or mitigated against. • Both Trig Road and Hobsonville Road are required to facilitate elements of usage by public transport and freight. While it is understood that AT may tolerate a Level of Service as low as D or E, further assessment is requested to understand whether the intersection and wider network	The intersection of Trig Road and Hobsonville Road has been assessed utilising peak commuter flows. This has been balanced against direction from the Urban Street and Road Design Guide – Design Hour which specifies that consideration is also to be given to the needs of users and functions for the rest of the day. Addressing only the performance of the peak hour can lead to very wide streets with excess capacity for the residual periods in the day. In addition to this, the impact of widening an intersection to provide for capacity has been balanced against urban design outcomes and proposed impacts. As such, it is considered that the performance of the intersection provides an appropriate balance of vehicle efficiency and a safe and	

		can still facilitate efficient movements of both freight and public transport. • Further assessment may include analysis of journey and delay times, further analysis of queue lengths on individual approaches and performance during interpeak periods in addition to peak periods.	attractive environment for cyclists and pedestrians. Additional capacity will also be counter to wider objectives to encourage mode shift to walking, cycling and public transport. In addition to the above, the intersection of Trig Road and Hobsonville Road has been designed to provide sufficient space for public transport priority measures, as such delays in the peak period will be experienced by private vehicles rather than public transport. Performance in the interpeak is expected to be better than in the peak hour. The SIDRA models have made allowances for pedestrian and cycle movements	
13	**Trig**	**Assessment against AT Roads & Streets Framework (RASF)** The Assessment of Transport Effects does not include an assessment of the southern section of Trig Road against AT's RASF, with regards to 'Place' and 'Movement' functions and modal priorities. Please provide assessment.	A RASF assessment that considers place and movement has been completed for the corridors and included in Section 6.6 of the Transport Assessment. A modal priority assessment, a separate component of the RASF, has not been completed for these corridors. It is noted that a full RASF assessment is based on information available at the time of the assessment, and that the assessments are intended to also respond to land use context. As such, the modal priority assessments will be completed prior to implementation, and iteratively updated as land use becomes more certain. The RASF assessment is a live process. Within the context of the designation, the indicative cross section enables space for the implementation of a corridor that can respond to a range of modal priorities.	**Trig Road:** Volume 4
14	**Trig**	**Future Safety Performance** What are the existing personal and collective safety risk ratings along the Trig Road Corridor and how are these expected to change as a result of the proposed upgrade works?	It is considered that an assessment of the existing personal and collective safety risk ratings provides limited value in the context of providing an assessment of safety effects. This is largely due to the significant land use change and the use of indicative designs. The current design will be subject to the ULDMP condition (condition 9), which requires that prior to construction, the detailed design of the project will consider the road design matters such as walking and cycling facilities, median widths and treatments and other matters which will influence the personal and collective safety risk. The requirement for the ULDMP to be in accordance with appropriate design standards will also ensure that the safety benefits are realised. Notwithstanding this, Auckland Transport have mapped existing collective risk for the whole network, and these can be found on Future Connect. https://mahere.at.govt.nz/FutureConnect/	**Trig Road:** AEE Appendix

3. Arboriculture

Ref	NOR	Request	Response	Relevant Document / Section
1	All	Under the S92 please provide an arborist report identifying all protected trees to be affected and methodologies and control measures in place with recommended suite of conditions. I am sure that community facilities need this under the TOA as well.	An arborist report is not being provided as part of the NORs. No notable trees (as identified in the AUP:OIP) will be affected by the NORs. In respect to Trig Road, there is a group of three notable trees (ID 1974) located within the front boundary of the property at 8 Luckens Road, West Harbour. This site is not subject to the NOR and will not be affected by tie-in works to be undertaken within the existing road corridor. Works in the road corridor immediately in front of the property will comprise line marking only. Trees in the FUZ or road reserve adjacent to the FUZ are not protected under the AUP:OIP. The Projects will not affect trees within open space zones. Trees in roads over height/girth requirements that are affected are likely to change in the time between NOR and implementation (due to growth, removal or addition). Therefore, an arboriculture assessment of the environment at this time is of limited value. Instead, a Tree Management Plan condition is proposed for each NOR. This sets out how any notable and protected trees will be managed, measures to mitigate effects including tree protection measures and tree replacement planting. Refer to condition 22 (Redhills) and condition 20 (Trig). The Tree Asset Owner Approval (TAOA) is not being sought, nor is it required at this time. Any required TAOA will be sought closer to implementation, the rationale being similar to that above, in that it is likely to be of limited value until closer to implementation.	**Trig Road:** AEE Section 5.2 and 7.4.1 **Redhills:** AEE Appendix C **Trig Road:** AEE Appendix E
2	All	More specifically I need all notable trees identified and verification that there are no others affected.	Refer to point 1 above. The Tree Management Plan conditions will ensure that adverse effects on any notable or protected trees that exist at the time of implementation are avoided, remedied or mitigated.	**Redhills:** AEE Appendix C **Trig Road:** AEE Appendix E

3	**Trig**	Under brief review I believe the only site may be: site #1980 Pohutukawa (2) Kauri at 104a Hobsonville Road	These trees are located over 1 kilometre east of the Project area and are therefore not affected by the NOR.	
4	All	Under the arborist report justify why the only alternative is the removal of one notable tree and what are the effects on the adjacent notable tree and how they will be managed/controlled.	No notable trees are to be removed as a result of the Projects.	

4. Archaeology and Historic Heritage

Ref	NOR	Request	Response	Relevant Document / Section
1	All	Regards the two HIF assessments (for Redhills and Trig Road(s) – these are for smaller areas but they provide detailed research and a better indication of the risk as this company has done the bulk of the work in this environment. These will be acceptable.	Noted.	
2	**Trig**	The built heritage team cannot complete this stage of the soft lodgement. Attached is a study list of 'Built Heritage in Whenuapai'. Can you please check to see if any of the sites are affected by the NoRs.	One site on the 'Built Heritage in Whenuapai' Study List is subject to the proposed designation for the Trig Road Project; item number 5, "Quail Hollow", located at 40 Trig Road, Whenuapai. The Study List identifies this site as Cultural Heritage Inventory (CHI) site 3705. Recent correspondence with the Council's Built Heritage Team has confirmed that the record has been removed from the CHI due to insufficient heritage information to warrant its retention. The Built Heritage Team advised that as part of their ongoing work to improve the quality of the data in the CHI, records which contained very little, and often uninformative information are being investigated and systematically removed from the CHI. This record was part of a rough identification of places for a study list by Waitakere City Council in the late 1990's. The site is not subject to any heritage protection under Chapters D17 or D18 of the AUP:OIP. As stated in Section 7.1 of the Historic Heritage Assessment (refer Volume 4), there are no archaeological sites recorded within or in close proximity to the Project area. The first ~9m of the site at 40 Trig Road is subject to the proposed designation. This area comprises the front yard, including the driveway and manoeuvring area. The existing dwelling and garage at the property are located outside of the proposed designation. The space within the front yard is required to enable the construction of a retaining wall located along the current property boundary. Any landscaping, paving	**Trig Road:** Volume 4

			and fencing impacted by construction works will be reinstated as required by the ULDMP condition (condition 9). The formed road corridor will not encroach into the site. Overall, given the proposed works will not affect the existing buildings located at 40 Trig Road, and as any built heritage values associated with these buildings have not been confirmed, it is considered that any adverse effects on built heritage values will be less than minor. Further, in the unlikely event that an unknown archaeological site is exposed during construction, the AUP:OIP Accidental Discovery Rule (E12.6.1), will be adhered to, mitigating any potential adverse effects on historic heritage values.	**Trig Road:** AEE Appendix E

5. Stormwater and Flooding

Ref	NOR	Request	Response	Relevant Document / Section
1	**Trig**	The Trig Road document provides significantly more information on specific stormwater management to be provided for the upgrade to the road. I am happy that what has been provided by SGA in the document is a realistic representation of the land take required to provide the necessary stormwater management. Information is provided within the document of device sizing, and this will be refined through the design process.	Noted. For clarity, a greater level of stormwater detail has been provided in respect to the Trig Road Project as the resource consents required to implement the Project are being sought now, in addition to the NOR.	

6. Urban Design

Ref	NOR	Request	Response	Relevant Document / Section
1	**Trig**	I note there is no Urban Design Assessment for Trig Road but the AEE does contain a section within the AEE. Will an Urban Design Assessment be provided for this?	No standalone Urban Design Assessment will be provided however the relevant matters are addressed in the AEE. Proposed designation condition 9 requires the preparation of an Urban Landscape and Design Management Plan (ULDMP) that will ensure that the detailed design of the corridor responds to and integrates with the surrounding landscape and urban context.	**Trig Road:** AEE Appendix E

2	**Trig**	Is there going to be a connection provided to the existing pedestrian pathway located at 91 Hobsonville Road, shown in a red circle below. This land is within the Conservation Zone and provides a pedestrian connection to Mona Value cul-de-sac.	The intention is to provide a connection to the existing pathways and there is space within the proposed designation for that connection to be made. This will be secured through the ULDMP (designation condition 9).	**Trig Road:** AEE Appendix E

Appendices

Appendix 1: North West – Redhills Arterial Transport Network Intersection Performance

TE TUPU NGĀTAHI
SUPPORTING GROWTH

Memorandum

To:	**Auckland Council**
From:	Michelle Seymour, Transport Planner, Te Tupu Ngātahi
Date:	16 December 2022
Subject:	North West Redhill Arterial Transport Network: Request for further information

The following memo has been prepared to provide additional information as requested as part of the soft lodged documentation for the North West Redhill Arterial Transport Network.

Request: Scope of intersection performance assessment in Assessment of Transport Effects Report Table 10

Please expand intersection performance assessment in Table 10 to additionally cover the proposed signalised intersections of:

- Dunlop Road (extended) / Baker Lane (extended) / East-West arterial corridor
- East-West arterial corridor / North-South arterial corridor

The performance of these intersections is summarised in the below table.

Intersection	Peak Period	Overall Level of Service	Degree of Saturation (worst Movement)	Maximum Queue Distance
Dunlop Road (extended)/Baker Lane (extended) /East West Corridor	Morning Peak Period	B	0.427	89.3 (East West Arterial approach)
	Evening Peak Period	B	0.463	70.5 (East West Arterial approach)
East West Corridor/North South Corridor	Morning Peak Period	C	0.500	85.7 (East West Arterial - East Approach)
	Evening Peak Period	C	0.657	144.1m (East West Arterial - East Approach)

In terms of performance, the intersections are shown to perform to a satisfactory level, with sufficient overall capacity in the peak periods in 2048. It is noted that these traffic volumes have been based on the land use assumptions with the wider models, and as further certainty is available regarding land use, refinements to the intersection layouts are likely. This is also provided for in Condition 9, where the Urban Design and Landscape Management Plan will review road design elements including intersection form and pedestrian and cycling infrastructure.

It is also confirmed that walking and cycling movements have been allowed for on all movements at these T-intersections.

Name:	**Michelle Seymour**
Title:	Transport Planner

ATTACHMENT 12

TRIG ROAD CORRIDOR UPGRADE
INDICATIVE DESIGN
AND DESIGNATION DRAWINGS

TRIG ROAD LOCATION PLAN
NTS

DRAWING LIST - NORTHWEST - TRIG ROAD SOUTH		
DRAWING No.	DRAWING TITLE	REVISION
SGA-DRG-NWE-002-GE-1001	LOCATION PLAN, GENERAL NOTES AND DRAWING LIST	E
SGA-DRG-NWE-002-GE-1100	GENERAL ARRANGEMENT PLAN	E
SGA-DRG-NWE-002-CI-1101	GENERAL ARRANGEMENT LAYOUT PLAN - SHEET 1 OF 5	B
SGA-DRG-NWE-002-CI-1102	GENERAL ARRANGEMENT LAYOUT PLAN - SHEET 2 OF 5	B
SGA-DRG-NWE-002-CI-1103	GENERAL ARRANGEMENT LAYOUT PLAN - SHEET 3 OF 5	B
SGA-DRG-NWE-002-CI-1104	GENERAL ARRANGEMENT LAYOUT PLAN - SHEET 4 OF 5	B
SGA-DRG-NWE-002-CI-1105	GENERAL ARRANGEMENT LAYOUT PLAN - SHEET 5 OF 5	B
SGA-DRG-NWE-002-DR-1401	STORMWATER LAYOUT PLAN - SHEET 1 OF 5	B
SGA-DRG-NWE-002-DR-1402	STORMWATER LAYOUT PLAN - SHEET 2 OF 5	B
SGA-DRG-NWE-002-DR-1403	STORMWATER LAYOUT PLAN - SHEET 3 OF 5	B
SGA-DRG-NWE-002-DR-1404	STORMWATER LAYOUT PLAN - SHEET 4 OF 5	B
SGA-DRG-NWE-002-DR-1405	STORMWATER LAYOUT PLAN - SHEET 5 OF 5	B
SGA-DRG-NWE-002-DR-1410	DRY POND AND RAINGARDEN TYPICAL CROSS SECTIONS	B
SGA-DRG-NWE-002-EN-1500	EROSION & SEDIMENT CONTROL LEGEND AND GENERAL NOTES	B
SGA-DRG-NWE-002-EN-1501	EROSION & SEDIMENT CONTROL PLAN - SHEET 1 OF 5	B
SGA-DRG-NWE-002-EN-1502	EROSION & SEDIMENT CONTROL PLAN - SHEET 2 OF 5	B
SGA-DRG-NWE-002-EN-1503	EROSION & SEDIMENT CONTROL PLAN - SHEET 3 OF 5	B
SGA-DRG-NWE-002-EN-1504	EROSION & SEDIMENT CONTROL PLAN - SHEET 4 OF 5	B
SGA-DRG-NWE-002-EN-1505	EROSION & SEDIMENT CONTROL PLAN - SHEET 5 OF 5	B
SGA-DRG-NWE-002-EN-1510	EROSION & SEDIMENT CONTROL SEDIMENT RETENTION DEVICES	B

GENERAL NOTES

GENERAL

1.1. THE GENERAL ARRANGEMENT LAYOUT PLANS (GA's) PROVIDE A PRELIMINARY / CONCEPT LEVEL OF DESIGN REQUIRED TO IDENTIFY THE DESIGNATION FOOTPRINT FOR CONSTRUCTION AND OPERATION OF THE PERMANENT WORKS.

1.2. THE GENERAL ARRANGEMENT PLAN INDICATE HOW IT IS INTENDED THAT THE CORRIDOR TIES INTO THE WIDER EXISTING TRANSPORT NETWORK.

STORMWATER

2.1. THE STORMWATER DESIGN IS INDICATIVE.

2.2. THE DESIGN IS BASED ON THE UPGRADED ROAD HAVING KERB AND CHANNEL WITH CATCHPITS PROVIDED ON BOTH SIDES OF THE ROAD.

2.3. THE PIPE SIZES ARE SUBJECT TO FURTHER DESIGN DEVELOPMENT AND MANHOLES WILL BE PROVIDED ON EACH PIPELINE.

2.4. RAINGARDEN SERVICING HOBSONVILLE ROAD HAS BEEN DESIGNED FOR STORMWATER TREATMENT, RETENTION / DETENTION AND ATTENUATION. CONFIRMATION OF THE LEVEL OF SERVICES IS REQUIRED.

2.5. RAINGARDENS SERVICING TRIG ROAD HAVE BEEN DESIGNED AS A TREATMENT WITHOUT RETENTION / DETENTION AND ATTENUATION.

2.6. DRY POND AND RAINGARDEN ON HOBSONVILLE ROAD HAS BEEN DESIGNED TO:

- PROVIDE RETENTION/ DETENTION AND ATTENUATE FLOW FOR THE 10% AEP AND 1% AEP. CONFIRMATION OF THE LEVEL OF SERVICES IS REQUIRED.
- PROVIDE TREATMENT IN ACCORDANCE WITH AUCKLAND COUNCIL GUIDELINE GD01.

2.7. CATCHMENT 2 DISCHARGES TO WAIAROHIA STREAM DURING LOW FLOW EVENTS TO MAINTAIN BASEFLOW AND HIGHER FLOWS DRAIN TO DRY POND FOR ATTENUATION.

WETLANDS

2.8. RAIN GARDENS AND DRY POND

- POTENTIAL SEEPAGE FROM RAIN GARDEN AND DRY POND TO BE CONTAINED AND DISCHARGED AWAY FROM FILL AREAS IF REQUIRED TO MANAGE GEOTECHNICAL EFFECTS .

ORIGINAL IN COLOUR

"AERIAL IMAGERY SUPPLIED BY NEARMAP AUSTRALIA PTY LTD"

NOT FOR CONSTRUCTION

ORIGINAL SIZE A1

REV	REVISIONS	DRAWN	DATE
E	ISSUED FOR NOTICE OF REQUIREMENT LODGEMENT	VDLT	DEC. 2022
D	FOR NOTICE OF REQUIREMENT AND RESOURCE CONSENT	VDLT	28.08.20
C	FOR DRAFT DETAILED BUSINESS CASE	VDLT	25.07.19
B	FOR AT INTERNAL REVIEW	VDLT	17.04.19
A	FOR SAFETY AUDIT	VDLT	05.04.19

SURVEYED	N/A	
DRAWN	V. DELA TORRE	01.05.20
DRAWING CHECK	J. DELA TORRE	01.05.20
DESIGN	P. HADWIN	01.05.20
DESIGN REVIEW	R.BROWN	01.05.20
APPROVED	B. BUSNARDO	07.12.2022

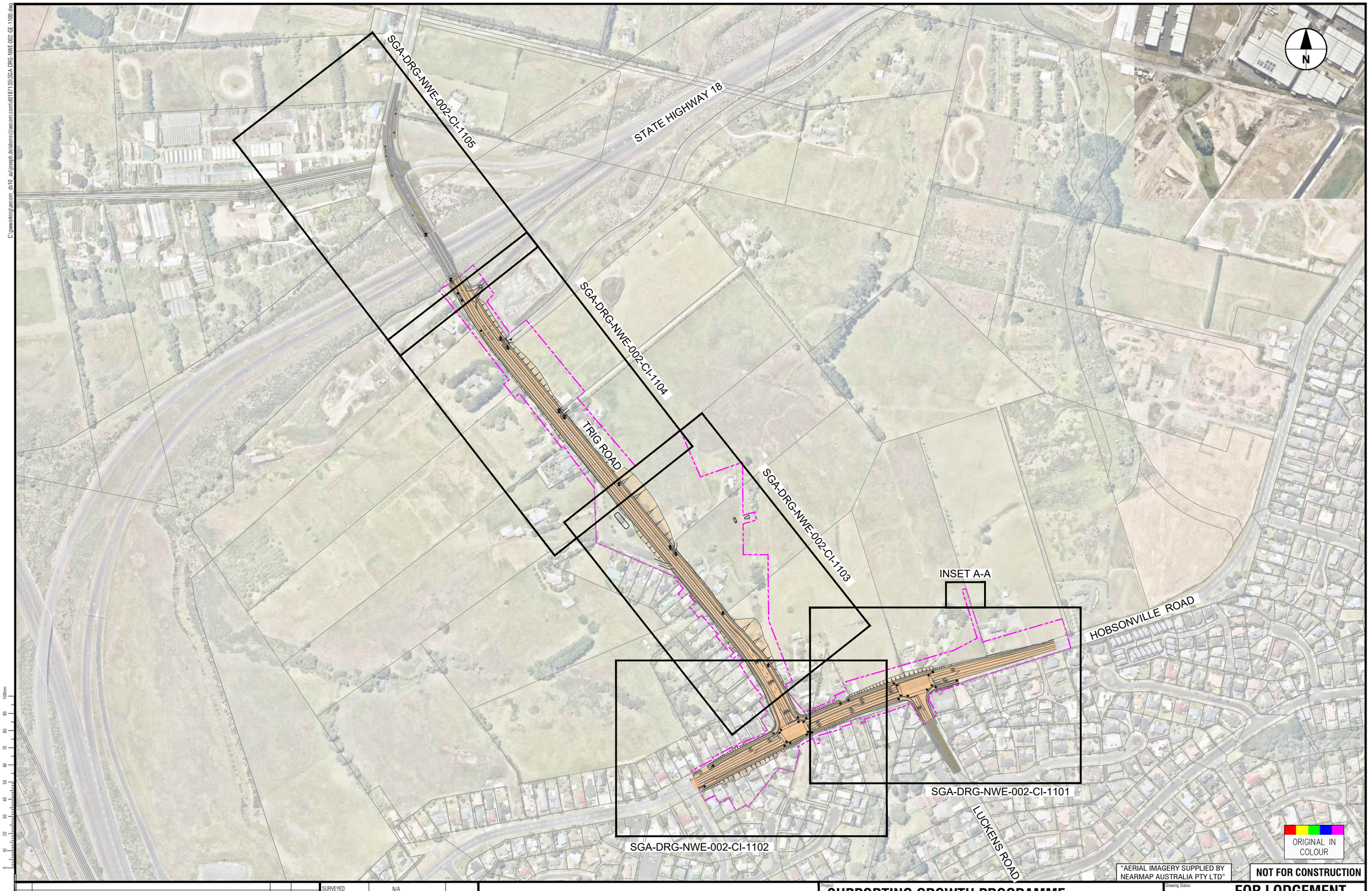
TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project:
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
TRIG ROAD AND HOBSONVILLE ROAD
LOCATION PLAN, GENERAL NOTES AND DRAWING LIST

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
A1 Scales: NTS | A3 Scales: NTS
Discipline: CIVIL
Drawing No.: SGA-DRG-NWE-002-GE-1001
Revision: **E**



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D	FOR NOTICE OF REQUIREMENT AND RESOURCE CONSENT	VDLT	AUG. 2020
C	FOR DRAFT DETAILED BUSINESS CASE	VDLT	25.07.19
B	FOR AT INTERNAL REVIEW	VDLT	17.04.19
A	FOR SAFETY AUDIT	VDLT	05.04.19

SURVEYED	N/A	
DRAWN	V. DELA TORRE	01.05.20
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TE TUPU NGĀTAHI Supporting Growth

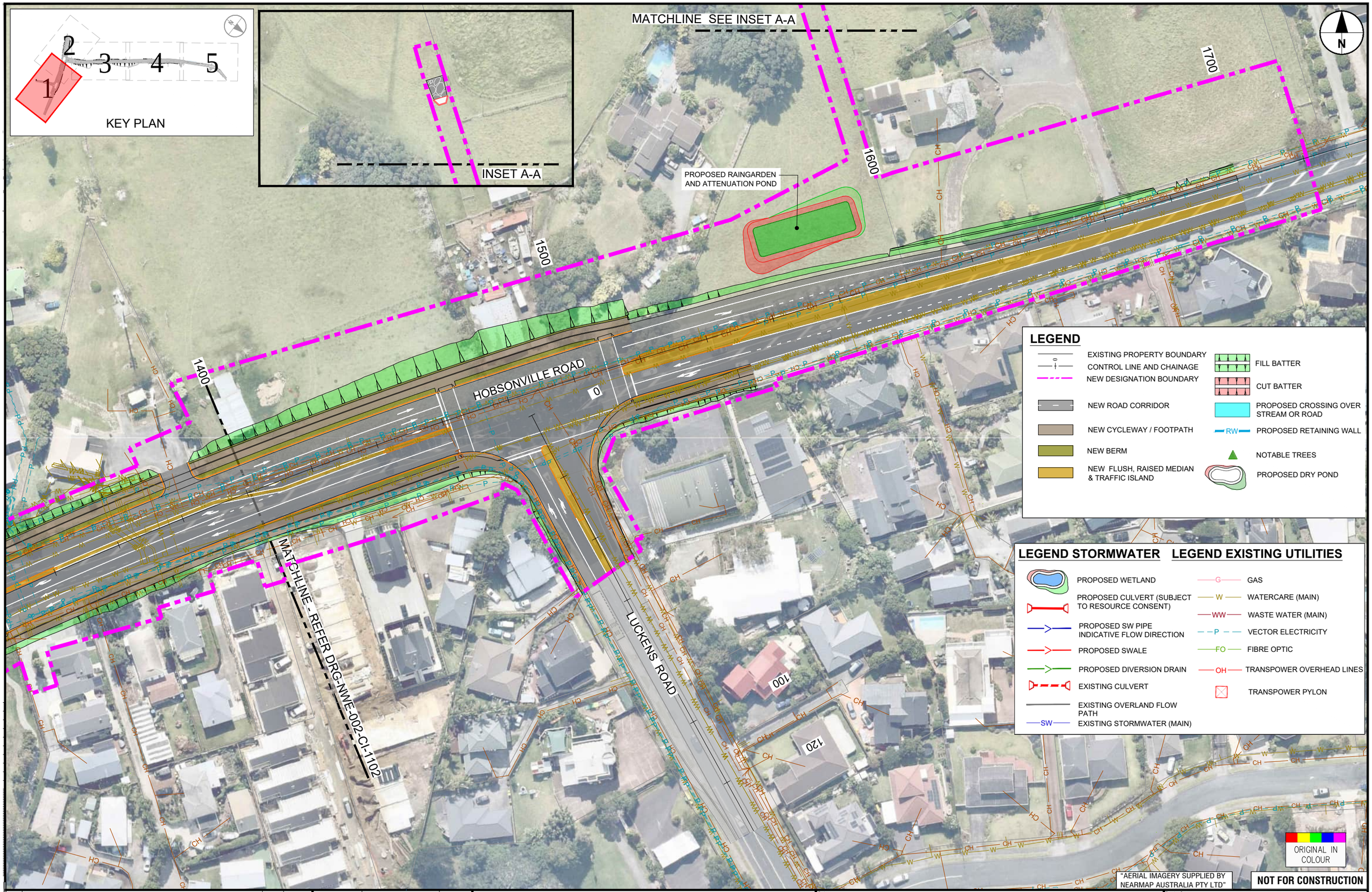
WAKA KOTAHI NZ TRANSPORT AGENCY

Project: **SUPPORTING GROWTH PROGRAMME**
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title: GENERAL ARRANGEMENT PLAN

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
A1 Scales 1:2500 | A3 Scales 1:5000
Discipline: CIVIL
Drawing No.: SGA-DRG-NWE-002-GE-1100
Revision: E

ORIGINAL SIZE A1



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A	FOR NOTICE OF REQUIREMENT AND RESOURCE CONSENT	VDLT	AUG. 2022

SURVEYED	N/A	
DRAWN	V. DELA TORRE	01.05.20
DRAWING CHECK	J. DELA TORRE	01.05.20
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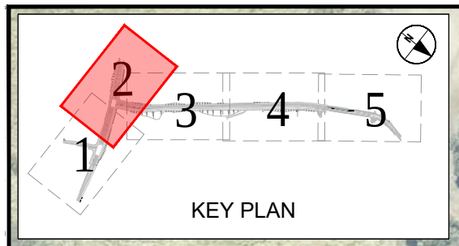
TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
GENERAL ARRANGEMENT LAYOUT PLAN
SHEET 1 OF 5

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
A1 Scales 1:500 | A3 Scales 1:1000
Discipline: CIVIL
Drawing No: SGA-DRG-NWE-002-CI-1101
Revision: B



KEY PLAN

LEGEND STORMWATER

- PROPOSED WETLAND
- PROPOSED CULVERT (SUBJECT TO RESOURCE CONSENT)
- PROPOSED SW PIPE INDICATIVE FLOW DIRECTION
- PROPOSED SWALE
- PROPOSED DIVERSION DRAIN
- EXISTING CULVERT
- EXISTING OVERLAND FLOW PATH
- SW — EXISTING STORMWATER (MAIN)

LEGEND EXISTING UTILITIES

- G — GAS
- W — WATERCARE (MAIN)
- WW — WASTE WATER (MAIN)
- P — VECTOR ELECTRICITY
- FO — FIBRE OPTIC
- OH — TRANSPOWER OVERHEAD LINES
- TRANSPOWER PYLON

TRIG ROAD

HOBSONVILLE ROAD

MATCHLINE - REFER DRG-NWE-002-CI-1103

MATCHLINE - REFER DRG-NWE-002-CI-1101

1400

1300

1200

1100

1050

BUS STOP MARKING

N

SGA-DRG-NWE-002-CI-1102.DWG Plotted:5 Dec 2022 1:01 PM

LEGEND

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE AND CHAINAGE
- NEW DESIGNATION BOUNDARY
- NEW ROAD CORRIDOR
- NEW CYCLEWAY / FOOTPATH
- NEW BERM
- NEW FLUSH, RAISED MEDIAN & TRAFFIC ISLAND
- FILL BATTER
- CUT BATTER
- PROPOSED CROSSING OVER STREAM OR ROAD
- RW — PROPOSED RETAINING WALL
- NOTABLE TREES
- PROPOSED DRY POND

ORIGINAL IN COLOUR

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NOT FOR CONSTRUCTION

REV	REVISIONS	DRAWN	DATE
B	ISSUED FOR NOTICE OF REQUIREMENT LODGEMENT	VDLT	DEC. 2022
A	FOR NOTICE OF REQUIREMENT AND RESOURCE CONSENT	VDLT	AUG. 2022

SURVEYED	N/A	
DRAWN	V. DELA TORRE	01.05.20
DRAWING CHECK	J. DELA TORRE	01.05.20
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DESIGN REVIEW	R. BROWN	01.05.20
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TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project:
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
GENERAL ARRANGEMENT LAYOUT PLAN
SHEET 2 OF 5

Drawing Status: FOR LODGEMENT

Drawing Date: 07.12.2022

A1 Scales	1:500	A3 Scales	1:1000

Discipline: CIVIL

Drawing No.: SGA-DRG-NWE-002-CI-1102

Revision: B

LEGEND

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE AND CHAINAGE
- NEW DESIGNATION BOUNDARY
- NEW ROAD CORRIDOR
- NEW CYCLEWAY / FOOTPATH
- NEW BERM
- NEW FLUSH, RAISED MEDIAN & TRAFFIC ISLAND
- FILL BATTER
- CUT BATTER
- PROPOSED CROSSING OVER STREAM OR ROAD
- RW — PROPOSED RETAINING WALL
- NOTABLE TREES
- PROPOSED DRY POND

LEGEND STORMWATER

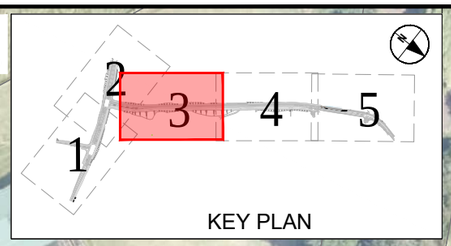
- PROPOSED WETLAND
- PROPOSED CULVERT (SUBJECT TO RESOURCE CONSENT)
- PROPOSED SW PIPE INDICATIVE FLOW DIRECTION
- PROPOSED SWALE
- PROPOSED DIVERSION DRAIN
- EXISTING CULVERT
- EXISTING OVERLAND FLOW PATH
- SW — EXISTING STORMWATER (MAIN)

LEGEND EXISTING UTILITIES

- G — GAS
- W — WATERCARE (MAIN)
- WW — WASTE WATER (MAIN)
- P — VECTOR ELECTRICITY
- FO — FIBRE OPTIC
- OH — TRANSPOWER OVERHEAD LINES
- TRANSPOWER PYLON

GENERAL NOTE:

1. DWG. DR-1410 REVISION TO BE CONFIRMED



KEY PLAN

MATCHLINE - REFER DRG-NWE-002-CI-1102

MATCHLINE - REFER DRG-NWE-002-CI-1104

NEW ACCESS TO CUL-DE-SAC

BIORETENTION RAIN GARDEN

TRIG ROAD

NEW ACCESS RD

TRIG ROAD DRY POND

ORIGINAL IN COLOUR

"AERIAL IMAGERY SUPPLIED BY NEARMAP AUSTRALIA PTY LTD"

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REV	REVISIONS	DRAWN	DATE
B	ISSUED FOR NOTICE OF REQUIREMENT LODGEMENT	VDLT	DEC. 2022
A	FOR NOTICE OF REQUIREMENT AND RESOURCE CONSENT	VDLT	AUG. 2022

SURVEYED	N/A	
DRAWN	V. DELA TORRE	01.05.20
DRAWING CHECK	J. DELA TORRE	01.05.20
DESIGN	P. HADWIN	01.05.20
DESIGN REVIEW	R. BROWN	01.05.20
APPROVED	B. BUSNARDO	07.12.2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project: **SUPPORTING GROWTH PROGRAMME**
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title: GENERAL ARRANGEMENT LAYOUT PLAN
SHEET 3 OF 5

Drawing Status: **FOR LODGEMENT**

Drawing Date: 07.12.2022

A1 Scales 1:500 | A3 Scales 1:1000

Discipline: CIVIL

Drawing No.: SGA-DRG-NWE-002-CI-1103

Revision: B

SGA-DRG-NWE-002-CI-1103 Drawing Plotted 5 Dec 2022 - 10:14 AM

LEGEND

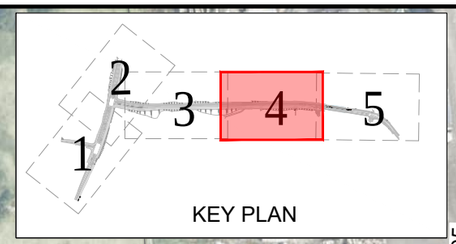
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE AND CHAINAGE
- NEW DESIGNATION BOUNDARY
- NEW ROAD CORRIDOR
- NEW CYCLEWAY / FOOTPATH
- NEW BERM
- NEW FLUSH, RAISED MEDIAN & TRAFFIC ISLAND
- FILL BATTER
- CUT BATTER
- PROPOSED CROSSING OVER STREAM OR ROAD
- RW — PROPOSED RETAINING WALL
- NOTABLE TREES
- PROPOSED DRY POND

LEGEND STORMWATER

- PROPOSED WETLAND
- PROPOSED CULVERT (SUBJECT TO RESOURCE CONSENT)
- PROPOSED SW PIPE INDICATIVE FLOW DIRECTION
- PROPOSED SWALE
- PROPOSED DIVERSION DRAIN
- EXISTING CULVERT
- EXISTING OVERLAND FLOW PATH
- SW — EXISTING STORMWATER (MAIN)

LEGEND EXISTING UTILITIES

- G — GAS
- W — WATERCARE (MAIN)
- WW — WASTE WATER (MAIN)
- P — VECTOR ELECTRICITY
- FO — FIBRE OPTIC
- OH — TRANSPOWER OVERHEAD LINES
- TRANSPOWER PYLON



KEY PLAN

MATCHLINE - REFER DRG-NWE-002-CI-1103

MATCHLINE - REFER DRG-NWE-002-CI-1105

500

600

700

800

TRIG ROAD

OFF RAMP

ORIGINAL IN COLOUR

"AERIAL IMAGERY SUPPLIED BY NEARMAP AUSTRALIA PTY LTD"

NOT FOR CONSTRUCTION

SGA-DRG-NWE-002-CI-1104 Drawing Plotted15 Dec 2022 - 1:02 PM

REV	REVISIONS	DRAWN	DATE
B	ISSUED FOR NOTICE OF REQUIREMENT LODGEMENT	VDLT	DEC. 2022
A	FOR NOTICE OF REQUIREMENT AND RESOURCE CONSENT	VDLT	AUG. 2022

SURVEYED	N/A	
DRAWN	V. DELA TORRE	01.05.20
DRAWING CHECK	J. DELA TORRE	01.05.20
DESIGN	P. HADWIN	01.05.20
DESIGN REVIEW	R. BROWN	01.05.20
APPROVED	B. BUSNARDO	07.12.2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project:
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
GENERAL ARRANGEMENT LAYOT PLAN
SHEET 4 OF 5

Drawing Status: **FOR LODGEMENT**

Drawing Date: 07.12.2022

A1 Scales: 1:500 | A3 Scales: 1:1000

Discipline: CIVIL

Drawing No.: SGA-DRG-NWE-002-CI-1104

Revision: B

LEGEND

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE AND CHAINAGE
- NEW DESIGNATION BOUNDARY
- NEW ROAD CORRIDOR
- NEW CYCLEWAY / FOOTPATH
- NEW BERM
- NEW FLUSH, RAISED MEDIAN & TRAFFIC ISLAND
- FILL BATTER
- CUT BATTER
- PROPOSED CROSSING OVER STREAM OR ROAD
- RW — PROPOSED RETAINING WALL
- NOTABLE TREES
- PROPOSED DRY POND

LEGEND STORMWATER

- PROPOSED WETLAND
- PROPOSED CULVERT (SUBJECT TO RESOURCE CONSENT)
- PROPOSED SW PIPE INDICATIVE FLOW DIRECTION
- PROPOSED SWALE
- PROPOSED DIVERSION DRAIN
- EXISTING CULVERT
- EXISTING OVERLAND FLOW PATH
- SW — EXISTING STORMWATER (MAIN)

LEGEND EXISTING UTILITIES

- G — GAS
- W — WATERCARE (MAIN)
- WW — WASTE WATER (MAIN)
- P — VECTOR ELECTRICITY
- FO — FIBRE OPTIC
- OH — TRANSPOWER OVERHEAD LINES
- TRANSPOWER PYLON

KEY PLAN

1 2 3 4 5

MATCHLINE - REFER DRG-NWE-002-CI-1104

MATCHLINE - REFER DRG-NWE-002-CI-1106

TRIG ROAD

OFF RAMP

STATE HIGHWAY 18

ON RAMP

"AERIAL IMAGERY SUPPLIED BY NEARMAP AUSTRALIA PTY LTD"

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TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project:
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
GENERAL ARRANGEMENT LAYOUT PLAN
SHEET 5 OF 5

Drawing Status: **FOR LODGEMENT**

Drawing Date: 07.12.2022

A1 Scales 1:500 | A3 Scales 1:1000

Discipline: CIVIL

Drawing No.: SGA-DRG-NWE-002-CI-1105

Revision: B

KEY PLAN

1 2 3 4 5

PROPOSED NEW DOWNSTREAM CONCRETE WINGWALL OUTFALL AND RIPRAP EROSION PROTECTION

INSET A-A

MATCHLINE SEE INSET A-A

NEW Ø300mm RRJ CONCRETE SW PIPE

STORMWATER PIPES UPSTREAM OF EXISTING MANHOLE TO BE MADE REDUNDANT

TIE INTO EXISTING STORMWATER MANHOLE

PROPOSED RAINGARDEN AND ATTENUATION POND 248m² BASE x 0.6m DEEP WITH 1:4 INTERNAL SIDE SLOPES. INCLUDES SCRUFFY DOME OVERFLOW MANHOLE, DISCHARGING INTO OVERLAND FLOW PATH

NEW Ø300mm RRJ CONCRETE SW PIPE

MATCHLINE - REFER DRG-NWE-002-DR-1402

NEW Ø300mm RRJ CONCRETE SW PIPE

HOBSONVILLE ROAD

NEW 460mm x 675mm INLET (BOTH SIDES) AND MANHOLE TIE INTO EXISTING STORMWATER NETWORK

ROAD HIGHPOINT

NEW DOUBLE 460mm x 675mm INLET AND MANHOLE DISCHARGING TO RAINGARDEN / DETENTION NORTH OF HOBSONVILLE RD.

NEW DOUBLE 460mm x 675mm INLET AND MANHOLE DISCHARGING TO RAINGARDEN/DETENTION NORTH OF HOBSONVILLE RD

LUCKENS ROAD

N

LEGEND

- PROPOSED DESIGNATION BOUNDARY
- EXISTING 1% AEP FLOOD PLAIN
- PROPOSED DRY POND
- PROPOSED NEW CULVERT
- INDICATIVE PROPOSED SW PIPE & FLOW DIRECTION
- INDICATIVE FLOW DIRECTION
- RIP RAP
- RAINGARDEN LOCATED WITHIN BERM
- BIORETENTION RAINGARDEN (WITH ATTENUATION)
- INDICATIVE HEADWALL
- INDICATIVE MANHOLE
- EXISTING MANHOLE
- INDICATIVE SCRUFFY DOME INLET MANHOLE
- INDICATIVE CATCHPIT
- INDICATIVE DROP KERB INTO RAINGARDEN
- EXISTING OVERLAND FLOW PATH
- EXISTING STORMWATER PIPES
- EXISTING PROPERTY BOUNDARY
- EXISTING CONTOUR

ORIGINAL IN COLOUR

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DESIGN	N. WOLFAARDT	20.08.20
DESIGN REVIEW	R. SEYB	20.08.20
APPROVED	B. BUSNARDO	07.12.2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project: **SUPPORTING GROWTH PROGRAMME**
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title: STORMWATER LAYOUT PLAN SHEET 1 OF 5

Drawing Status: **FOR LODGEMENT**

Drawing Date: 07.12.2022

A1 Scales 1:500 | A3 Scales 1:1000

Discipline: STORMWATER

Drawing No.: SGA-DRG-NWE-002-DR-1401

Revision: B

REV	REVISIONS	DRAWN	DATE
B	ISSUED FOR NOTICE OF REQUIREMENT LODGEMENT	VDLT	DEC. 2022
A	FOR NOTICE OF REQUIREMENT AND RESOURCE CONSENT	VDLT	AUG. 2020

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DESIGN REVIEW	R. SEYB	20.08.20
APPROVED	B. BUSNARDO	07.12.2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project:
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
STORMWATER LAYOUT PLAN
SHEET 2 OF 5

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
A1 Scales 1:500 | A3 Scales 1:1000
Discipline: STORMWATER
Drawing No.: SGA-DRG-NWE-002-DR-1402
Revision: B

LEGEND

- PROPOSED DESIGNATION BOUNDARY
- EXISTING 1% AEP FLOOD PLAIN
- PROPOSED DRY POND
- PROPOSED NEW CULVERT
- INDICATIVE PROPOSED SW PIPE & FLOW DIRECTION
- INDICATIVE FLOW DIRECTION
- RIP RAP
- RAINGARDEN LOCATED WITHIN BERM
- BIORETENTION RAINGARDEN (WITH ATTENUATION)
- INDICATIVE HEADWALL
- INDICATIVE MANHOLE
- EXISTING MANHOLE
- INDICATIVE SCRUFFY DOME INLET MANHOLE
- INDICATIVE CATCHPIT
- INDICATIVE DROP KERB INTO RAINGARDEN
- EXISTING OVERLAND FLOW PATH
- EXISTING STORMWATER PIPES
- EXISTING PROPERTY BOUNDARY
- EXISTING CONTOUR

KEY PLAN

EXISTING MANHOLE AND PROPERTY CONNECTIONS TO REMAIN. COVER TO MATCH NEW ROAD LEVEL

NEW 460mm x 675mm INLET AND MANHOLE

NEW 460mm x 675mm INLET AND MANHOLE

EXISTING PROPERTY CONNECTION TO BE CONNECTED TO NEW STORMWATER SYSTEM

NEW 460mm x 675mm INLET AND MANHOLE

NEW Ø375mm CONCRETE SW PIPE

LARGER RAINGARDEN WILL CATER FOR STORMWATER TREATMENT FOR CATCHMENT OF WEST SIDE TRIG ROAD CARRAIGEWAY FROM LOWPOINT UP TO HOBSONVILLE ROAD INTERSECTION, AS WELL AS PORTION OF HOBSONVILLE ROAD (WEST) CATCHMENT

PROPOSED NEW UPSTREAM CONCRETE WINGWALL OUTFALL AND RIPRAP EROSION PROTECTION. EXISTING LOW POINT TO BE SLIGHTLY SHIFTED WITH LOCALIZED EARTHWORKS SHAPING TO ACCOMMODATE FOR NEW PIPE ALIGNMENT

NEW 20m x 7.5m (MIN. 142m²) RAINGARDEN MAX 1:3 SIDE SLOPES. INCLUDES PIPED INLET AND SCRUFFY DOME OVERFLOW MANHOLE CONNECTION TO UNDERGROUND STORMWATER NETWORK, DISCHARGING INTO DRY POND FOR ATTENUATION.

Ø450mm PIPED INLET INTO RAINGARDEN

NEW Ø450mm CONCRETE SW PIPE

MATCHLINE - REFER DRG-NWE-002-DR-1404

TRIG ROAD

NEW DN Ø450mm

NEW DN Ø750mm

NEW DN Ø450mm

SAG POINT CH 420 RL 53.455

NEW 460mm x 675mm INLET

EXISTING Ø315mm CONCRETE PIPE TO BE DEMOLISHED

NEW 460mm x 675mm INLET WITH Ø250mm PIPED OUTLET INTO STEPPED RAINGARDEN

NEW Ø375mm CONCRETE SW PIPE

NEW 6m x 2m AND 12m x 1m STEPPED RAINGARDEN LOCATED WITHIN NEW BERM WITH DROPPED KERB ENTRY AND DROPPED KERB OVERFLOW TO CATCHPIT WITH CONNECTION TO UNDERGROUND STORMWATER NETWORK.
0.5m BUFFER BETWEEN EDGE OF RAINGARDEN AND CYCLE WAY TO FACILITATE TRANSITION OF HEIGHT DIFFERENCE DUE TO STEPPED CONFIGURATION

OPEN CHANNEL IL ~52.5m RL AT TOE OF ROAD EMBANKMENT

OPEN CHANNEL (SECONDARY FLOW PATH DISCHARGING INTO DRY POND)
BASE WIDTH 600mm, SIDE SLOPE 3H:1V,
DEPTH = 400mm
TOP WIDTH = 3.0m
GRADIENT AT 1%
RUNNING ON TOP OF FILL EMBANKMENT

UNDERFILL DRAINAGE TO BE PLACED BENEATH FILL EMBANKMENT. UNDERFILL DRAINAGE TO COMPRISE:
- BASAL DRAINAGE BLANKET
- HERRING BONE DRAINS CONNECTED TO CENTRAL COLLECTION DRAINS
- MID-HEIGHT DRAINAGE BLANKET

DRAINS TO OUTLET AT PROPOSED CULVERT WINGWALL DETAILS TO BE CONFIRMED AT DETAILED DESIGN STAGE

PROPOSED NEW Ø300mm RRJ CONCRETE PIPE OUTLET TO REPLACE EXISTING AND EXTEND TO END OF FILL EMBANKMENT

PROPOSED NEW DOWNSTREAM CONCRETE WINGWALL OUTFALL AND RIPRAP EROSION PROTECTION

DRY POND
INVERT LEVEL=49.2m
RIM LEVEL=51.0m

OPEN CHANNEL INLET TO DRY POND IL ~51m RL

SEE TYPICAL DRY POND CROSS SECTION ON DR-1410

ALLOW FOR DISHED OVERLAND ESCAPE ROUTE AT LOCALIZED LOW POINT, AND SLOTTED KERB OUTLET

3.5m ACCESS ROAD TO DRY POND @ 1:8 SLOPE

FLOW CONTROL OUTLET MANHOLE WITH SCRUFFY DOME. REFER TO DR-1410 FOR DETAILS

TRIG STREAM (UPPER BRANCH)

PROPOSED NEW Ø600mm STORMWATER OUTLET FROM DRY POND WITH WINGWALL OUTFALL DISCHARGE INTO TRIG STREAM WITH 2m W x 7m L RIPRAP EROSION PROTECTION

MATCHLINE - REFER DRG-NWE-002-DR-1402

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TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project:
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

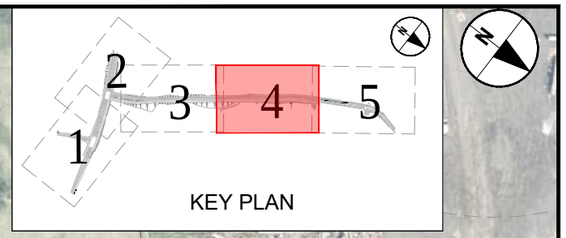
Drawing Title:
STORMWATER LAYOUT PLAN
SHEET 3 OF 5

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
A1 Scales 1:500 | A3 Scales 1:1000
Discipline: STORMWATER
Drawing No.: SGA-DRG-NWE-002-DR-1403
Revision: B

SGA-DRG-NWE-002-DR-1403.DWG Drawing Plotted: 15 Dec 2022 1:05 PM

LEGEND

- PROPOSED DESIGNATION BOUNDARY
- EXISTING 1% AEP FLOOD PLAIN
- PROPOSED DRY POND
- PROPOSED NEW CULVERT
- INDICATIVE PROPOSED SW PIPE & FLOW DIRECTION
- INDICATIVE FLOW DIRECTION
- RIP RAP
- RAINGARDEN LOCATED WITHIN BERM
- BIORETENTION RAINGARDEN (WITH ATTENUATION)
- INDICATIVE HEADWALL
- INDICATIVE MANHOLE
- EXISTING MANHOLE
- INDICATIVE SCRUFFY DOME INLET MANHOLE
- INDICATIVE CATCHPIT
- INDICATIVE DROP KERB INTO RAINGARDEN
- EXISTING OVERLAND FLOW PATH
- EXISTING STORMWATER PIPES (SW)
- EXISTING PROPERTY BOUNDARY
- EXISTING CONTOUR



EXISTING Ø150mm STORMWATER PIPE AND INLET AND OUTFALL TO BE DEMOLISHED

NEW 6m x 2m RAINGARDEN LOCATED WITHIN NEW BERM WITH DROPPED KERB ENTRY AND DROPPED KERB OVERFLOW TO CATCHPIT WITH CONNECTION TO UNDERGROUND STORMWATER NETWORK.

PROPOSED NEW UPSTREAM CONCRETE WINGWALL OUTFALL AND RIPRAP EROSION PROTECTION

2 x NEW 6m x 2m RAINGARDEN LOCATED WITHIN NEW BERM WITH DROPPED KERB ENTRY AND DROPPED KERB OVERFLOW TO CATCHPIT WITH CONNECTION TO UNDERGROUND STORMWATER NETWORK.

NEW 6m x 2m RAINGARDEN LOCATED WITHIN NEW BERM WITH DROPPED KERB ENTRY AND DROPPED KERB OVERFLOW TO CATCHPIT WITH CONNECTION TO UNDERGROUND STORMWATER NETWORK.

2 x NEW 6m x 2m RAINGARDEN LOCATED WITHIN NEW BERM WITH DROPPED KERB ENTRY AND DROPPED KERB OVERFLOW TO CATCHPIT WITH CONNECTION TO UNDERGROUND STORMWATER NETWORK.

ROAD LOWPOINT

ROAD HIGHPOINT

TRIG ROAD

55.00

50.00

45.00

150 FLT

NEW Ø450mm CONCRETE SW PIPE FOR CAPACITY AND CONVEYANCE OF 1:100 RUNOFF FROM CATCHMENT 2 LOWPOINT

LOCALIZED LOW POINT FOR CATCHMENT TO BE CONVEYED WITHIN PRIMARY SYSTEM TO DRY POND

NEW Ø375mm CONCRETE SW PIPES

PIPED OUTLET FROM ALL OF CATCHMENT 4'S RAIN GARDENS' FILTER MEDIA LAYER TO DISCHARGE BEYOND TOE OF EMBANKMENT

UNDERFILL DRAINAGE TO BE PLACED BENEATH FILL EMBANKMENT DETAILS TO BE CONFIRMED DURING DETAILED DESIGN.

REFER DRG-NWE-002-DR-1403

MATCHLINE - REFER DRG-NWE-002-DR-1405

UNDERFILL DRAINAGE TO BE PLACED BENEATH FILL EMBANKMENT DETAILS TO BE CONFIRMED DURING DETAILED DESIGN.

PROPOSED NEW Ø600mm RRJ CONCRETE PIPE CROSSING

PROPOSED NEW DOWNSTREAM CONCRETE WINGWALL OUTFALL AND RIPRAP EROSION PROTECTION TO TIE INTO EXISTING OVERLAND FLOW PATH

PROPOSED NEW DOWNSTREAM CONCRETE WINGWALL OUTFALL AND RIPRAP EROSION PROTECTION

PROPOSED NEW Ø525mm RRJ CONCRETE PIPE CROSSING TO REPLACE EXISTING

WAIAROHIA STREAM (UPPER BRANCH)

NEW 6m x 2m RAINGARDEN LOCATED WITHIN NEW BERM WITH DROPPED KERB ENTRY AND DROPPED KERB OVERFLOW TO CATCHPIT WITH CONNECTION TO UNDERGROUND STORMWATER NETWORK.

TRIG STREAM (UPPER BRANCH)

ORIGINAL IN COLOUR

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TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project:
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

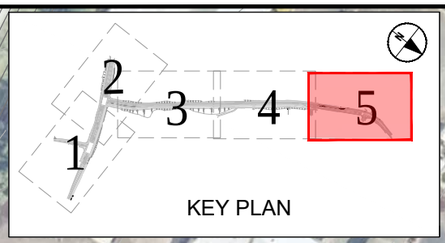
Drawing Title:
STORMWATER LAYOUT PLAN
SHEET 4 OF 5

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
A1 Scales 1:500 | A3 Scales 1:1000
Discipline: STORMWATER
Drawing No.: SGA-DRG-NWE-002-DR-1404
Revision: B

SGA-DRG-NWE-002-DR-1404 Drawing Plotted15 Dec 2022 1:05 PM

LEGEND

- PROPOSED DESIGNATION BOUNDARY
- EXISTING 1% AEP FLOOD PLAIN
- PROPOSED DRY POND
- PROPOSED NEW CULVERT
- INDICATIVE PROPOSED SW PIPE & FLOW DIRECTION
- INDICATIVE FLOW DIRECTION
- RIP RAP
- RAINGARDEN LOCATED WITHIN BERM
- BIORETENTION RAINGARDEN (WITH ATTENUATION)
- INDICATIVE HEADWALL
- INDICATIVE MANHOLE
- EXISTING MANHOLE
- INDICATIVE SCRUFFY DOME INLET MANHOLE
- INDICATIVE CATCHPIT
- INDICATIVE DROP KERB INTO RAINGARDEN
- EXISTING OVERLAND FLOW PATH
- SW — EXISTING STORMWATER PIPES
- EXISTING PROPERTY BOUNDARY
- EXISTING CONTOUR



KEY PLAN

MATCHLINE - REFER DRG-NWE-002-DR-1404

STATE HIGHWAY 18

50.00

55.00

EXISTING BRIDGE

TRIG ROAD

END OF CATCHMENT, DRAINAGE BEYOND THIS POINT TO REMAIN AS PER EXISTING

55.00

CATCHPIT TO BE RELOCATED TO ACCOMMODATE NEW ROAD ALIGNMENT

50.00

ORIGINAL IN COLOUR

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TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project: **SUPPORTING GROWTH PROGRAMME**
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
STORMWATER LAYOUT PLAN
SHEET 5 OF 5

Drawing Status: **FOR LODGEMENT**

Drawing Date: 07.12.2022

A1 Scales	1:500	A3 Scales	1:1000

Discipline: STORMWATER

Drawing No.: SGA-DRG-NWE-002-DR-1405

Revision: B

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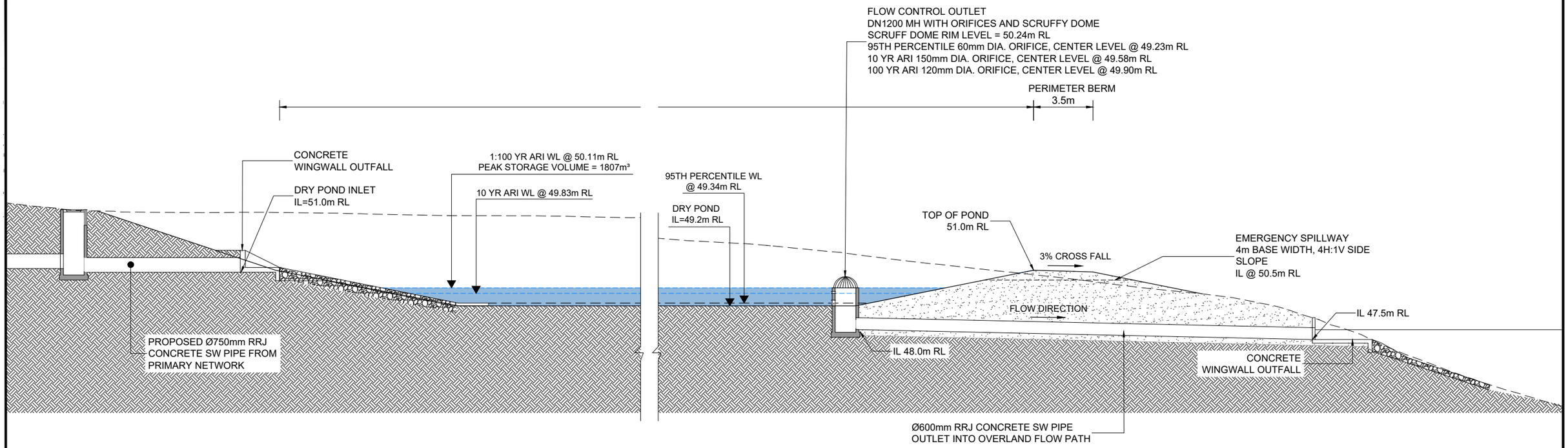

A | **TYPICAL DRY POND CROSS SECTION**
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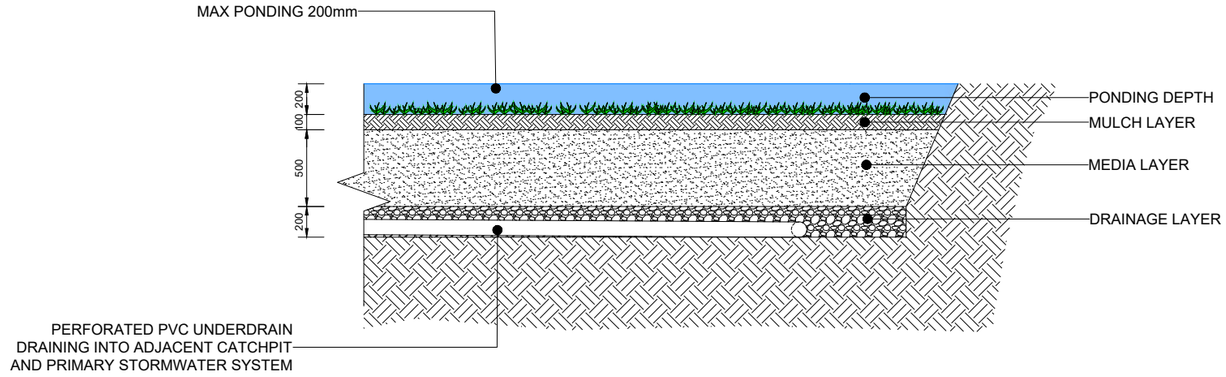
Scale 1:100



B | **TYPICAL RAINGARDEN LONG SECTION**
-
Scale 1:20

ORIGINAL IN COLOUR

NOT FOR CONSTRUCTION

REV	REVISIONS	DRAWN	DATE
B	ISSUED FOR NOTICE OF REQUIREMENT LODGEMENT	VDLT	DEC. 2022
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SURVEYED		
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DRAWING CHECK	J. DELA TORRE	01.05.20
DESIGN	N. WOLFAARDT	20.08.20
DESIGN REVIEW	R. SEYB	20.08.20
APPROVED	B. BUSNARDO	07.12.2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project:
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
STORMWATER
DRY POND AND RAINGARDEN TYPICAL CROSS SECTIONS

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
A1 Scales: AS SHOWN | A3 Scales: HALF SCALE
Discipline: STORMWATER
Drawing No.: SGA-DRG-NWE-002-DR-1410
Revision: B

SGA-DRG-NWE-002-DR-1410.DWG Drawing Plotted:5 Dec 2022 1:07 PM

LEGEND

- PROPOSED DESIGNATION BOUNDARY
- EXISTING 1% AEP FLOOD PLAIN
- PROPOSED DRY POND
- PROPOSED NEW CULVERT
- INDICATIVE PROPOSED SW PIPE & FLOW DIRECTION
- INDICATIVE FLOW DIRECTION
- RIP RAP
- RAINGARDEN LOCATED WITHIN BERM
- BIORETENTION RAINGARDEN (WITH ATTENUATION)
- INDICATIVE HEADWALL
- INDICATIVE MANHOLE
- EXISTING MANHOLE
- INDICATIVE SCRUFFY DOME INLET MANHOLE
- INDICATIVE CATCHPIT
- INDICATIVE DROP KERB INTO RAINGARDEN
- EXISTING OVERLAND FLOW PATH
- SW — EXISTING STORMWATER PIPES
- EXISTING PROPERTY BOUNDARY
- EXISTING CONTOUR

ESCM LEGEND

- EXISTING SWALE
- CLEAN WATER DIVERSION BUND
- 'DIRTY' WATER DIVERSION BUND
- SILT FENCE
- SAND BAG/LOG
- SILT SOCK
- CONTOUR DRAIN
- SILT STABILIZED ENTRANCEWAY
- DECANTING EARTH BUND
- EXTEND SURFACING/LAYERWORKS (DISTURBED AREAS). APPLIES TO FULL LENGTH OF TRIG ROAD AND HOBSONVILLE ROAD AS INDICATED

GENERAL NOTES (APPLICABLE TO ALL LAYOUTS):

1. ALL ENVIRONMENTAL CONTROLS TO BE SET UP PRIOR TO COMMENCEMENT OF WORKS AND APPROVED FOR SUITABILITY BY ENGINEER.
2. CLEAN WATER DIVERSION BUNDS TO DIRECT RUNOFF TO EXISTING CROSSINGS UNTIL OFFLINE CONSTRUCTION OF NEW STORMWATER CROSSINGS HAVE BEEN COMPLETED, INCLUDING OUTFALL AND EROSION PROTECTION, AFTER WHICH CLEAN RUNOFF WILL BE DIVERTED TO NEW STORMWATER CROSSINGS.
3. STORMWATER CROSSINGS UNDER TRIG ROAD TO BE CONSTRUCTED OFFLINE ALONG NEW ALIGNMENT. DOWNSTREAM DISCHARGE FROM EXISTING CROSSINGS TO BE TEMPORARILY DIVERTED TO ALLOW FOR DRY WORKS AREA AT NEW OUTFALL POSITION.
4. WHERE EXISTING STORMWATER PIPES TIE INTO NEW NETWORK, ENSURE DOWNSTREAM STORMWATER PIPES AND OUTFALLS ARE COMPLETED PRIOR TO CONNECTION.
5. TRAFFIC MANAGEMENT PLAN TO BE SUPPLIED BY CONTRACTOR FOR ZONE 2 AND 3 OF WORKS FOR WHICH FULL ROAD RECONSTRUCTION IS EXPECTED WITH DETAILS OF PROGRESSIVE CHANGES TO SEDIMENT CONTROL METHODS WITHIN THE CARRIAGEWAY.
6. WORKS AND ASSOCIATED EROSION AND SEDIMENT CONTROL MEASURES TO BE STAGED TO MAINTAIN ACCESS TO EXISTING PROPERTIES THROUGHOUT.
7. USE CUT AND COVER METHOD FOR OPEN TRENCH INSTALLATION.
8. ALL STOCKPILES TO BE COVERED DURING PERIODS OF INACTIVITY.
9. ALL EXISTING STORMWATER INLETS AND NEW INLETS DRAINING INTO EXISTING STORMWATER SYSTEMS, TO RECEIVE SEDIMENT PROTECTION.
10. ALL SEDIMENT CONTROL MEASURES TO REMAIN IN PLACE POST CONSTRUCTION UNTIL >80% STABILIZED SURFACES HAVE BEEN ESTABLISHED.
11. ANY SEDIMENT LADEN RUNOFF COLLECTED OFF THE TRIG ROAD SURFACE AREA WILL BE COLLECTED VIA THE NEW STORMWATER PIPE NETWORK AND DISCHARGED INTO THE SEDIMENT RETENTION POND FOR TREATMENT.
12. ANY SEDIMENT LADEN RUNOFF COLLECTED OFF THE ROAD SURFACE OF HOBSONVILLE ROAD, JUST EAST OF THE INTERSECTION, WILL BE COLLECTED VIA THE NEW STORMWATER PIPE NETWORK AND DISCHARGED INTO THE PROPOSED ATTENUATION POND / RAINGARDEN (TO USED AS A TEMPORARY TREATMENT DEVICE DURING CONSTRUCTION) FOR TREATMENT.
13. NEW SLOTTED KERB ENTRY INTO AND OUT OF THE PROPOSED RAINGARDENS WITHIN THE BERM ARE TO BE ADDED ONLY AFTER FULL SITE STABILIZATION IS ACHIEVED AND ROAD SURFACE RUNOFF IS NO LONGER SEDIMENT LADEN. RAINGARDENS ARE TO RECIEVE PERIMETER SEDIMENT PROTECTION MEASURES AND TEMPORARY COVERS DURING THIS PERIOD UNTIL OPEN FOR USE.

ORIGINAL IN COLOUR

NOT FOR CONSTRUCTION

REV	REVISIONS	DRAWN	DATE
B	ISSUED FOR NOTICE OF REQUIREMENT LODGEMENT	VDLT	DEC. 2022
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SURVEYED		
DRAWN	V. DELA TORRE	20.08.20
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DESIGN	N. WOLFAARDT	20.08.20
DESIGN REVIEW	R. SEYB	20.08.20
APPROVED	B. BUSNARDO	07.12.2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project: **SUPPORTING GROWTH PROGRAMME**
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title: EROSION & SEDIMENT CONTROL LEGEND AND GENERAL NOTES

Drawing Status: **FOR LODGEMENT**

Drawing Date: 07.12.2022

A1 Scales: NTS | A3 Scales: NTS

Discipline: ENVIRONMENTAL

Drawing No.: SGA-DRG-NWE-002-EN-1500

Revision: B

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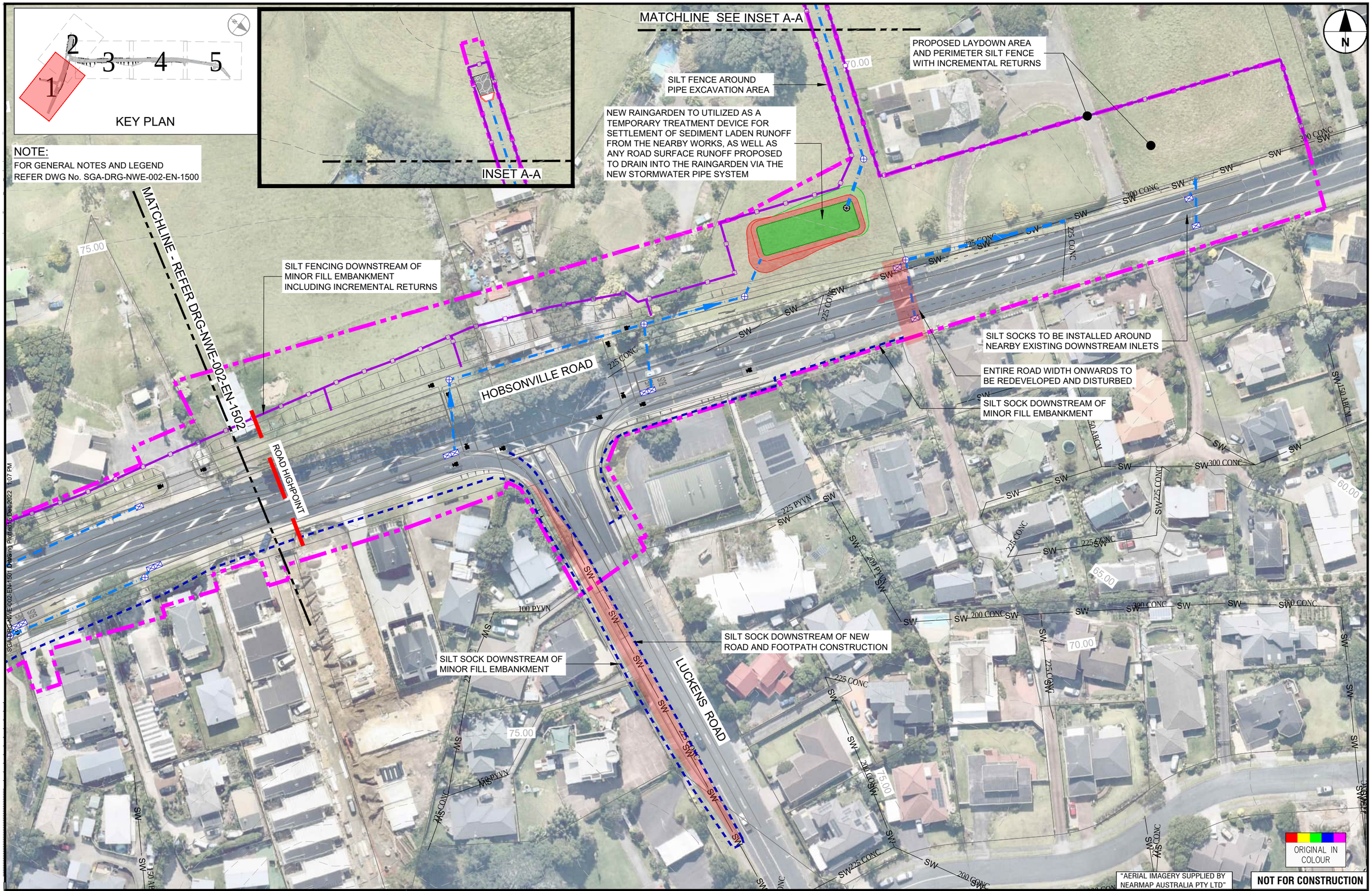

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A	FOR NOTICE OF REQUIREMENT AND RESOURCE CONSENT	VDLT	AUG. 2020

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DESIGN REVIEW	R. SEYB	20.08.20
APPROVED	B. BUSNARDO	07.12.2022

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WAKA KOTAHI NZ TRANSPORT AGENCY

Project:
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
EROSION & SEDIMENT CONTROL PLAN
SHEET 1 OF 5

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
A1 Scales 1:500 | A3 Scales 1:1000
Discipline: ENVIRONMENTAL
Drawing No.: SGA-DRG-NWE-002-EN-1501
Revision: B

SGA-DRG-NWE-002-EN-1501 Drawing Plotted: 15 Dec 2022 - 1:07 PM

REV	REVISIONS	DRAWN	DATE
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DRAWING CHECK	J. DELA TORRE	20.08.20
DESIGN	N. WOLFAARDT	20.08.20
DESIGN REVIEW	R.SEYB	20.08.20
APPROVED	B. BUSNARDO	07.12.2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project:
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
EROSION & SEDIMENT CONTROL PLAN
SHEET 2 OF 5

Drawing Status: **FOR LODGEMENT**

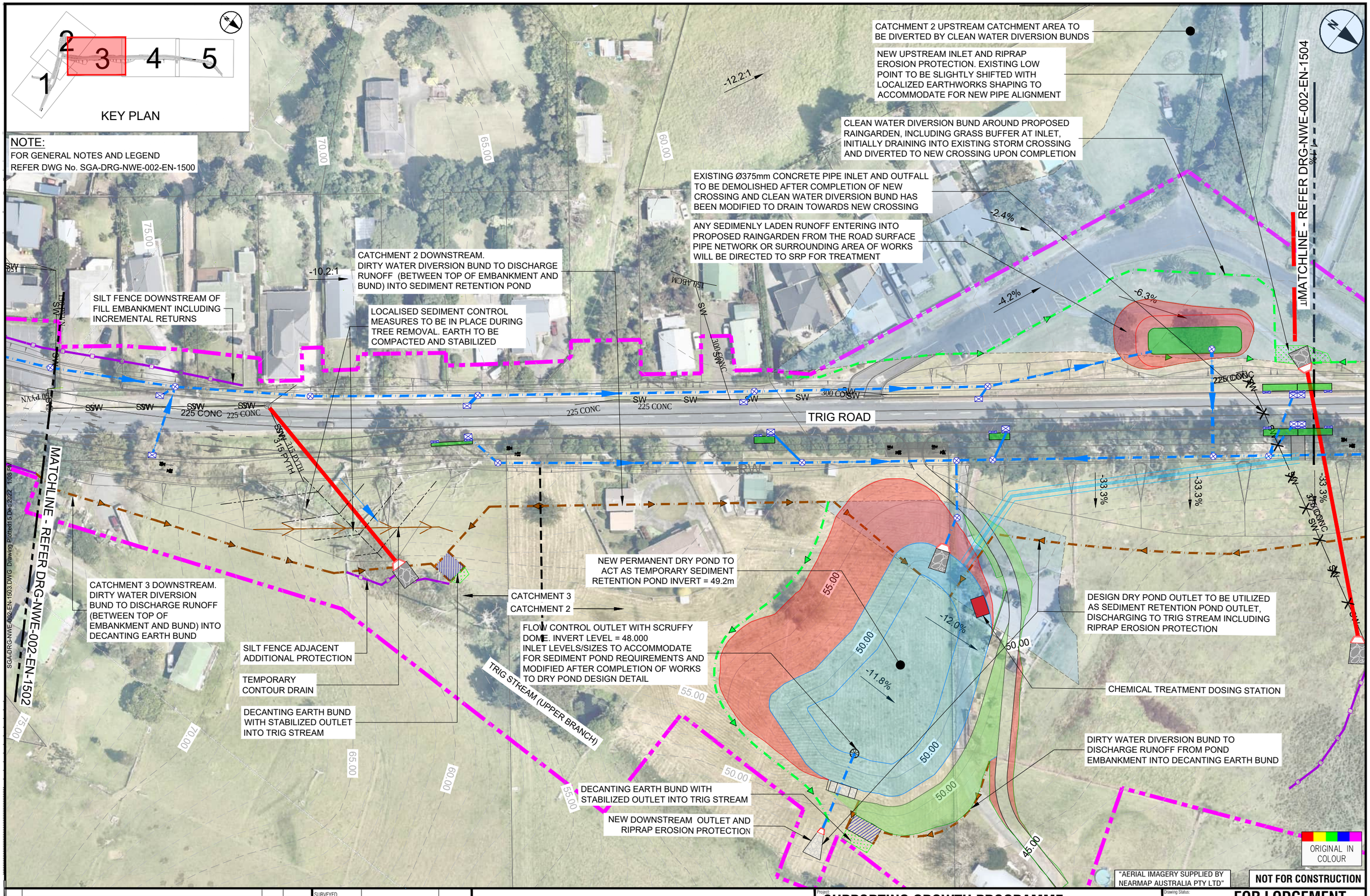
Drawing Date: 07.12.2022

A1 Scales	1:500	A3 Scales	1:1000

Discipline: ENVIRONMENTAL

Drawing No.: SGA-DRG-NWE-002-EN-1502

Revision: B



REV	REVISIONS	DRAWN	DATE
B	ISSUED FOR NOTICE OF REQUIREMENT LODGEMENT	VDLT	DEC. 2022
A	FOR NOTICE OF REQUIREMENT AND RESOURCE CONSENT	VDLT	AUG. 2020

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DRAWN	V. DELA TORRE	20.08.20
DRAWING CHECK	J. DELA TORRE	20.08.20
DESIGN	N. WOLFAARDT	20.08.20
DESIGN REVIEW	R. SEYB	20.08.20
APPROVED	B. BUSNARDO	07.12.2022

TE TUPU NGĀTAHI Supporting Growth

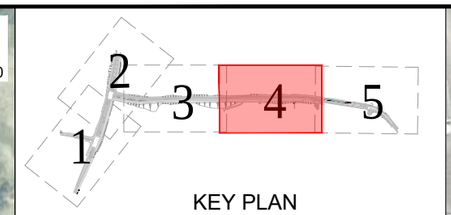
WAKA KOTAHI NZ TRANSPORT AGENCY

Project:
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
EROSION & SEDIMENT CONTROL PLAN
SHEET 3 OF 5

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
A1 Scales 1:500 A3 Scales 1:1000
Discipline: ENVIRONMENTAL
Drawing No. SGA-DRG-NWE-002-EN-1503
Revision B

NOTE:
FOR GENERAL NOTES AND LEGEND
REFER DWG No. SGA-DRG-NWE-002-EN-1500



KEY PLAN

CATCHMENT 1 UPSTREAM CATCHMENT AREA TO BE DIVERTED BY CLEAN WATER DIVERSION BUNDS

CLEAN WATER DIVERSION BUND, INCLUDING GRASS BUFFER AT INLET, INITIALLY DRAINING INTO EXISTING STORM CROSSING AND DIVERTED TO NEW CROSSING UPON COMPLETION

EXISTING Ø150mm STORMWATER PIPE AND INLET AND OUTFALL TO BE DEMOLISHED AFTER COMPLETION OF NEW CROSSING AND CLEAN WATER DIVERSION BUND HAS BEEN MODIFIED TO DRAIN TOWARDS NEW CROSSING

NEW UPSTREAM INLET AND RIPRAP EROSION PROTECTION

NEW Ø525mm CONCRETE PIPE CROSSING COMPLETED OFFLINE

SILT SOCK/COIR LOG

ENTIRE ROAD WIDTH ONWARDS TO BE REDEVELOPED AND DISTURBED

REFER DRG-NWE-002-EN-1503

MATCHLINE - REFER DRG-NWE-002-EN-1505

ROAD LOWPOINT

ROAD HIGHPOINT

ROAD LOWPOINT

TRIG ROAD

-1.1%
-1.4%
-4.6%
-4.2%
-3.5%
-2.5%
-33.3%
-33.3%
-33.3%
-12.3%
-10.9%
-8.5%
-9.4%

CATCHMENT 2
CATCHMENT 1

55.00
55.00
50.00
45.00

150 CI/TI

PROPOSED NEW Ø600mm RCRRJ PIPE CROSSING

CATCHMENT 2 DOWNSTREAM DIRTY WATER DIVERSION BUND TO DISCHARGE RUNOFF (BETWEEN TOP OF EMBANKMENT AND BUND) INTO SEDIMENT RETENTION POND

SILT FENCE

SILT SOCK FOR EXISTING SW INLET PROTECTION

INITIAL STABILIZED ENTRANCEWAYS

PROPOSED SITE ESTABLISHMENT AREA AND PERIMETER SILT FENCE, BOTH SIDES OF OVERLAND FLOW PATH

LONG TERM SILT FENCE INCLUDING RETURNS AND GRASS BUFFER ADJACENT TO STREAM OUTLET. TO REMAIN UNTIL EMBANKMENT PERMANENT STABILIZATION HAS BEEN ESTABLISHED. POSITION AFTER SHIFTED UP[TOWARDS EMBANKMENT TOE AFTER FILLING IS COMPLETE

NEW DOWNSTREAM OUTFALL AND RIPRAP EROSION PROTECTION

SILT FENCE ADJACENT STREAM EDGE FOR ADDITIONAL PROTECTION

WAIARORHIA STREAM (UPPER BRANCH)

CATCHMENT 2
CATCHMENT 1

ORIGINAL IN COLOUR

"AERIAL IMAGERY SUPPLIED BY NEARMAP AUSTRALIA PTY LTD"

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Drawing Plotted: 15 Dec 2022 09:40
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REV	REVISIONS	DRAWN	DATE
B	ISSUED FOR NOTICE OF REQUIREMENT LODGEMENT	VDLT	DEC. 2022
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DRAWN	V. DELA TORRE	20.08.20
DRAWING CHECK	J. DELA TORRE	20.08.20
DESIGN	N. WOLFAARDT	20.08.20
DESIGN REVIEW	R. SEYB	20.08.20
APPROVED	B. BUSNARDO	07.12.2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project
SUPPORTING GROWTH PROGRAMME
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
EROSION & SEDIMENT CONTROL PLAN
SHEET 4 OF 5

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
A1 Scales 1:500 | A3 Scales 1:1000
Discipline: ENVIRONMENTAL
Drawing No.: SGA-DRG-NWE-002-EN-1504
Revision: **B**

NOTE:
FOR GENERAL NOTES AND LEGEND
REFER DWG No. SGA-DRG-NWE-002-EN-1500

KEY PLAN

MATCHLINE - REFER DRG-NWE-002-EN-1504

STATE HIGHWAY 18

50.00

55.00

END OF CATCHMENT. DRAINAGE BEYOND THIS POINT TO REMAIN AS PER EXISTING

EXISTING BRIDGE

SILT SOCK TO MANAGE RUNOFF FROM DISTURBED AREA (NEW CYCLE AND FOOTPATH EXTENSION)

CLEANWATER DIVERSION BUND DRAINING INTO EXISTING INLET

-7.6%

-6.3%

TRIG ROAD

SILT SOCK FOR EXISTING SW INLET PROTECTION

-7.2%

SILT SOCK ALONG EASTERN ROAD BOUNDARY DOWNSTREAM SIDE OF MINOR WORKS TO BERM AND KERB

-7.3%

EXISTING SCRUFFY DOME INLET

-7.0%

SILT SOCK TO MANAGE RUNOFF FROM DISTURBED AREA

-3.0%

TEMPORARY SAND BAGS FOR CLEAN WATER DIVERSION. TO DISCHARGE CLEAN RUNOFF INTO CARRIAGEWAY

-3.5%

SILT SOCK FOR EXISTING SW INLET PROTECTION

-10.8%

-10.9%

-8.7%

SILT FENCE ALONG EASTERN ROAD EDGE DOWNSTREAM SIDE OF DISTURBED AREA (NEW CYCLE AND FOOT PATH EXTENSION)

EXISTING SWALE

ORIGINAL IN COLOUR

"AERIAL IMAGERY SUPPLIED BY NEARMAP AUSTRALIA PTY LTD"

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SGA-DRG-NWE-002-EN-1505.DWG Drawing Plotted:15 Dec 2022 - 10:51

REV	REVISIONS	DRAWN	DATE
B	ISSUED FOR NOTICE OF REQUIREMENT LODGEMENT	VDLT	DEC. 2022
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SURVEYED		
DRAWN	V. DELA TORRE	20.08.20
DRAWING CHECK	J. DELA TORRE	20.08.20
DESIGN	N. WOLFAARDT	20.08.20
DESIGN REVIEW	R. SEYB	20.08.20
APPROVED	B. BUSNARDO	07.12.2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project: **SUPPORTING GROWTH PROGRAMME**
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title:
EROSION & SEDIMENT CONTROL PLAN
SHEET 5 OF 5

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
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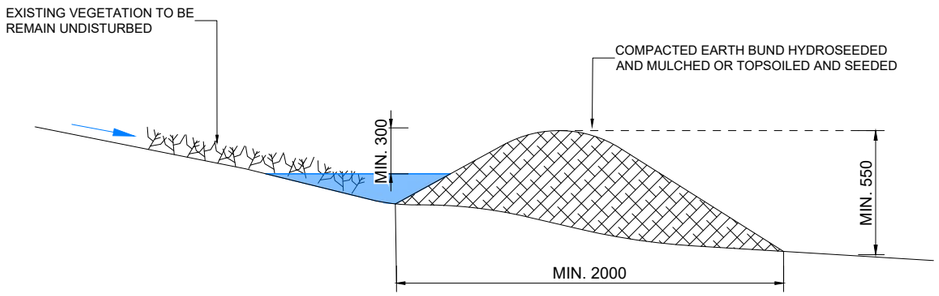
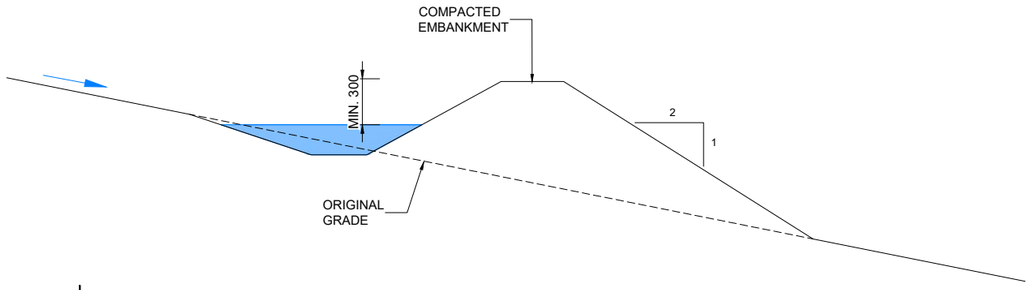
Discipline: ENVIRONMENTAL
Drawing No.: SGA-DRG-NWE-002-EN-1505
Revision: B



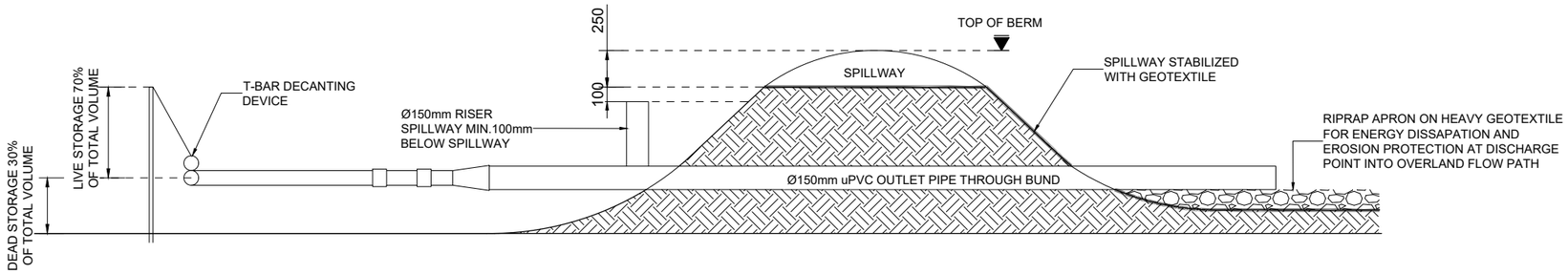
B | TYPICAL CROSS SECTION : CLEAN WATER DIVERSION BUND

Scale 1:20



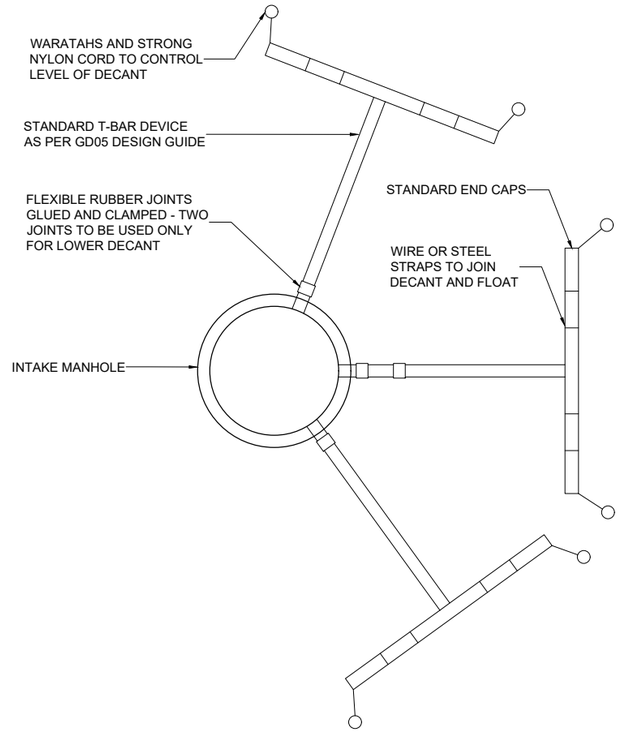
C | TYPICAL CROSS SECTION : DIRTY WATER DIVERSION BUND

Scale 1:20



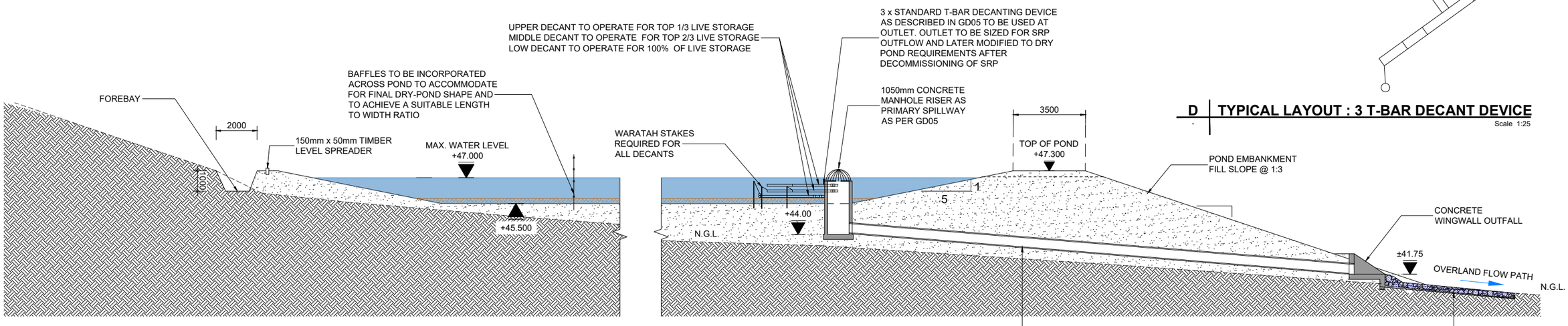
A | TYPICAL CROSS SECTION : DECANTING EARTH BUND

Scale 1:20



D | TYPICAL LAYOUT : 3 T-BAR DECANT DEVICE

Scale 1:25



TYPICAL CROSS SECTION: SEDIMENT RETENTION POND (UTILIZING FUTURE DRY POND STRUCTURE)

NTS

ORIGINAL IN COLOUR

NOT FOR CONSTRUCTION

REV	REVISIONS	DRAWN	DATE
B	ISSUED FOR NOTICE OF REQUIREMENT LODGEMENT	VDLT	DEC. 2022
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SURVEYED		
DRAWN	V. DELA TORRE	20.08.20
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APPROVED	B. BUSNARDO	07.12.2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Project: **SUPPORTING GROWTH PROGRAMME**
NORTH WEST - HIF TRIG ROAD (SOUTH)

Drawing Title: EROSION & SEDIMENT CONTROL
SEDIMENT RETENTION DEVICES

Drawing Status: **FOR LODGEMENT**
Drawing Date: 07.12.2022
A1 Scales: AS SHOWN | A3 Scales: HALF SCALE
Discipline: ENVIRONMENTAL
Drawing No.: SGA-DRG-NWE-002-EN-1510
Revision: **B**

SGA-DRG-NWE-002-EN-1510.DWG Drawing Plotted:15 Dec 2022 1:10 PM

ATTACHMENT 13

TRIG ROAD CORRIDOR UPGRADE ASSESSMENT OF TRANSPORT EFFECTS

TE TUPU NGĀTAHI
SUPPORTING GROWTH

Trig Road Assessment of Transport Effects

Version 1.0

December 2022

Document Status

Version	Responsibility	Name
2020 Draft	Author	M Seymour
	Reviewer	J Phillips M Kerr-Ridge
1.0	Author	M Seymour
	Reviewer	A Murray
	Approver	Bridget O'Leary

Revision Status

Version	Date	Reason for Issue
1.0	December 2022	Final for Lodgement

Table of Contents

Acronym/Term	Description
AEE	Assessment of Environmental Effects
AT	Auckland Transport
ATAP	Auckland Transport Alignment Plan
AUP:OP	Auckland Unitary Plan Operative in Part 2016
CTMP	Construction Traffic Management Plan
ITA	Integrated Transport Assessment
LoS	Level of Service
MSM	Macro Strategic Model
NoR	Notice of Requirement
RMA	Resource Management Act 1991
RPTP	Regional Public Transport Plan
RTN	Rapid Transit Network
SH16	State Highway 16
SH18	State Highway 18
SSTMP	Site Specific Traffic Management Plan
TDM	Transport Design Manual
Waka Kotahi	Waka Kotahi NZ Transport Agency

1 Introduction

1.1 Background

Auckland's population is growing rapidly; driven by both natural growth (more births than deaths) and migration from overseas and other parts of New Zealand. The Auckland Plan 2050 anticipates that this growth will generate demand for an additional 313,000 dwellings and require land for approximately 263,000 additional employment opportunities.

In response to this demand, the Auckland Unitary Plan Operative in Part 2016 (**AUP:OP**) identifies 15,000 hectares of predominantly rural land for future urbanisation. The Future Urban Land Supply Strategy 2017 (**FULSS**) prepared by Auckland Council sets out the anticipated timing for the future urbanisation of these areas. To enable the urban development of greenfield land, appropriate bulk infrastructure needs to be planned and delivered.

The Supporting Growth Programme is a collaboration between Auckland Transport (**AT**) and Waka Kotahi NZ Transport Agency (**Waka Kotahi**), to investigate, plan and deliver the transport networks needed to support Auckland's future urban growth areas over the next 30 years.

1.2 Purpose of this Report

Trig Road, Whenuapai has been identified in the Supporting Growth Programme as a future arterial corridor that is needed to support the urban development of Whenuapai.

This report has been prepared to support AT's notice of requirement (**NoR**) and application for resource consents for the Trig Road Corridor Upgrade (the **Project**). The NoR under the Resource Management Act 1991 (**RMA**) is to designate land for the construction, operation and maintenance of the Project.

Funding for the upgrade of Trig Road between Hobsonville Road and State Highway 18 (**SH18**) has been identified in the Regional Land Transport Plan and as such AT are also applying for the necessary resource consents under the RMA, concurrently with the NoR process.

This report provides an assessment of transport effects associated with the construction and operation of the Project. This assessment has been prepared to inform the Assessment of Environmental Effects (**AEE**) for the NoR and resource consent applications.

2 Trig Road Project Description

The Project consists of the widening and upgrade of Trig Road between the SH18 off-ramps and Hobsonville Road. The widening has capacity to provide for a two-lane arterial standard corridor including new footpaths on both sides of the road and a cycleway which is indicatively shown as a dedicated bi-direction cycleway on the eastern side of the corridor. The Project will upgrade the current rural standard corridor to an urban standard, which is appropriate to support the soon to be urban environment on either side of Trig Road.

To tie into the existing road network, the Project also includes the signalisation of the intersections at Trig Road/Hobsonville Road and Luckens Road/Hobsonville Road and the upgrade of Hobsonville Road between these intersections. This will require some localised widening of the road corridor along Hobsonville Road. To tie into the northern section of Trig Road, the line markings on the existing road corridor will be remarked. An overview of the design is provided in Figure 1.

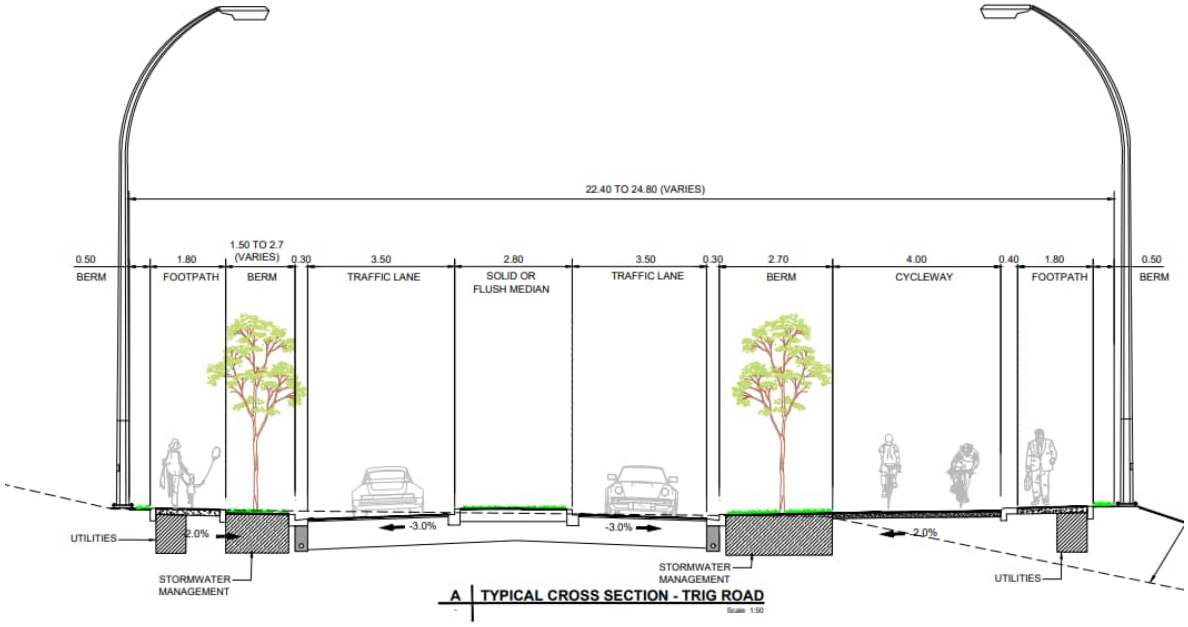
Figure 1: Whenuapai – Trig Road Corridor Upgrade

2.1 Project Features

The key transport features within the Project indicatively include[1]:

- Two-lane arterial standard road (24m cross section) between the SH18 off ramps and Hobsonville Road.
- Signalised intersection at Trig Road and Hobsonville Road.
- Signalised intersection at Hobsonville Road and Luckens Road.
- Upgrade of Hobsonville Road between Luckens Road and Trig Road to four lanes.
- 1.8m footpaths on both sides of Trig Road and Hobsonville Road.
- 4.0m bi-directional cycle route on the eastern side of Trig Road.
- 2.0m separated cycle paths on both sides of Hobsonville Road within the extent of the Project works.
- Remarking of the overbridge and the northern section of Trig Road to tie into the existing road configuration.

Figure 2: Proposed Indicative Trig Road Cross Section



[1] The following cross sections are indicative and design details including specific dimensions will be confirmed via the Outline Plan of Works.

3 Assessment Framework

3.1 Statutory Context

3.1.1 Notice of Requirement

This assessment has been prepared to support the NoR process for the Project. Section 171 of the RMA sets out the matters that must be considered by a territorial authority in making a recommendation on a NoR. This includes consideration of the actual or potential effects (including positive effects) on the environment of allowing the requirement.

3.1.2 Resource Consent Applications

AT are also seeking regional resource consents under the AUP:OP and resource consent under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.

Overall, the application is assessed as a Discretionary Activity.

3.1.3 Whenuapai Structure Plan 2016

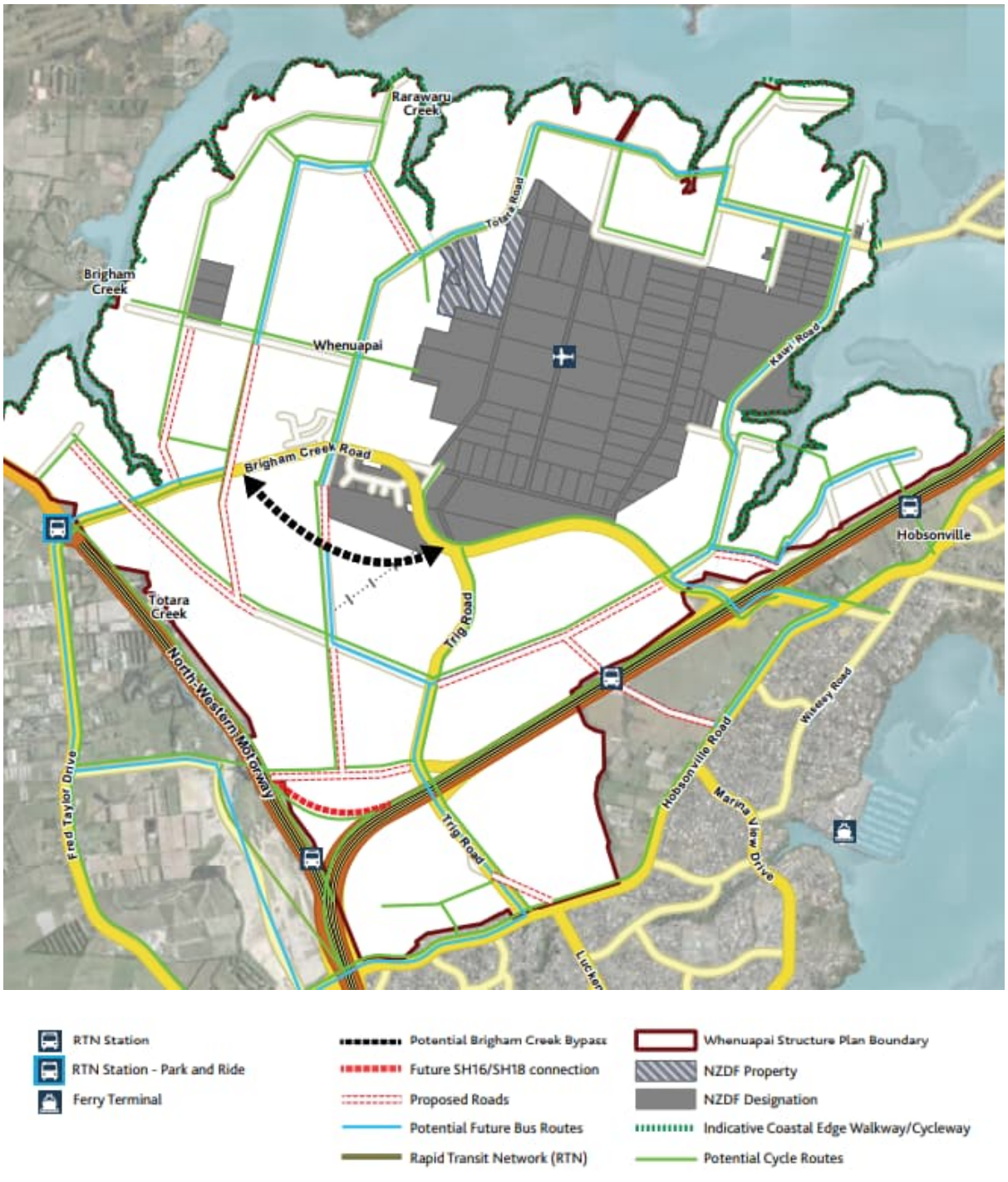
A structure plan is a high-level plan for a large area that shows the generally intended arrangement of various land uses (e.g. centres, housing, employment and parks) and infrastructure (e.g. transport and stormwater), and how the area connects to adjacent urban areas and wider infrastructure networks. A structure plan forms the basis of more detailed changes that are later made to the AUP:OP through the plan change process.

The Whenuapai Structure Plan (**WSP**) was completed in 2016 by Auckland Council.

From a transport perspective, the WSP identifies the required transport infrastructure to support the expected changes in land use including walking and cycling facilities, public transport facilities and a high-level framework for the roading network. The transport infrastructure identified in the WSP is shown below in Figure 3.

Trig Road is shown as a key arterial that plays a network role as a future public transport route and a future cycling route. The corridor is shown with a realignment and further details are provided on this in Section 4.2.5.

Figure 3: Whenuapai Structure Plan – Transport Network



3.2 Project Objectives

The Project Objectives are as follows:

- **Project Objective 1**: Provide an urban arterial transport corridor between State Highway 18 and Hobsonville Road to support and integrate with the planned urban residential growth of Whenuapai.

- **Project Objective 2**: Provide arterial transport corridors that are safe for all transport users.
- **Project Objective 3**: Contribute to mode shift by providing a choice of transport options including walking, cycling and public transport.

4 Receiving Environment

Chapter Summary: Receiving Environment

The existing transport environment includes two key arterial corridors, Hobsonville Road that travels east-west, and Trig Road that travels north-south towards Whenuapai.

Trig Road is currently two lanes wide, with a narrow footpath on one side. The posted speed limit on Trig Road from Hobsonville Road to Ryans Road is 50kph, increasing to 80kph beyond Ryans Road. There are currently no cycle facilities provided and the corridor can be characterised as generally rural in standard. The intersection with Hobsonville Road is a priority-controlled intersection with acceleration and deceleration lanes provided for left turning vehicles into and out of Trig Road.

Hobsonville Road is two lanes wide, with footpaths on both sides. There are no cycle facilities on either side of the road. Luckens Road intersects with Hobsonville Road with a priority-controlled intersection. This intersection also provides acceleration and deceleration lanes for left turning vehicles on to and from Luckens Road.

The SH18 overbridge currently provides one traffic lane in each direction and a flush median. Footpaths are provided on both sides of the bridge. The footpath on the eastern side is not connected to any other existing footpath. There are no dedicated cycle facilities on the bridge.

Other than bus stops, there are no dedicated public transport facilities on Trig Road or Hobsonville Road. Bus services currently run on both Hobsonville Road and Trig Road, with increased frequency and services expected as the Whenuapai area progressively urbanises.

In terms of the likely-future network, the vision for the Project area is consistent with the wider vision for Auckland, providing for a safe and efficient network that allows communities to travel with a choice of modes. This means supporting travellers to increasingly make the choice to walk, cycle and use public transport rather than travel by private vehicle.

Based on the Whenuapai Structure Plan, the future land use for the land around the Project is likely to be residential.

A key part of this residential intensification is to ensure that the local arterial network delivers sufficient movement function that provides safe facilities for walking, cycling and public transport use. In terms of this Project, the local arterial infrastructure includes providing**:**

- Bus priority at intersections and on Hobsonville Road to facilitate improvements in the reliability of bus journey times.
- Walking and cycling facilities that are appropriate for higher levels of patronage and enable safe segregated use of the facilities.
- An appropriate urban context with lowered vehicle speeds and more reliable access to the wider network.

4.1 Approach to Receiving Environment

A key objective of the Supporting Growth Programme is to protect land now to ensure that the transport networks required to support growth areas in the future, around Auckland, can be provided in an efficient and co-ordinated manner. This Project supports the development of housing in the immediate vicinity of Trig Road and currently has funding to be constructed in the near future.

In the context of an RMA assessment process, considering the environment as it exists today will not be a true reflection of the real-world environment in which the transport corridor will operate. Accordingly, when considering the environment within which the effects of the construction and operation of the transport corridor are likely to occur, this assessment considers both the existing environment and the likely future environment for the Project area.

The Whenuapai Structure Plan provides an indication of the future urban context in which the corridor is likely to operate. At the time of the assessment this information indicates that the likely receiving environment will be residential in nature, with a mix of high and medium density shown in the plan.

4.2 Transport Specific Context

The following section provides a brief summary of the existing transport environment and the likely future transport environment.

4.2.1 Existing Transport Environment

Table 1 and Table 2 provide a summary of the existing road network and key characteristics.

Table 1: Existing Road Transport Network

Existing Corridor	Key Characteristics
Trig Road	• 50 kph posted speed limit from Hobsonville Road to north of the Ryans Road intersection • 80 kph posted speed limit for remaining northern section of corridor • SH18 access with east facing ramps • Two lanes for entire corridor • Footpath approximately 1.2m wide on the western side only with no dedicated crossing facilities • No dedicated cycle facilities • Overbridge over SH18 with two lanes and a 1.8m – 2.0m wide footpath on the western and eastern side • Given the currently semi-rural land use within Whenuapai and adjacent to Trig Road the existing public transport network is relatively limited. There are currently two key routes that operate on Trig Road and Hobsonville Road, each with 30min frequencies in the peak periods. (Route 114 and 120)
Hobsonville Road	• 50 kph posted limit • Two lanes with a central flush median • Kerb side lane in each direction to facilitate merging from Trig Road and Luckens Road • Identified as an over dimension route • Footpaths are provided on both sides of the road approximately 1.2m wide. A small pedestrian refuge is provided on Hobsonville Road between Luckens Road and Trig Road within the flush median • No dedicated cycle facilities • Currently two key bus routes operate on Hobsonville Road, each with 30min frequencies in the peak periods (Route 114 and 120) • Due to high use of the 120-bus service on Hobsonville Road, AT intends to increase services to a core 20-minute frequency service 7 days per week between 6am and 7pm, and then a 30-minute frequency until 11pm. It is also planned to provide a 'peak overlay' between Westgate and Constellation in the peak direction (to Constellation in AM, from Constellation in PM), to give a 10-minute frequency on this core section

Table 2: Existing Intersections with Hobsonville Road

Existing Corridor	Key Characteristics
Trig Road and Hobsonville Road	• Priority controlled intersection • Separate left and right turn approach lanes on Trig Road • The intersection is relatively large in scale, with deceleration and acceleration lanes on Hobsonville Road, likely a result of previously higher speed limits on Hobsonville Road • Dedicated right turn bay on Hobsonville Road • No dedicated pedestrian facilities, raised central island on Trig Road approach • No dedicated cycling facilities
Luckens Road and Hobsonville Road	• Priority controlled intersection • Separate left and right turn approach lanes on Luckens Road • The intersection is relatively large in scale, with deceleration and acceleration lanes on Hobsonville Road, likely a result of previously higher speed limits on Hobsonville Road • Dedicated right turn bay on Hobsonville Road • No dedicated pedestrian facilities, raised central island on Luckens Road approach • No dedicated cycling facilities

4.2.2 Existing Traffic Volumes

Existing traffic volumes on Trig Road and Hobsonville Road have been counted by AT in December 2020 and December 2021. The results of these surveys are shown in Table 3 below. It is expected that the future urbanisation and strategic transport infrastructure will have a notable effect in terms of future traffic volumes and transport demand on these corridors.

Table 3: Existing Traffic Volumes on Trig Road

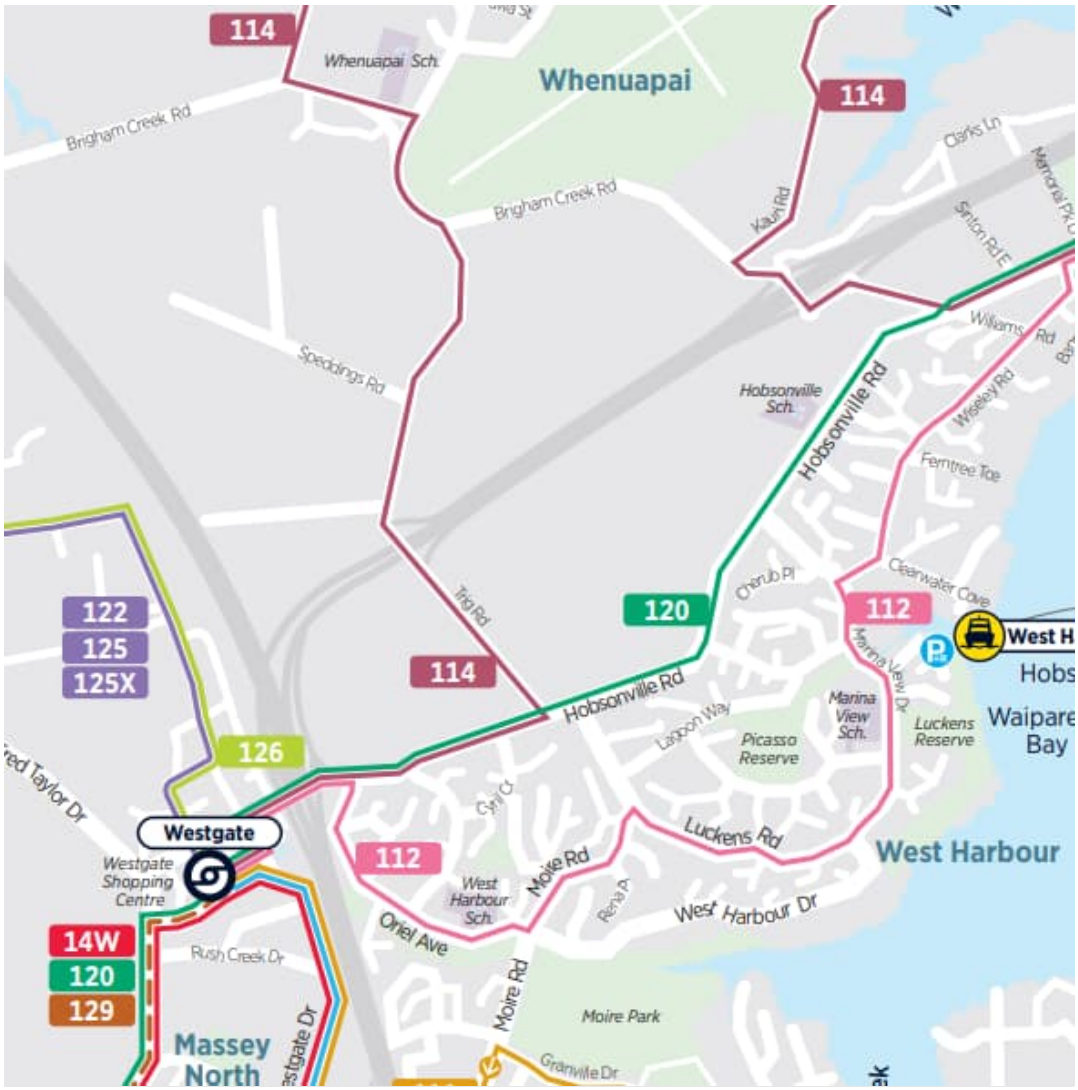
Location of Count	Survey Date	5 Day ADT[2]	7-day ADT	AM Peak Volumes	PM Peak Volumes
Trig Road between Spedding Road and Brigham Creek Road	December 2020	4,160	4,180	430	490
Trig Road between Ryan's Road and Motorway Overbridge	December 2021	6,890	6,460	590	690
Hobsonville Road between Luckens Road and Westpark Drive	February 2022	14,170	13,300	1,220	1,380
Hobsonville Road between Fitzherbert Avenue and Cyril Crescent	November 2020	18,720	17,830	1,400	1,760

4.2.3 Existing Bus Services

The following figure shows the existing bus services in the Whenuapai region. As detailed in Table 1, the two key services are Route 114 and Route 120.

[2] Average Daily Traffic (ADT)

Figure 4: Existing Bus Services in Whenuapai



4.2.4 Future Transport Network

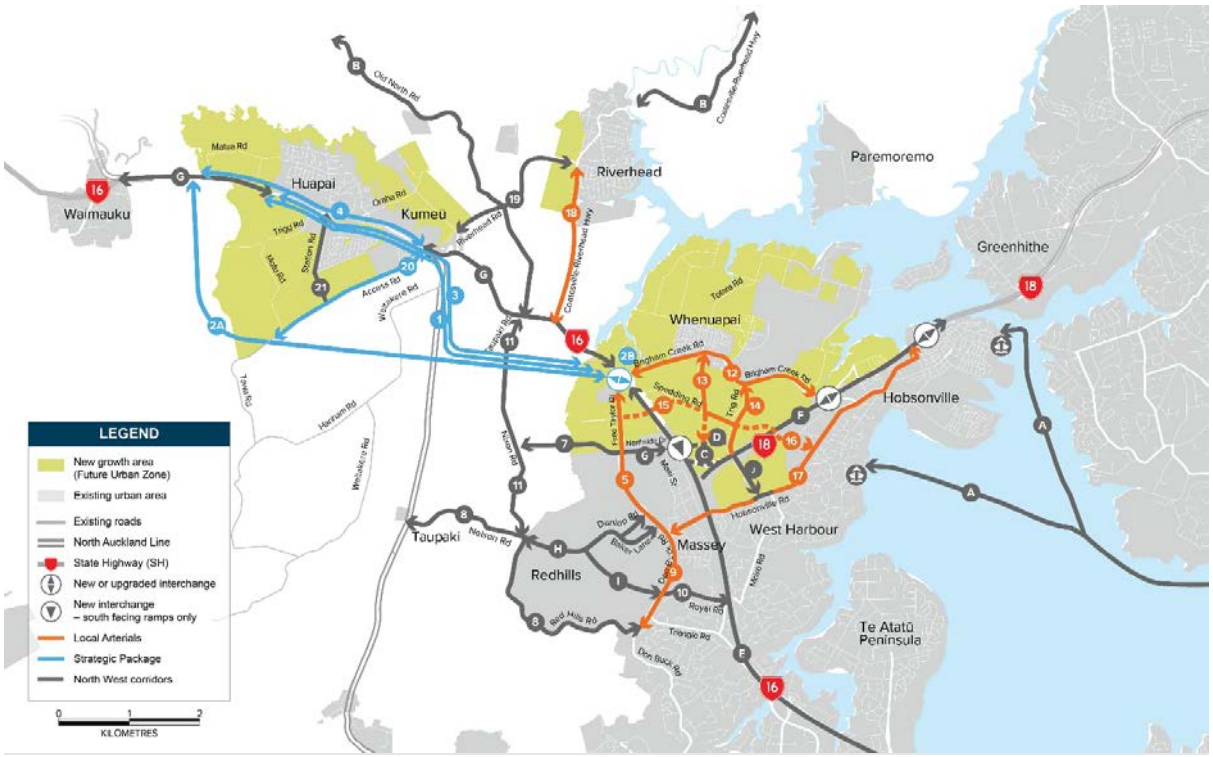
The transport corridors within Whenuapai and the surrounding area will be delivered as part of the wider urbanisation that is scheduled to occur in the North West of Auckland.

To understand the future transport network an indicative transport network for the North West has been developed to support Auckland Council's planned urban growth and is shown below in Figure 5.

The future urban area proposed by Auckland Council includes the urbanisation of currently rural areas as shown in yellow in Figure 5. The Whenuapai area is expected to provide for 8,100 to 10,700 dwellings (depending on density), 8,600 jobs and over 300 hectares of new business land[3].

[3] Whenuapai Structure Plan, September 2016

Figure 5: Indicative North West Transport Network



Subsequent to the North West Indicative Business Case for the Supporting Growth Programme, the Housing Infrastructure Detailed Business Case was completed under the Supporting Growth Programme, which focussed on the development of the southern section of Trig Road (this Project) and the Redhills network.

Through these assessments it was established that Trig Road will continue to facilitate key movements, including providing access to SH18 and will be an important north-south connection as Whenuapai urbanises. There are future urban areas immediately adjacent to Trig Road, and future developments will be able to connect to this key corridor via future developer delivered collector roads.

Once the area around Trig Road is urbanised, the road will need to serve a variety of movement needs, including:

- Access to and from the east facing motorway ramps to SH18
- Facilitating north-south non-motorway movement between business and residential land in Whenuapai, and the existing residential areas around West Harbour and Hobsonville
- Provide opportunities for future developments to deliver connections for collector road access to the surrounding residential land
- Provide access from Whenuapai to wider destinations such as the Westgate Shopping Mall and the ferry terminals at West Harbour and Hobsonville.

Trig Road will therefore serve a range of local and strategic uses across a range of modes and consequently needs to provide the appropriate facilities associated with an urban arterial.

Hobsonville Road will play an increasingly important public transport role and will facilitate local east-west movements between Westgate and Hobsonville.

4.2.5 Previously Indicated Trig Road Alignment

As identified above, the Trig Road alignment within the WSP was identified to be realigned to meet with Luckens Road. The intention of this realignment was to provide a single intersection along Hobsonville Road and provide a direct north to south route from Whenuapai to West Harbour.

Further investigations identified that in order to meet geometric requirements, the realignment would result in significant earthworks including a substantial volume of fill to address the location within a valley. The follow-on impacts from this included significant property effects, limited ability for adjacent land uses to connect to the corridor due to height differences, and significant visual impacts.

When compared to an upgrade of the existing corridor, it was concluded that by upgrading both the Trig Road and Luckens Road intersections and providing an upgraded corridor on Trig Road that a similar transport outcome, that supported north south movements and provided safe intersections, could be delivered without the impacts identified.

The development of the alignment is set out in the Assessment of Alternatives report attached to the AEE.

4.2.6 Future Walking and Cycling Network

The WSP indicates that Trig Road and Hobsonville Road will form part of the cycling network for Whenuapai and notes that this would include the provision of dedicated cycle facilities.

4.2.7 Future Local Public Transport

In the longer term, there will be changes to the supporting local network to deliver an integrated public transport network. These changes have been identified through discussions with AT public transport network developers and reflect the outcomes sought by the WSP.

The changes include:

- Local services on Trig Road connecting to Hobsonville Road, Moire Road and Wisely Road
- Local services along Hobsonville Road will become a *frequent* route, which is defined as having a service at least every 10 minutes from 7am to 7pm, 7 days per week.

It is noted that the longer term future public transport network has been developed on the basis of significant public sector investment including a rapid transit network on SH18 with associated interchanges, an additional road crossing of SH18 between Brigham Creek and Trig Road, a Northside Drive connection over SH16 to Westgate and connections between SH16 and SH18 to facilitate movements from Westgate to Whenuapai.

In the interim period between these investments and the investment of rapid transit to the North West, Trig Road and Hobsonville Road will play a critical part in the delivery of a public transport network to support the developing more intensive urban form in Whenuapai.

The Regional Public Transport Plan (RPTP) provides a 10-year indication of public transport provisions. In terms of the two existing services on Trig Road and Hobsonville Road, Table 4 summarises the proposed changes to these services over the next 10 years.

Table 4: Bus Services as proposed in RPTP 2018 – 2028

	2018	2021	2028
Route 114	30 minute services in weekday peak, 60 minute in interpeak, no evening service	30 minute services in weekday peak, 60 minute in interpeak, no evening service	20 minute services weekday peak, 20 minute interpeak, 30 minute evening service
Route 120	30 minute services in weekday peak, 30 minute in interpeak, 60 minute evening service	15 minute services in weekday peak, 20 minute in interpeak, 20 minute evening service	10 minute services weekday peak, 15 minute interpeak, 15 minute evening service

4.2.8 Future Traffic Volumes

Current and forecast traffic volumes for Trig Road are shown in Table 5 and Figure 6. Considerable growth in traffic volumes is forecast between now and 2038, aligned with the planned projected urbanisation of the Whenuapai area.

Table 5: Trig Road – Traffic volumes to 2048+

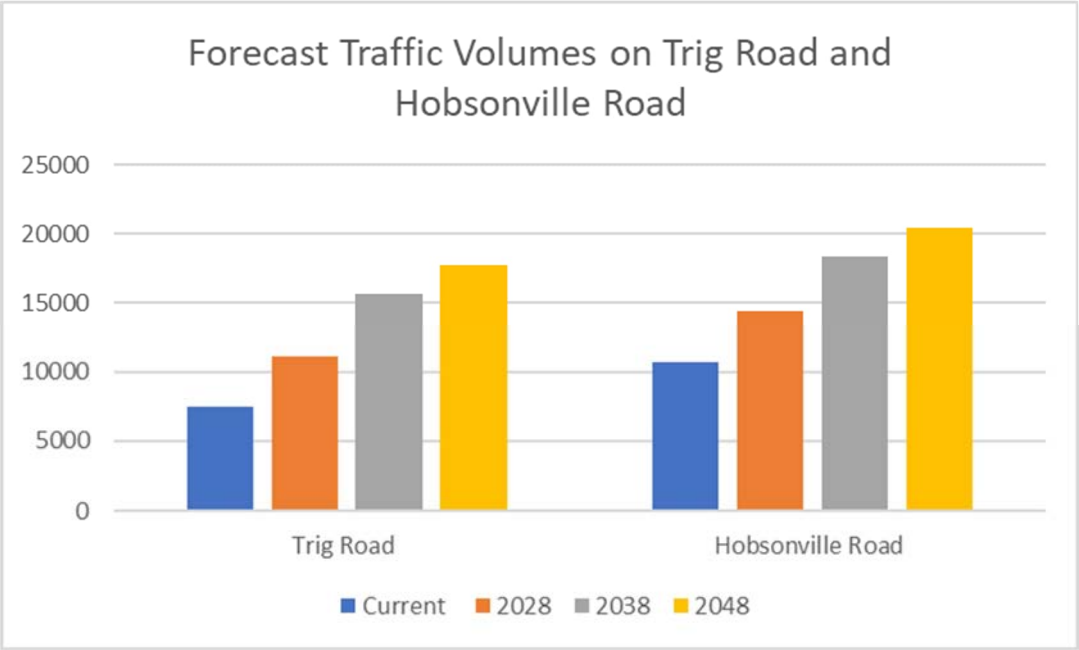
	Current[4]	2028	2038	2048+
Trig Road (forecast)	7,500	11,100	15,700	17,700
% growth on previous decade	-	**48%**	**41%**	**12%**
Hobsonville Road (forecast)	10,700	14,400	18,400	20,400
% growth on previous decade	-	**35%**	**28%**	**11%**

When considering north and south movements, and wider connectivity through the West Harbour area, a strong connection to Luckens Road is critical. Luckens Road connects directly to Marina View Drive, facilitating a loop through West Harbour and back to Hobsonville Road.

Of those turning right out of Trig Road in the morning peak period, it is predicted some 60% travel through to turn right into Luckens Road. Of those turning left from Luckens, approximately 60% again turn right into Trig Road. These proportions demonstrate the importance of considering the Luckens Road intersection in coordination with the Trig Road intersection.

[4] Based on the SATURN modelling based year, calibrated against 2015 surveyed traffic volumes.

Figure 6: Trig Road and Hobsonville Road – Predicted Daily traffic volumes to 2048+



4.3 Summary of Transport Specific Context

Overall, it is considered that the existing transport facilities on Trig Road are currently commensurate to facilities provided in a rural area. The existing network has intermittent facilities for walking and cycling, a low level of public transport and no dedicated facilities to provide for reliable and attractive travel by bus.

Walking and cycling facilities are currently limited to narrow facilities for pedestrians and no facilities for cyclists. The lack of safe and attractive facilities for active modes encourages travel by car, even for shorter distance trips, such as to Westgate, that could be reasonably be undertaken by foot or bike. The intersections have poor crossing facilities, with no dedicated facilities for pedestrians and cyclists, further reinforcing travel choice by car.

In terms of vehicle movements to and from Trig Road and Luckens Road, delays for right turning vehicles in particular can be highly variable in the peak periods. Additionally, the intersections in their existing form are wide and accommodate higher speed turning movements more conducive to high speed rural roads, consistent with the legacy operation of Hobsonville Road as a rural state highway. This encourages higher speed intersection movements, increasing safety risks for drivers and further reducing amenity and safety for pedestrians and cyclists at intersections.

Limited bus priority measures mean that buses will experience the same delays as private vehicles. These delays are expected to increase in the future with increasing urbanisation in the area. Accordingly, without the Project, this results in limited safe and viable transport choices for the existing and future communities in the area and maintains a reliance on private vehicles to travel. Additionally, the form and function of the intersections and the road environment on Trig Road and Hobsonville Road does not contribute to quality urban outcomes sought for future urban development in the area.

5 Methodology and Analysis

5.1 Approach to Assessment of Operational Transport Effects

As detailed in Section 3.2, the Project has an identified set of Project Objectives. From a transport perspective these objectives are focused predominately on the themes of connectivity, safe travel choice and mode shift. In order to assess the transport effects of the Project the follow methods have been utilised.

5.1.1 Transport Modelling

Throughout the transport network analysis process, a range of different transport modelling tools have been used to undertake quantitative assessments of the transport system. These then inform decisions about planning the transport network, corridors, and intersections.

The impacts of the Projects on the future transport environment are assessed using forecasting transport models, owned by the Auckland Forecasting Centre (AFC). The models include:

- The regional multi-modal model (MSM). This model creates estimates of car, truck and public transport movements at a regional level based on land use, network and policy inputs. This model is the primary tool to estimate future PT usage. Generally, this model is run using regional assumptions as per recent Auckland Transport Alignment Plan (ATAP) planning, but with scenario-specific inputs in the growth areas.
- A local traffic model (SATURN). This uses the traffic demands from MSM on a more detailed representation of the road network.
- A strategic active model (walk/cycling) model (SAMM). This tool gives strategic-level estimates of walking and cycling demands.

The assessment of operational effects will therefore be informed by modelled estimates of travel and network performance for a future full-build-out scenario.

A key input to the models are regional land use forecasts, which influence the future quantum and location of travel. Regionally agreed land use forecasts are prepared by Auckland Council via the Auckland Forecasting Centre (AFC), with the most recent available forecasts (at the time of this assessment), referred to as Scenario I11.5. Those forecasts are based on regional population forecasts from Statistics NZ, with spatial allocation to individual spatial areas based on the AFC land use model and known detail around specific land use planning processes.

Land use forecasts have inherent uncertainty, particularly in terms of the specific rate of new growth in specific areas. Currently, there is additional uncertainty around the likely outcomes and rate and location of higher-density development sought through central Government policies such as the National Policy Statement on Urban Development (NPS-UD) and Auckland Council's Plan Change 78. A key intent of those policies is to enable higher density development, especially around high-quality public transport systems. The specific planning response to those policies is currently being progressed by Auckland Council, and revised land use forecasts reflecting any expected changes were not available at the time of preparing this assessment. Generally, it is considered that this Project is not inconsistent with such policy direction, regarding supporting higher density urban development via more sustainable travel modes. Given this context, the use of those available I11.5 forecasts is considered acceptable for this assessment.

In addition to the SATURN modelling, SIDRA[5] modelling has been undertaken to assess the operational outputs of key intersections along the project corridors. The regional model (MSM) was used to inform assessment of the public transport network components.

In regard to traffic modelling analysis used in this report, a Level of Service (LOS) metric has been used. This refers to a qualitative measure used to assess the quality of motor vehicle traffic service. LOS is used to analyse road corridors and intersections by categorising traffic flow and assigning quality levels of traffic based on a performance measure ranging from A to F and can be summarised as follows:

- **LOS A: free flow**. Traffic flows at or above the posted speed limit and motorists have complete mobility between lanes.
- **LOS B: reasonably free flow**. LOS A speeds are maintained, manoeuvrability within the traffic stream is slightly restricted.
- **LOS C: stable flow, at or near free flow**. Ability to manoeuvre through lanes is noticeably restricted and lane changes require more driver awareness.
- **LOS D: approaching unstable flow**. Speeds slightly decrease as traffic volume slightly increase. Freedom to manoeuvre within the traffic stream is much more limited and driver comfort levels decrease.
- **LOS E: unstable flow, operating at capacity**. Flow becomes irregular and speed varies rapidly because there are virtually no usable gaps to manoeuvre in the traffic stream and speeds rarely reach the posted limit.
- **LOS F: forced or breakdown flow.** Every vehicle moves in lockstep with the vehicle in front of it, with frequent slowing required. Travel time cannot be predicted, with generally more demand than capacity.

5.1.2 Relevant Standards and Guidelines

Integrated Transport Assessment

The AT Integrated Transport Assessment (**ITA**) Guidelines[6] have been used to inform the preparation of this ITA. In particular, the Guidelines identify that an ITA should provide an assessment of the accessibility of a proposal by walking, cycling, public transport and private motor vehicles. The Guidelines also indicate that the ITA should consider the potential effects a proposal could have on the transport network and any mitigation measures needed to ensure that any adverse effects of a proposal are avoided, remedied, or mitigated.

Design Standards

The proposed cross section has been developed in coordination with AT design specialists and in reference to AT's Transport Design Manual (**TDM**)[7].

[5] SIDRA modelling enables an assessment of individual intersections using inputs from regional models.
[6] Integrated Transport Assessment Guidelines, January 2015, Auckland Transport
[7] https://at.govt.nz/about-us/manuals-guidelines/roads-and-streets-framework-and-the-transport-design-manual/

It is considered that the TDM enables a design consistent with the future aspirations for the Whenuapai area, including providing facilities to support travel by walking, cycling, and public transport.

5.1.3 Assessment Methodology - Transport Mode

Table 6 summarises how each mode/element of transport has been assessed in terms of operational effects as a result of the Project.

Table 6: Summary of Assessment Methodology

Network Component	Information sources	Assessment Method
Walking and Cycling	Walking and Cycling network plans Proposed cross sections	Qualitative assessment to determine alignment with walking and cycling strategic documents and design compliance with Transport Design Manual
Safety	CAS database Project design drawings	Quantitative assessment of potential safety risk based on design features Qualitative assessment to determine alignment with AT's 'Vision Zero' standards
Public Transport	RPTP Strategic Regional Documents	Qualitative assessment to determine alignment with RPTP and other strategic documents Qualitative and Quantitative assessment using key model outputs including intersection performance
Access	Typical travel speeds Engineering standards	Qualitative assessment identifying where there is a potential effect on access Quantitative assessment of the change in travel time for properties with reduced accessibility
General Traffic	Transport Model – SATURN Model and Paramics Model Proposed design	Qualitative and Quantitative assessment using key model outputs including traffic volumes, intersection performance Qualitative assessment of surrounding network connections
Roads and Streets Framework (RASF) Assessment	Roads and Streets Framework	Qualitative and Quantitative assessment of the proposed corridor against the RASF principles
Overall Assessment against Project Objectives	Connectivity Travel Choice Mode Shift	Qualitative assessment based on above assessments

5.2 Approach to Assessment of Construction Traffic Effects

5.2.1 Construction Traffic Effects

In order to assess the potential construction traffic effects, an indicative construction methodology has prepared. This can be found in the AEE.

Based on the indicative construction methodology an assessment of construction effects has been completed. This assessment will consider:

- An overview of key considerations including speed, potential impacts to pedestrians and cyclists and property access
- Identification of any works that should not occur at the same time
- Assessment of potential conflict areas with vulnerable road users that will need specific mitigation within a Construction Traffic Management Plan (**CTMP**) and / or Site-Specific Traffic Management Plans (**SSTMP**).

The Project specific construction effects will be managed via a CTMP and/or SSTMP which will be developed immediately prior to implementation when the greatest certainty is available.

5.2.2 Temporary Traffic Management

The impact of any temporary traffic management measures implemented to undertake the projects will be re-assessed in the future, prior to construction, when a greater level of detail is available in terms of the specific construction methodology and traffic environment.

It is noted that there may be some nuances between projects delivered 'online' as they are existing roads and those delivered 'offline' as new greenfield roads. It is noted that the majority of the Project is expected to be delivered online. As such, any future assessment should be required to consider potential road closures, any capacity reductions on key corridors through lane closures, and any other ancillary effects such as shoulder closures.

At the time of construction of the Project or any stage of the Project, a Construction Traffic Management Plan (**CTMP**) will be developed with the purpose of managing traffic and transport effects on the local community and wider network and community. The CTMP will consider the effects on the transport network of potential road closures, any capacity reductions on key corridors through lane closure, and effects of any other ancillary activities such as shoulder closures.

6 Assessment of Transport Effects

Chapter Summary

The assessment of transport effects of the Project has identified the following outcomes and it is considered that, where necessary, the adverse effects identified in this report can be appropriately mitigated through the measures identified and detailed in Section 7. Significant positive transport effects of the Project, including the provision of separated walking and cycling facilities and public transport priority measures have also been identified.

Assessment of Walking and Cycling Effects

- All corridors within the Project are proposed to include separated walking and cycling facilities to encourage increased mode share for walking and cycling. This is achieved through the provision of safe separated facilities.
- The proposed facilities are a considerable improvement on the existing facilities and provide a significant contribution to achieving the Project outcomes. In particular the provision of high-quality walking and cycling facilities will support walking and cycling as a safe travel choice for future and existing communities.
- On Trig Road a bi-directional cycle way is indicatively proposed to minimise potential conflict between cyclists and existing driveways encouraging greater numbers of cyclists.
- Dedicated cycle and pedestrian crossings are proposed at all new and upgraded intersections to provide safe crossing facilities for pedestrians and cyclists.

Assessment of Safety Effects

- The Project design is consistent with Vision Zero outcomes sought by AT and prioritises facilities to support safe travel by foot, bike or public transport.
- The provision of separated facilities significantly improves safety for people that travel by walking and cycling.
- By reducing the speed of the corridor to 50 km/hr, this will offer further safety benefits when compared to the current 80 km/hr speed environment. This speed reduction is appropriate for the future urban context for Trig Road.

Assessment of Public Transport Effects

- The provision of bus priority at the intersections of Trig Road and Hobsonville Road and the provision of bus priority on Hobsonville Road from Luckens Road is consistent with the future route intentions identified in the Regional Public Transport Plan and ensures that buses are provided with reliable journey times, making travel by bus more attractive.
- The implementation of bus priority at these intersections will improve bus reliability and travel times, encouraging mode shift to public transport.
- Prioritising bus services at this intersection is consistent with the future RTN intentions for the North West, enabling connectivity to a new planned RTN station at Westgate.

Assessment of Access Effects

- For the majority of existing properties, there will be limited to no change to vehicle access provided.
- For existing properties that are rural and gain access from Trig Road, existing use access will be reinstated however once these properties are developed for urban purposes, they will need to gain access via future roads extending from Trig Road which will need to be provided by developers as the land is developed for urban purposes.
- Existing driveways that are remaining will be reformed in accordance with standards contained in AUP:OP where possible. Where this is not possible these properties have been included within the designation boundary as additional works may be required to provide a suitable access, or in some circumstances the properties acquired.

Chapter Summary

- Existing vehicle movements for most properties will be maintained. However, in the case of the dwellings between Trig Road and Luckens Road, right-in right-out movements will no longer be achievable because of a raised central median provided as a safety measure at the intersection approaches. The existing and future local network will allow right turn movements and facilitate access through the surrounding road network.

Assessment of General Traffic Effects

- The proposed intersections, as modelled with 2048 traffic volumes, operate well. Both intersections are predicted to operate within the theoretical capacities of the proposed design in both the morning and evening periods, with an overall LoS C or D at the intersections. This means a delay for drivers of between 20 and 55 seconds at the intersection.
- The queue lengths predicted for most approaches and times, demonstrate there is sufficient stacking space allowed. In the PM peak period, the 95th -percentile queue for vehicles on the Hobsonville Road approach may exceed the distance between intersections; however the provision of bus lanes between the intersections will limit the impact this would otherwise have had on bus reliability.
- The provision of traffic signals at both intersections will result in greater reliability, in particular for vehicles wishing to turn right from Luckens Road and Trig Road. The ability to turn right is currently variable, and it is considered that with the forecasted increase in traffic on Hobsonville Road, this variability will also increase.

Roads and Streets Framework Assessment

- A draft Roads and Streets Framework Assessment has been completed. This assessment indicates that Trig Road will have a Place 1/Movement 2 functionality.
- A Place 1 recognises that the adjacent land use has a primarily local function, with a small catchment of users.
- A Movement 2 recognises that the network function is of medium strategic significance with increasing volumes of users. It provides a connection to a strategic route – SH18.

Assessment of Construction Effects

- Construction effects are proposed to be managed via a detailed CTMP. This will be completed in relation to a confirmed construction methodology at the time of delivery of the Project.
- Given the expected future volumes on the surrounding road network, construction traffic movements are capable of being accommodated within the existing road network.
- Specific measures related to access and safe movement of vulnerable road users are expected to be provided at the time of resource consent.

6.1 Walking and Cycling

Trig Road is close to several key trip attractors, including Westgate shopping centre and public transport interchange (1km west of Trig Road), and business land planned in Whenuapai (1 to 3km north and east of Trig Road). West Harbour ferry terminal is 2.6km east of Trig Road on the current road network. Due to the relative distances, there are many opportunities to encourage local residents to walk or cycle to these facilities. The proposed separated cycle lane and footpaths will provide safe alternative transport options and encourage a mode shift for these local movements.

Based on the TDM, specifically the Urban Street and Road Design Guide, the standard for walking and cycling is to provide separated, protected walking and cycling facilities where general traffic volumes exceed 5,000 vehicles per day and 30kph. Consistent with AT's 'Vision Zero' objectives, the

proposed design provides for separated cycling facilities, given that the expected traffic speeds are in excess of 30 km/hr.

Trig Road and Hobsonville Road meet these triggers and therefore these facilities are proposed, not only for safety, but also to provide walking and cycling opportunities equal to those available to people who choose to drive, i.e. that footpaths and cycleways are safe, coherent, and connected.

Table 7: Geometry of Walking and Cycling Facilities

Standards	Minimum Standard Width	Comment
Auckland TDM	**Footpaths:** 1.8m minimum.	A 1.8m footpath is proposed on Hobsonville Road and Trig Road on both sides of the corridor. This is in accordance with the AT TDM requirements.
	Cycle Paths 2.0m width recommended for raised cycle paths. No specific width recommended for two way facilities but notes that a cyclist has an envelope of approximately 1.0m.	A 4.0m wide two-way facility is proposed for Trig Road, and 3.7m over the SH18 over-bridge. 2.0m raised separated cycle paths are proposed for Hobsonville Road. These facilities are in accordance with the AT TDM requirements.

6.1.1 Indicative Cycling Facilities

Typically cycling facilities would be provided on both sides of the corridor, allowing for high levels of access to adjacent properties. Through a series of design workshops with AT specialists, a two-way cycle facility on one side of the corridor was agreed to be appropriate on the eastern side of Trig Road, due to the high number of vehicle crossings on the western side. Once the land is urbanised on the north eastern and western side, it is expected that these properties will be accessed via future collector roads from Trig Road, rather than driveways directly on to Trig Road. Locating the cycleway on the eastern side of Trig Road means that cycle facility users will not have to cross multiple vehicle crossings, reducing the potential for conflict and accidents.

It is noted however, that should the urban context or environment along Trig Road change, there may be a desire to implement typical one way cycle facilities on each side of the corridor. The proposed corridor width would be capable of achieving these reconfigured cycle facilities in the future if required.

A 4.0m cycling facility is planned to enable two cyclists to pass each other with generous separation.

The cycle facility will also connect into future intentions for a strategic shared path on the southern side of SH18 and the proposed cycle provisions along Hobsonville Road.

The intersection of Trig Road and Luckens Road with Hobsonville Road will be provided with dedicated signalised cycle crossing facilities. These are considered to provide a significant increase in the level of service provided for cyclists at these intersections compared to the existing environment.

6.1.2 Pedestrian Facilities

Full signalised pedestrian crossings are to be provided at the signalised intersections of Trig Road and Hobsonville Road and Hobsonville Road and Luckens Road. There is an existing small pedestrian refuge located between Trig Road and Luckens Road on Hobsonville Road, which will be removed. The proposed signalised intersections on Hobsonville Road are considered to provide a significant increase in the level of service provided to pedestrians compared to the existing environment.

It is expected that additional pedestrian crossing facilities will be provided on Trig Road, south of the SH18 interchange, at such time that there is greater certainty in regard to adjacent land uses, the location of future collector roads and the location of bus stops. The proposed design provides a flush median which provides sufficient road corridor space to not preclude this crossing from being provided. These crossing facilities could also be provided in coordination with the delivery of the collector network, which will intersect with Trig Road.

For pedestrians, a pedestrian refuge has been provided to the south of the interchange ramps to enable pedestrians to connect with the footpath on the western side of Trig Road. This is considered a safe and appropriate facility. It is also noted that the form of the ramp intersections will be further investigated as part of subsequent business cases being completed by the Supporting Growth Programme, in conjunction with the remainder of Trig Road.

6.1.3 Integration with the Existing Network

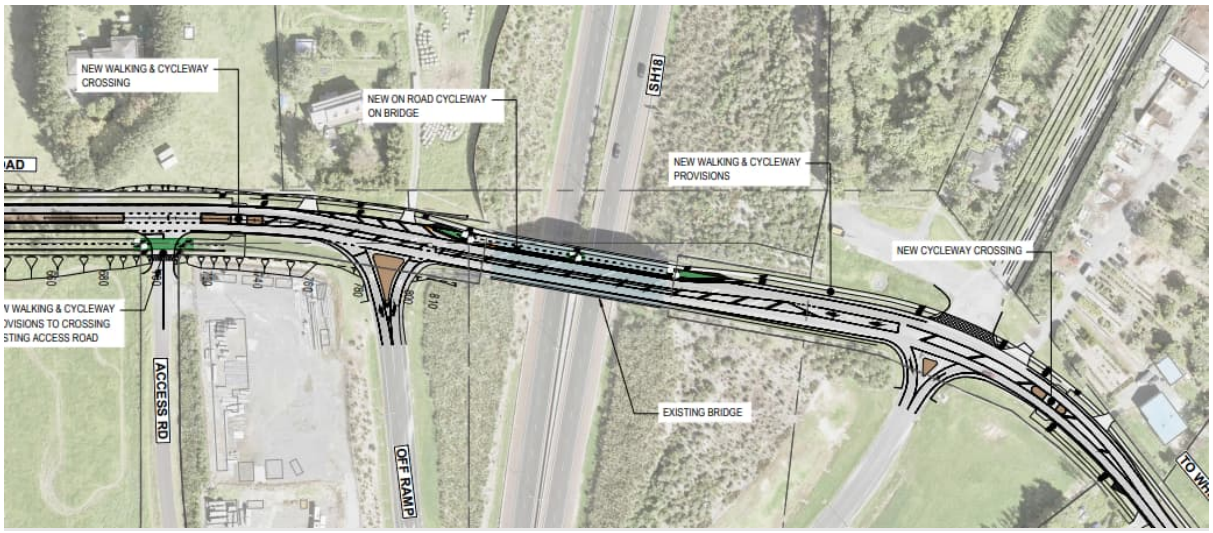
Ongoing wider network planning is being undertaken by AT, Waka Kotahi and the Supporting Growth Programme. Over time the Project will integrate with wider future elements of the network, including the continuation of Trig Road and SH16/18 connections including the strategic cycling facilities adjacent to SH18. This planning and subsequent implementation will occur over time. The Outline Plan will enable detail to be provided to show the effective integration with the network existing at the time of construction.

An important consideration with walking and cycling is the tie-in to the existing network where the Project extents ‘end’. In the case of Trig Road, there are three important transition points that were considered in the iterative geometric design process. They are Trig Road to Hobsonville Road; Hobsonville Road to Luckens Road; and Trig Road as it crosses SH18 on the over-bridge. It is recommended that specific details on the proposed tie ins at these locations are detailed within the Outline Plan.

The Outline Plan should include the proposed tie in locations and design for these tie ins for all modes of transport. This will detail the safe transition from the Project to the existing road network on Hobsonville Road and Trig Road. This may include safely transitioning cyclists back onto the road network.

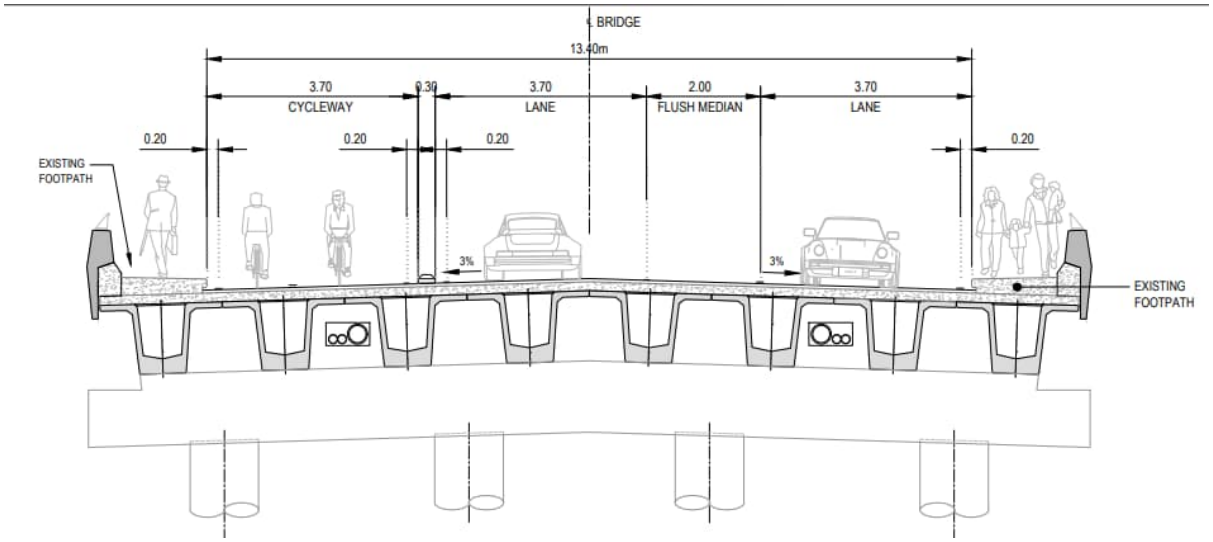
SH18 eastbound on-ramp and westbound off-ramps are located on the eastern side of Trig Road. Given this, careful design consideration has been given to the interaction between the ramps and cyclists. The Project accordingly provides for an unsignalised crossing point south on the interchange, moving cyclists to the western side of Trig Road and over the bridge. This is shown below in Figure 7.

Figure 7: Proposed Cycle Crossing on Trig Road



The facilities on the bridge will be provided through the reallocation of the space on the existing bridge. This will result in the cross section shown below in Figure 8.

Figure 8: Proposed Cross Section on Trig Road Bridge



6.2 Road Safety

The design of the Project has been undertaken cognisant of AT's Vision Zero, transport safety approach. As detailed below, this has resulted in the proposed corridors being designed to support lower vehicle speeds and with separate facilities for pedestrians and cyclists to reduce potential conflicts between road users and complement the future urbanisation of the surrounding land uses.

Given that the Project changes the form and function of the intersections, historical crash records do not provide significant insight into predicting future trends. The Project will address existing safety matters, including the rural nature of the corridor within an urbanising environment.

6.2.1 Alignment with Vision Zero

AT have adopted Vision Zero[8], an ethics-based transport safety approach, which is focused on all elements of road safety for all road users. The underlying premise of AT's Vision Zero is that no death or serious injury is acceptable.

As part of AT's Vision Zero response, a Transport Safety Strategy and Action Plan to 2030 has been implemented. This strategy identifies a suite of actions that will be undertaken to support a Vision Zero approach. The Project supports this suite of actions by:

- Providing for protected walking and cycling facilities on all corridors, where necessary, supporting facilities for vulnerable road users
- Safe intersection design based on AT standards and provision of crossing facilities for vulnerable users, where necessary
- Vehicle lane widths and corridor widths minimised, as much as practicable, to support a lower speed environment.

Overall, the Project is well aligned with the principles of AT's Vision Zero. It is noted that detailed design refinements will be completed to further support safety outcomes at a subsequent stage prior to construction.

6.2.2 Effect on Current Roading Environment

The current intersection forms at Trig Road and Luckens Road with Hobsonville Road were designed for a low-volume rural environment.

It is noted that the existing intersections currently provide:

- Wide radius curves at the intersections that enable turning at greater speeds than would be expected or required in an urban environment
- Acceleration lanes for left turning vehicles from both Trig Road and Luckens Road to enable vehicles to increase speeds to match through movement vehicles
- Left turn slip lanes approaching the intersections to allow for deceleration.

While these intersections may have been appropriate in the past, these will be less appropriate as urbanisation occurs. A speed environment of 50kph is more appropriate in an urban context and consequently there is a need to reform these intersections in a way that supports walking and cycling and encourages a slower speed environment.

Moreover, the current posted speed limit on Trig Road is 50kph near Hobsonville Road, increasing to 80kph further north adjacent to Ryans Road. Given that the proposed works are to support an urban environment, and will include facilities to encourage walking and cycling, it is recommended that the 50kph speed limit on Trig Road be extended to the north of the SH18 interchange. This can be facilitated by a change to the existing by-law utilising the Setting of Speed Limits Rule (NZ Govt 2017).

[8] https://at.govt.nz/projects-roadworks/vision-zero-for-the-greater-good/

6.3 Access

Hobsonville Road is currently classified as an 'Arterial' corridor. Under the AUP:OP, vehicle access to and from sites is restricted or managed to provide for the movement of people and goods on the network[9]. As such it is expected that arterial corridors will not actively provide for new direct property access in the longer term and any new access will need to be assessed as part any consenting process for future developments. Being arterial corridors, the core purpose of these corridors is to facilitate safe and efficient movement along the corridor for connection between key destinations, rather than property access. Existing property access will need to be maintained; however some movement controls or impacts may be required for safety or efficiency reasons.

Trig Road is not currently shown as an arterial in the AUP:OP, however it is shown as an arterial in the WSP. It is expected to perform as an arterial road in the future network in Whenuapai and be re-classified as such in the future.

Future access to the land adjacent to the Trig Road corridor will be provided by collector roads through the subdivision process. These collector roads and the intersections to Trig Road will be provided by developers at the time of urbanisation. As such, this section primarily addresses where existing property access will be affected by the Project.

In terms of existing properties, the overarching design philosophy for the Project has been to maintain driveway access where practicable and minimise impacting land other than where necessary to re-instate driveways.

There are several existing properties where it has been identified that a replacement driveway will not be possible to implement with the Project in place, primarily due to changes to road levels and incursion of the corridor into the front of properties. These properties have been included within the proposed designation boundary.

6.3.1 Implications on Access Movements

As part of the design of the signalised intersections a raised traffic island has been proposed to separate traffic at the intersection approaches. The provision of the raised island has been provided as a safety measure to prevent crashes between vehicles at the intersection.

The additional lanes provided on Hobsonville Road result in right turning vehicles needing to cross up to three traffic lanes. This movement is considered to have safety implications and accordingly the design includes a raised median on Hobsonville Road between Luckens Road and Trig Road.

The implication of these raised islands is that several existing property accesses between 72 to 78 Hobsonville Road and 87 to 111 Hobsonville Road will no longer be able to turn right and will in effect be a left-in left-out access.

For these properties, it is expected that vehicles will be able to make left-in and left-out movements only. To safely travel in a direction that would have required a right turn movement, vehicles can travel using the wider network. If requiring a right turn from the property, they can turn left from the property and travel down Cyril Crescent, Elizabeth Drive, Moire Road to Luckens Road – and turn right from the signalised intersection. This route would result in between 1.5 km to 1.7 km of additional

[9] Chapter E27: Transport, E27.3 Policy 21

travel for the most eastern property (111 Hobsonville Road). If approaching from the west and requiring a right turn into the property, vehicles may turn at Cyril Crescent and complete the journey as described above. If they are approaching from SH16, vehicles may choose to exit at Royal Road and travel via Moire Road which is a similar distance to if they approached the properties on Hobsonville Road.

It is expected that in the future with development within the future urban area there may also be a finer grain network of collectors to enable other possible routes for these properties.

Within the context of significantly improved walking, cycling and bus facilities, the effects in terms of additional travel time to complete these vehicle access movements, are considered to be minor.

6.4 Public Transport Network

6.4.1 Design Philosophy

Currently there are no dedicated public transport facilities within the Project extents. The Project proposes to improve bus travel time and reliability through the following infrastructure:

- Provide 'bus only' through movements in the left turn lanes on Hobsonville Road at the intersections of Luckens Road and Trig Road;
- Provide a dedicated kerb-side lane on both sides of Hobsonville Road; and
- Provide a right-turn bus advance lane on Trig Road.

This infrastructure will allow buses travelling on Hobsonville Road to avoid intersection queuing, reducing delay at intersections and improving travel time reliability. These benefits for buses will help to encourage a shift away from private vehicles to reliable bus services. The ability for buses to avoid queuing creates a direct incentive to use public transport.

The Project also proposes to remove the indented bus bays on Hobsonville Road, west of Trig Road. These bus stops will be remarked in the same location. The bus stops on Luckens Road will be remarked in the same location. Where the buses will stop in the traffic lane, such as Hobsonville Road to the west of Trig Road, this will provide buses with increased reliability and improved ability to re-enter the traffic flow with minimal impact on general traffic.

The bus stop on Hobsonville Road east of Luckens Road will be relocated to be centrally located between the two signalised intersections (within the bus lanes). These will support safe crossing for pedestrians at the signalised intersections.

In terms of new bus stops on Trig Road or potentially the relocation of stops on Hobsonville Road, the proposed road berm in the indicative corridor cross section can accommodate potential new bus shelters. It is expected that the exact location of bus stops will be confirmed when there is more certainty in the adjacent land uses and the location of the collector network.

6.4.2 Alignment with Regional Strategy and Planning

Overall, the Project is well aligned with the RPTP. Specifically, the provision of bus priority, at the intersection of Trig Road and Hobsonville Road and along Hobsonville Road, is consistent with long-term intentions for public transport facilities in this area, as identified in the RPTP and ATAP.

In the shorter term, the intersection design provides increased reliability and reduced delay for buses travelling along Hobsonville Road.

Hobsonville Road will play an increasingly important role as part of the Frequent Transport Network and will support staged growth in Whenuapai. As such the intersection of the Trig Road and Hobsonville Road, and Luckens Road with Hobsonville Road have been designed to accommodate both existing and future bus movements and, in particular, enable buses travelling along Hobsonville Road to gain priority in the kerb-side lane (shared with left turning vehicles).

6.5 General Traffic

The performance of the road network within the Project has been assessed using inputs from SATURN and a small Paramics model to understand intersection performance. Due to the proximity of the two intersections on Hobsonville Road, it is appropriate that a localised Paramics model is used to assess intersection performance.

6.5.1 Intersection Performance

The Paramics model developed is based on the following peak periods:

- Morning Peak: 6:30am to 9:30am, with the peak hour being 8:00am to 9:00am
- Evening Peak: 3:30pm to 6:30pm, with the peak hour being 5:00pm to 6:00pm

Traffic demands included in the Paramics model are based on traffic demand cordons sourced from the 2046 North West Supporting Growth SATURN Model.

Cordon traffic demands for both the morning and evening peak hour have been extracted from the SATURN model period (one hour), with the hourly traffic demands then being factored to create three-hour demands using traffic profiles derived from SCATS[10] and manual traffic surveys obtained in 2015.

The predicted traffic volumes, intersection delays and LoS at the Trig Road/Hobsonville Road and Luckens Road/Hobsonville Road intersections for the 2046 peak period are summarised below in Table 8 and Table 9.

Table 8: Proposed Intersection Performance: Morning Peak Hour 2048

Intersection	Approach	Movement (left/right/through)	Number of Vehicles	Delays (sec)	LoS	AM Peak Queue (m)	
						Avg	95%le
Trig Road/ Hobsonville Rd	Trig Rd	L	520	26	C	89	136
		R	489	45	D		
	Hobsonville Rd W	L	215	11	B	48	74
		T	465	34	C		

[10] Sydney Coordinated Adaptive Traffic System manages the timing of signal phases using sensors at traffic signals to detect vehicle presence in each lane and pedestrians waiting to cross. The vehicle sensors are generally inductive loops installed within the road pavement.

Intersection	Approach	Movement (left/right/through)	Number of Vehicles	Delays (sec)	LoS	AM Peak Queue (m)	
	Hobsonville Rd E	T	591	5	A	63	106
		R	364	32	C		
Luckens Road/ Hobsonville Rd	Hobsonville Rd W	T	662	19	B	59	98
		R	318	40	D		
	Luckens Rd	L	437	13	B	61	89
		R	384	35	C		
	Hobsonville Rd E	L	116	16	B	61	154
		T	516	33	C		

Table 9: Intersection Performance: Evening Peak Hour 2048

Intersection	Approach	Movement	Volume	Delays (Seconds)	LoS	PM Peak Queue (m)	
						Avg	95%le
Trig Road/ Hobsonville Rd	Trig Rd	L	415	11	B	55	83
		R	309	39	D		
	Hobsonville Rd W	L	388	17	B	64	83
		T	392	35	C		
	Hobsonville Rd E	T	546	6	A	55	93
		R	507	27	C		
Luckens Road/ Hobsonville Rd	Hobsonville Rd W	T	456	7	A	54	88
		R	351	27	C		
	Luckens Rd	L	437	13	B	94	164
		R	359	33	C		
	Hobsonville Rd E	L	223	32	C	46	71
		T	614	54	D		

The results in the above tables demonstrate that the intersections, as modelled with 2048 traffic volumes, operate well. Both intersections are predicted to operate within the theoretical capacities in both the morning and evening periods, with an overall LoS C or D at the intersections. With a predicted LoS C or D, this means that delay at the intersections will be generally within an acceptable level. Based on the Highway Capacity Manual standards, a LoS D suggests that occasionally a driver may have to wait through more than one signal cycle before proceeding. This is not uncommon in peak periods in urban environments and overall, not a significant level of delay.

These queue lengths demonstrate that for most approaches and times, there is sufficient stacking space allowed. In the PM peak period, the 95th percentile queue for the Hobsonville Road approach may exceed the distance between intersections, however the provision of bus lanes between the

intersections will limit the impact this would otherwise have had on bus reliability, and may encourage mode shift from private vehicles to public transport.

Should the intersections remain as existing in the future, movements on Hobsonville Road would remain largely uninterrupted, however turning movements and delay associated with these movements would become greater and increasingly variable with increased traffic volumes. In comparison, the provision of signalised intersections will result in lower peak period delays for side roads, and greater delays for Hobsonville Road movements. However, within the urbanising context and in light of the increased outcomes for pedestrians and cycling this is considered to be an acceptable effect.

In comparison to the existing intersections, which provide priority to through movement on Hobsonville Road, the provision of signalised intersections along Hobsonville Road will result in delays to vehicles travelling down Hobsonville Road. The delay experienced travelling through two signalised intersections is typical of travelling by vehicle in an urban environment and therefore would not be unexpected within the context of the rapidly urbanising surrounding area. This delay to private vehicles is considered minor when compared to the increased amenity and crossing facilities provided to other users by the Project improvements (particularly pedestrians and cyclists).

Travel time along Trig Road is expected to increase slightly as a result of the lower speed urban environment. The reduced speed limit of 50 kph is a more appropriate speed for an urban environment with increasing vehicles, pedestrian and cyclists. Overall, a reduced speed limit over approximately 600 m of corridor would result in an increased travel time of some 10 seconds.

It is also acknowledged that the provision of bus priority at the intersections and the connecting bus lanes will mean that bus services will be provided with additional facilities. This is consistent with the Project Objectives to provide for different modes and encourage mode shift.

6.6 Surrounding Network Connections

The collector road network as in the WSP is not provided for by the Project as the alignment and delivery of these will be the responsibility of developers at the time of urbanisation. The design does not preclude these intersections being provided by developers at a later time. Additional land that may be necessary to deliver the intersections for collector roads will be vested by developers at the time of development. The median also facilitates the opportunity for future pedestrian/cycle crossing points along Trig Road, as the urbanisation on both sides of the corridor occurs.

The location of these collector intersections will also need to be integrated with the bus stop locations and pedestrian crossing facilities. The Project does not preclude these facilities being provided at a future stage of design or after construction by other parties.

6.7 Roads and Streets Framework Assessment

The Roads and Streets Framework describes, balances and integrates the intended strategic and local place and movement functions of roads and streets, as well as the levels of service for all transport modes.

Based on the future land use and the surrounding road network a draft assessment has been completed for Trig Road. This identifies a categorisation of Place (1) and a Movement (2). This recognises that the adjacent land use has a primarily local function, with a small catchment of users, while a Movement 2 category recognises that the network function is of medium strategic significance with increasing volumes of users. Trig Road provides a connection to a strategic route – SH18 and connects to Hobsonville Road a key east west arterial link.

The provision of dedicated walking and cycling facilities, and public transport priority at the intersections of Luckens Road and Trig Road is consistent with road corridors of this nature.

6.8 Overall Assessment against Project Objectives

From a transport perspective the Project Objectives are focused on the themes of connectivity, safe travel choice and mode shift, and supporting planned urban growth. The above assessments have detailed the expected outcomes that the Project will provide, and overall, the Project achieves these outcomes. Without the Project, the walking and cycling facilities on these roads are substandard for an urban context and are not attractive for travel by these modes. The current road environment including the intersections of Trig Road and Luckens Road supports higher vehicle speeds, which further results in a reduced attractiveness for walking and cycling and safety implications for all transport modes. The overall impact of this is increased levels of private car use as the preferred transport choice.

The Project addresses these outcomes in the following ways:

- In terms of connectivity, the upgrade of Trig Road and Hobsonville Road will improve connectivity between the future growth areas in Whenuapai and the Metropolitan centre at Westgate. In particular, connectivity by foot, cycle and public transport will be significantly improved for both local and regional travel.
- The upgraded corridors within the Project will include the provision of safe walking and cycling facilities to enable attractive travel choices for residents in the Project area and enable connections to the existing and/or future active networks. The Project also includes the upgrade of intersections with the existing arterial network, providing safe crossing for pedestrians and cyclists. Specifically, the provision of a bi-directional cycle way on Trig Road will provide a high quality of service for cyclists that will connect with Hobsonville Road.
- Improved public transport facilities at the intersection of Trig Road and Hobsonville Road will provide for improved reliability for bus travel times, thereby increasing the efficiency and attractiveness of public transport travel to future rapid transport networks.
- The upgrade of Trig Road and Hobsonville Road is consistent with the future urban environment planned for within the WSP. It provides for urban arterials that accommodate movements by foot, by bike and bus, and by private vehicles.

Overall, the Project provides safe, attractive arterial roads that supports future travel choice and will sufficiently provide for increased connectivity in the Whenuapai area.

6.9 Assessment of Construction Effects

Given the construction timing and staging of the package has yet to be determined, there is a degree of uncertainty associated with any predicted construction methodology and associated traffic routes. This means:

- The routes that will be used by construction vehicles will depend on the location of quarries and disposal sites which are not yet certain
- The exact location and extent of compound sites/lay down areas has yet to be determined
- The timing of construction of other projects could impact on likely construction vehicle routes

Notwithstanding this, it is considered that with available connectivity to the strategic network and available capacity in the network, construction traffic will be able to be readily accommodated.

The construction of the Project will require earthworks. Final cut and fill volumes will be confirmed following detailed design prior to construction. The construction traffic movements to accommodate the earthworks will likely result in an increase of traffic volumes on construction routes used during the construction period of the Projects.

It is noted that the access to compound sites/laydown areas and construction zone for construction vehicles, plant and materials will be via site access points identified as part of detailed CTMPs.

Details of the routes and time restrictions will need to be updated and refined as part of the CTMP process. It is anticipated that the routes for construction traffic will likely be limited to arterial corridors and intersections with the provision of adequate vehicle tracking.

Speed Limits

In order to maintain the safety of all road users, it is recommended to implement a safe and appropriate temporary speed limit during the construction period on the network within the extent of works, and along the construction routes if needed. This should be in accordance with the latest traffic management standards at the time of construction. These recommended measures and other measures highlighted in the CTMP are expected to reduce the potential safety risks that may be associated with construction traffic.

Pedestrians and cyclists

The existing provision for pedestrian and cyclists is variable across the network. It is likely that the demand for these modes will increase if urbanisation occurs prior to construction, but future parallel collectors could also be used as alternative routes. Therefore, effects should be assessed again when a greater level of detail is available about surrounding facilities and land use activities prior to construction. However, it is recommended that residents and stakeholders be kept informed of construction times and progress, and general observations of pedestrian and cyclist activity be used to inform appropriate traffic management measures in the CTMP.

Property access for residents and businesses

During the time of construction, there will be temporary traffic management controls such as temporary concrete or steel barriers. Existing driveways that remain during construction will be required to have temporary access provision. It is anticipated that the contractor should undertake a property specific assessment of any affected driveways and provide temporary access arrangements

if required. The temporary access should ensure the ability for residents to safely access and exit the property. These requirements should be captured in the CTMP or SSTMP, if required. Confirmation of traffic management controls will be required immediately prior to works to reflect the land use considerations at that time.

Land use activities that will need further consideration in the CTMP

At the time of this report, no specific land use or activities have been identified as requiring specific consideration during the development of the CTMP. Overall, it is considered that expected construction effects can be managed via the use to the CTMP or SSTMP prior to implementation.

6.9.1 Temporary Traffic Management

It is anticipated that the works required for this project will likely be delivered online or in the live carriageway, which means that temporary traffic management will be required. The scale of temporary traffic management to delineate live traffic away from the construction zones is largely dependent on the various stages and requirements of the construction activities. It is expected that short term temporary road closure for nights or weekends may be required for some specific activities, such as road surfacing, traffic switches and gas relocation. Other activities may require stop/go or contraflow traffic management, such as drainage, utility relocation, survey and investigation work.

The effect of temporary road closure or other traffic management methods to existing traffic on the specific corridor and adjacent road network should be confirmed in the future as part of the CTMP and on the basis of the current traffic environment.

A CTMP is proposed to be required as a condition of the NoR. It is expected that the objective of the CTMP would be to manage the traffic effects during construction of the Project so that safe and adequate facilities for movements by all transport modes are maintained throughout the construction period. The CTMP would set out methods and measures to do this and would typically include:

- Identification of measures related to the interface with the existing road network at the extents on the Project; and
- Any specific temporary traffic management measures to maintain property access during construction.

The CTMP would be submitted to Auckland Council for information prior to construction. The CTMP would identify potential road closures, property access impacts any capacity reductions on key corridors through lane closure, and any other ancillary effects such as shoulder closures. The implementation of such measures would be addressed through a SSTMP, which would be part of a separate approval process by AT as road controlling authority.

7 Managing Effects and Achieving Project Outcomes

7.1 Managing Operational Effects

Table 10 below summarises the proposed measures to manage the identified effects of the Project and help to ensure that the positive effects of the Project are achieved.

Table 10: Summary of Proposed Measures

Operational Transport Effects	Proposed Measures
Walking and Cycling Effects	In order to provide safe and attractive walking and cycling facilities to appropriate standards that are integrated with the wider network an Outline Plan should specify: • The type of walking and cycling infrastructure to be provided within the corridor including confirmation of the proposed dimensions. • Details on the integration proposed for walking and cycling facilities between the extent of the works and any existing facilities.
Safety Effects	All transport design in New Zealand is subject to a Road Safety Audit at the detailed design stage. Once through that audit, the design will form part of the Outline Plan process. Given the change in the road form from rural to urban, a speed reduction from 80kph to 50kph is recommended for the extent of the Project on Trig Road and reflects the future urban environment. The standard process for undertaking a speed reduction Setting Speed Limits 2017 Land Transport Rule 54001/2017 (outside the RMA process) should be completed prior to the works being completed.
Access Effects	It is recommended that a detailed access assessment is completed by a suitably qualified traffic engineer and/or transport planner that considers property access implications and identifies appropriate mitigation where driveway access compliant with AUP:OP cannot be provided.

7.2 Managing Construction Traffic Effects

It is considered that the potential construction traffic effects can be accommodated and managed appropriately via a CTMP. Based on the assessment of transport construction effects, it is recommended:

- A CTMP shall be prepared prior to the Start of Construction for a Stage of Work.
- The objective of the CTMP is to avoid, remedy or mitigate, as far as practicable, adverse construction traffic effects. To achieve this objective, the CTMP shall include:
  - methods to manage the effects of temporary traffic management activities on traffic;
  - measures to ensure the safety of all transport users;
  - the estimated numbers, frequencies, routes and timing of traffic movements, including any specific non-working or non-movement hours to manage vehicular and pedestrian traffic near schools or to manage traffic congestion;

- site access routes and access points for heavy vehicles, the size and location of parking areas for plant, construction vehicles and the vehicles of workers and visitors;
- identification of detour routes and other methods to ensure the safe management and maintenance of traffic flows, including pedestrians and cyclists, on existing roads;
- methods to maintain vehicle access to property and/or private roads where practicable, or to provide alternative access arrangements when it will not be;
- the management approach to loads on heavy vehicles, including covering loads of fine material, the use of wheel-wash facilities at site exit points and the timely removal of any material deposited or spilled on public roads;
- methods that will be undertaken to communicate traffic management measures to affected road users (e.g. residents/public/stakeholders/emergency services).

8 Conclusion

The assessment of transport effects has identified that the Project provides safe and appropriate urban arterial corridors that support future travel choice and provides for increased connectivity for the current and future communities in Whenuapai.

Without the Project, the walking and cycling facilities on these roads are substandard for an urban context and are not attractive for travel by these modes. The current road environment, including the intersections of Trig Road and Luckens Road, support higher vehicle speeds, which further results in a reduced attractiveness for walking and cycling and safety implications for all transport modes. The expected traffic volume increases in the future will result in increasing delays and greater levels of delay variability at the intersections for vehicles on Luckens Road and Trig Road.

The potential outcomes are significantly improved by the Project and will include:

- Connectivity between the future growth areas in Whenuapai and the Metropolitan centre at Westgate and in particular, connectivity by foot, cycle and public transport.
- The level of provision for safe walking and cycling to enable attractive travel choices for residents in the Project area.
- Connections to the arterial network through the upgrade of intersections providing safe crossing for pedestrians and cyclists and reducing turning delay for traffic on Luckens Road and Trig Road.
- Public transport facilities at the intersection of Trig Road and Hobsonville Road and provide for improved reliability for bus travel times, thereby increasing the efficiency and attractiveness of public transport travel to future rapid transport networks.

In terms of adverse effects, the Project will result in restrictions on right turn movements from properties located between Luckens Road intersection and Trig Road intersection, as a result of the introduction of a central median (for safety). This will result in some inconvenience for these properties and potentially slightly longer travel times to reach their destinations. Overall, these adverse effects are considered to be minor, given that that there are alternatives routes available within the wider network routes, and lower order roads where u- turns can be safely undertaken.

Overall, the Project provides safe, attractive arterial roads that supports future travel choice and will sufficiently provide for increased connectivity in the Whenuapai area.

Appendix 1 - Transport Modelling Context

Transport Modelling Assumptions

Within the SATURN model (refer Section 5.1.1) there are a series of assumptions included within each forecast year. The below table summarises the assumptions regarding related projects and their likely impacts on Trig Road if they do not occur. Assumptions have been made about the implementation years of these projects, which have in turn informed the years in which the projects have been included in the transport model.

Table A1: Infrastructure Assumptions and Potential Impacts

Project	Model Years included			Potential impacts on Trig Road
	2028	2038	2048	
SH16/18				
Squadron Drive Ramps	Y	Y	Y	Limited Impact on Trig Road. Proposed Squadron Ramps are west facing, creating a full interchange Trig Road ramps are east facing as are existing east facing ramps at Squadron Drive.
SH16/18 Connections	-	Y	Y	Significant Impact on Trig Road. Reduces expected traffic volumes on Trig Road. Removes traffic from north of Brigham Creek travelling to SH18.
SH16 Brigham Creek Interchange	-	Y	Y	Northside Drive (and south facing ramps) component enables movement from Trig Road to Westgate. Potentially and increase in Movements on Trig Road to access Northside Drive ramps (City Bound).
SH18 Brigham Creek Interchange	-	-	Y	Enables public transport access for local services from Westgate to Trig Road.
City Centre to North West RTN				
Interim Bus Solution	Y	-	-	N/A
To Westgate	Y	Y	Y	Enables Westgate to operate with a public transport hub. Local services still required to use Northside Drive, Trig Road and Hobsonville Road to access Whenuapai.
To Kumeu		Y	Y	Limited Impact
Other Projects				
SH18 RTN	-	Y	Y	Significant impact. Bus services able to utilise SH18 RTN to travel rather than Northside Drive and Trig Road to access strategic network. Local services will continue to operate on Trig Road.
Kumeu Alternative Corridor	-	Y	Y	Limited Impact

Rawiri Road Bridge and Connections	-	Y	Y	Moderate impact. Implementation reduces traffic flows on Trig Road. Without the connections, daily flows on Trig Road are projected to be higher.

ATTACHMENT 14

TRIG ROAD CORRIDOR UPGRADE ASSESSMENT OF CONSTRUCTION NOISE AND VIBRATION

Supporting Growth

Trig Road Corridor Upgrade

Assessment of Construction Noise and Vibration

Version 1.0

December 2022

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Document Status

Version	Responsibility	Name
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Appendix 1. Noise Monitoring Results

Acronyms

Acronym/Term	Description
AEE	Assessment of Environmental Effects
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan Operative in Part 2016
BPO	Best Practicable Option
CNVMP	Construction Noise and Vibration Management Plan
DIN	Deutsches Institut Für Normung e.V. (German Institute for Standardisation)
NoR	Notice of Requirement
PPC5	Proposed Plan Change 5
Receivers	Noise sensitive areas such as dwellings, hospitals, school and commercial properties
RMA	Resource Management Act 1991
SH18	State Highway 18
Waka Kotahi	Waka Kotahi NZ Transport Agency

1 Executive Summary

Construction noise levels have been assessed using the method recommended in NZS 6803 in accordance with the Auckland Unitary Plan Operative in Part (AUP:OP). As construction of each Project is expected to last for more than 20 weeks, the “long-duration” noise limits are applicable.

Noisy activities will typically be carried out between 7am – 6pm on weekdays. Night-time and weekend works will be limited and only occur for critical activities.

Construction vibration levels have been assessed against the requirements of the AUP:OP, which refer to the criteria in DIN 4150-3:1999 for the avoidance of cosmetic building damage (DIN criteria). The AUP:OP also details amenity criteria, which act as a trigger for consultation if predicted to be exceeded.

Construction noise setback distances and vibration emission radii have been determined (based on assumptions of construction activities and equipment) for each of the NoR sections. The construction boundary is assumed to be the edge of the proposed alignment. Affected receivers have been identified using construction noise setback distances and vibration emission radii. The construction noise setback distances and vibration emission radii were used to determine where any potential construction noise and vibration exceedances of the relevant criteria could occur. It should also be noted that the emission radii are conservative and vibration levels measured on site tend to be much lower than those predicted at the NoR stage of a project.

Potential effects of construction noise and vibration have then been assessed and construction management and mitigation measures identified where appropriate. To avoid and/or minimise exceedances of the Project construction noise and vibration criteria, Best Practicable Option (BPO) mitigation and management measures should be utilised.

The noise environment is dominated by road traffic noise from vehicles on Don Buck Road and the surrounding road network.

Receivers within 90m of the works could experience unmitigated noise levels that exceed the daytime noise criterion during high noise generating activities such as the pavement works. Based on the footprint of the designation boundary, this would correspond to 135 existing dwellings that could experience noise levels up to 70 dB LA_{eq}.

The exclusion zone distance reduces to 28m with noise barriers implemented effectively around working sites. This would correspond to 69 existing dwellings that could experience noise levels up to 70 dB LA_{eq}.

Receivers are located at varying distances from the construction boundary along the alignment with the closest existing receiver being 2m from the alignment. With mitigation in place, as set out in Section 5.2, noise levels of up to 90 dB LA_{eq} could still occur intermittently at the closest receivers, if high noise generating activities occur on the construction boundary. At this level effects could include loss of concentration, annoyance, and a reduction in speech intelligibility.

Operation of construction equipment will be intermittent in nature. Construction will be linear so as the equipment moves away from the receiver noise levels will reduce. The worst-case situations, where mitigated noise levels could reach 90 dB LA_{eq} at the closest receivers, are not expected to be frequent, due to the setback distances to the majority of the proposed works and the use of

equipment with lower source noise levels for large portions of the works. It is therefore predicted that mitigated noise levels can comply with the 70 dB LA_{eq} noise criterion for most of the construction works.

Vibration levels could exceed the Category B criteria at 36 existing dwellings prior to mitigation being implemented, if high vibration generating equipment, such as the roller compactor, is used on the construction boundary at the closest position to the receivers. At these receivers there is potential for cosmetic damage to buildings (such as cracking) and annoyance from perception of vibration. Vibration can typically be tolerated inside buildings if it occurs intermittently during the day, is of limited duration and where there is effective prior engagement.

Conclusion

Construction noise and vibration can be mitigated and managed, utilising the measures set out in Section 7.2, to generally comply with the applicable limits as defined in the AUP:OP. Exceedances of the criteria could occur intermittently over a short duration if high noise or vibration generating equipment are used near occupied buildings. Where an exceedance is predicted at any receiver that exists at the time of construction, the effects will be mitigated and managed through the CNVMP and Schedules.

A CNVMP is the most effective way to avoid, remedy or mitigate construction noise and vibration effects on receivers.

2 Introduction

2.1 Background

Auckland's population is growing rapidly; driven by both natural growth (more births than deaths) and migration from overseas and other parts of New Zealand. The Auckland Plan 2050 anticipates that this growth will generate demand for an additional 313,000 dwellings and require land for approximately 263,000 additional employment opportunities.

In response to this demand, the Auckland Unitary Plan Operative in Part 2016 (**AUP:OP**) identifies 15,000 hectares of predominantly rural land for future urbanisation. To enable the urban development of greenfield land, appropriate bulk infrastructure needs to be planned and delivered.

The Supporting Growth Programme is a collaboration between Auckland Transport (**AT**) and Waka Kotahi NZ Transport Agency (**Waka Kotahi**), to investigate, plan and deliver the transport networks needed to support Auckland's future urban growth areas over the next 30 years.

2.2 Purpose of this Report

Trig Road, Whenuapai has been identified in the Supporting Growth Programme as a future arterial corridor that is needed to support the urban development of Whenuapai.

This report has been prepared to support AT's notice of requirement (**NoR**) and application for resource consents for the Trig Road Corridor Upgrade (the **Project**). The NoR under the Resource Management Act 1991 (**RMA**) is to designate land for the construction, operation and maintenance of the Project.

Funding for the upgrade of Trig Road between Hobsonville Road and State Highway 18 (**SH18**) has been made available through the Housing Infrastructure Fund[1]. As there is funding available for construction, AT are also applying for the necessary resource consents under the RMA, concurrently with the NoR process.

This report provides an assessment of noise and vibration effects associated with the construction and operation of the Project. This assessment has been prepared to inform the Assessment of Environmental Effects (**AEE**) for the NoR and resource consent application.

The key matters addressed in this report are as follows:

a. Identify and describe the existing noise environment;

b. Overview of the methodology used to undertake the assessment and identification of the assessment criteria and any relevant standards or guidelines;

c. Describe the actual and potential adverse construction noise and vibration effects of construction of the Project;

[1] See North West Housing Infrastructure Fund Assessment of Environmental Effects for further detail regarding the Housing Infrastructure Fund.

d. Recommend measures as appropriate to avoid, remedy or mitigate potential adverse construction noise and vibration effects (including any conditions/management plan required); and

e. Present an overall conclusion of the level of actual and potential adverse construction noise and vibration effects of the Project after recommended measures are implemented.

2.3 Project Description

The Project consists of the widening and upgrade of Trig Road between the SH18 off-ramps and Hobsonville Road. The widening has capacity to provide for a two-lane arterial standard corridor including new footpaths on both sides of the road and a cycleway which is indicatively shown as a dedicated bi-direction cycleway on the eastern side of the corridor. The Project will upgrade the current rural standard corridor to an urban standard, which is appropriate to support the soon to be urban environment on either side of Trig Road.

To tie into the existing road network, the Project also includes the signalisation of the intersections at Trig Road/Hobsonville Road and Luckens Road/Hobsonville Road and upgrade of Hobsonville Road between these intersections. This will require some localised widening of the road corridor along Hobsonville Road.

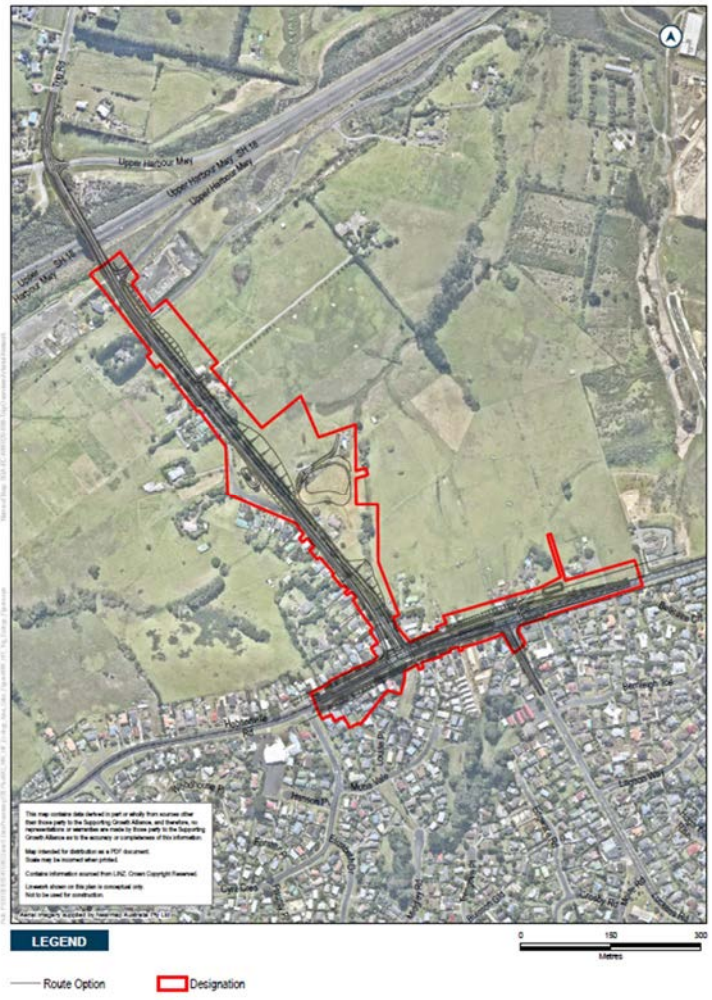


Figure 2-1: Whenuapai – Trig Road Corridor Upgrade

3 Assessment Criteria

3.1 Statutory Context

3.1.1 Notice of Requirement

This assessment has been prepared to support the NoR process for the Project. Section 171 of the RMA sets out the matters that must be considered by a territorial authority in making a recommendation on a NoR. This includes consideration of the actual or potential effects (including positive effects) on the environment of allowing the requirement.

3.1.2 Resource Management Act – Noise

Under the provisions of the RMA there is a duty to adopt the Best Practicable Option (**BPO**) to ensure that the noise from any development does not exceed a reasonable level. Specifically, sections 16 and 17 reference noise effects as follows:

Section 16 *"every occupier of land (including any premises and any coastal marine area), and every person carrying out an activity in, on, or under a water body or the coastal marine area, shall adopt the best practicable option to ensure that the emission of noise from that land or water does not exceed a reasonable level".*

Section 17 *"every person has a duty to avoid, remedy, or mitigate any adverse effect on the environment arising from an activity carried on by or on behalf of the person, whether or not the activity is in accordance with a national environmental standard, a rule, a resource consent or a designation, or relevant sections of the RMA".*

3.2 Relevant Standards and Guidelines

3.2.1 Construction noise

Rule E25.6.1(3) of the AUP:OP states that "The noise from any construction activity must be measured and assessed in accordance with the requirements of New Zealand Standard NZS6803:1999 Acoustics – Construction noise". Rules E.25.6.27(1) and E.25.6.27(2) contain construction noise limits for sensitive and all other receivers.

Furthermore, Rule E25.6.29 specifies that construction noise levels for work within the road for construction, maintenance and demolition activities must meet the relevant noise levels in the relevant table E25.6.27(1) or E25.6.27(2) (as replicated in below), with some relaxation of the compliance requirement for certain times and durations.

The construction noise standards provided by Rules E25.6.27(1) and E25.6.27(2) of the AUP:OP have been adopted for the purpose of this assessment.

The applicable construction noise criteria are detailed in Table 3-1 for sensitive receivers and in Table 3-2 for all other receivers.

Table 3-1: Construction noise criteria for sensitive receivers (outside of Business – City Centre Zone and the Business – Metropolitan Centre Zone)

		Noise level for construction duration >20 weeks	
Time of week	**Time period**	LA_{eq} dB	LA_{max} dB
Weekdays	**06:30 – 07:30**	55	75
	07:30 – 18:00	70	85
	18:00 – 20:00	65	80
	20:00 – 06:30	45	75
Saturdays	**06:30 – 07:30**	45	75
	07:30 – 18:00	70	85
	18:00 – 20:00	45	75
	20:00 – 06:30	45	75
Sunday and public holidays	**06:30 – 07:30**	45	75
	07:30 – 18:00	55	85
	18:00 – 20:00	45	75
	20:00 – 06:30	45	75

Table 3-2: Construction noise criteria for all other receivers (outside of Business – City Centre Zone) and the Business – Metropolitan Centre Zone)

Time period	Noise level LA_{eq} dB
07:30 – 18:00	70
18:00 – 07:30	75

Exemptions to these levels are provided in Rule E25.6.29(2) and E25.6.29(3). Under E25.6.29(2) noise levels specified (as replicated above) do not apply for planned works in the road between the hours of 10pm and 7am where:

a. the number of nights where the noise generated by the works exceeds the relevant noise levels at any one receiver exceeds the relevant noise levels for 3 nights or less; and

b. the works cannot practicably be carried out during the day or because the road controlling authority requires this work to be done at night time; or

c. because of the nature of the works the noise produced cannot be practicably be made to comply with the relevant noise levels.

Under E25.6.29(3), noise levels specified (as replicated above) do not apply for planned works in the road between the hours of 7am and 10pm where:

a. the number of days where the noise generated by the works exceeds the relevant noise levels at any one receiver is 10 days or less; or

b. because of the nature of the works and the proximity of receivers the noise generated cannot practicably made to comply with the relevant noise levels.

For situations that fall under the exemption rules then a copy of the works access permit issued by AT must be provided to Auckland Council five days prior to work commencing; or a Construction Noise and Vibration Management Plan (**CNVMP**) must be provided to Auckland Council no less than five days prior to the works commencing in accordance with the applicable provisions of Standard E25.6.29(5).

3.2.2 Construction vibration

The main objective of controlling construction vibration is to avoid vibration-related damage to buildings, structures, and services, in the vicinity of the works. Any adverse effects of construction vibration on human comfort would typically only be experienced for short durations, for most types of construction work.

It should be noted that the level of vibration perceived by humans, and the level of vibration that is likely to result in annoyance for some people, are somewhat lower than the level of vibration capable of damaging structures. This means that vibration levels which readily comply with the cosmetic building damage criteria may cause annoyance and adverse reaction from building occupants who mistakenly believe that their building is sustaining damage.

Therefore, construction vibration has only been assessed against the limits of section 3.2.2.2 which relate to the avoidance of potential building damage. Potential exceedances of the amenity criteria will

be considered when assessing the construction vibration effect on nearby receptors. However, it is recommended that the limits relating to human comfort detailed in Table 3-3 should be used as trigger for communication and consultation and should be included in the construction management plan.

3.2.2.1 Auckland Unitary Plan (Operative in Part)

The AUP:OP contains rules relating to construction vibration that cover both building damage and amenity. Rule E25.6.30 states that construction activities must be controlled to ensure any resulting vibration does not exceed:

a. The limits set out in German Industrial Standard DIN 4150-3 (1999): *Structural vibration – Part 3 Effects of vibration on structures* when measured in accordance with that Standard on any structure not on the same site; and

b. The limits set out in Table 3-3 in any axis when measured in the corner of the floor of the storey of interest for multi-storey buildings, or within 500mm of ground level at the foundation of a single storey building.

Table 3-3: AUP:OP Table E25.6.30.1 Vibration limits in buildings

Receiver	Period	Peak Particle Velocity (PPV) mm/s
Occupied activity sensitive to noise or vibration	Night-time 10pm to 7am	0.3
	Daytime 7am to 10pm	2.0
Other occupied buildings	At all times	2.0

3.2.2.2 DIN 4150-3:1999 – Structural vibrations: Effects of vibrations on structures

Deutsches Institut Für Normung e.V. (German Institute for Standardisation) (**DIN**) publishes standards including DIN 4150 that contains guideline vibration limits for buildings which, when complied with "will not result in damage that will have an adverse effect on the structure's serviceability". These limits are set out in Table 3-4.

Different criteria are given for "short-term" (transient) vibration sources such as blasting and impact piling, and "long-term" sources such as vibrocompaction. Note that the definition of "short-term" and "long-term" in DIN 4150-3:1999 differ from those in NZS 6803:1999 and do not strictly relate to the duration of the works, but rather how a building responds to the construction vibration. Short term vibration will not result in a significant increase in vibration due to resonance in the structure.

Table 3-4: Vibration velocity guideline values for structures (DIN 4150)

Type of structure	Short term vibration				Long Term Vibration**
	PPV at foundation, frequency of:			Vibration at horizontal plane of highest floor at all frequencies (mm/s)	PPV at horizontal plane of highest floor (mm/s)
	1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz*		
Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	10
Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15	5
Structures that, because of their sensitivity to vibration, do not correspond to those listed in lines 1 and 2 and are of great intrinsic value	3	3 to 8	8 to 10	8	2.5

** At frequencies above 100 Hz, the values given in this column may be used as minimum values*
*** The Standard defines short-term vibration as "vibration which does not occur often enough to cause structural fatigue, and which does not produce resonance in the structure being evaluated". Long-term vibration is defined as all other vibration types not covered by the short-term vibration definition.*

Clause 5.1 of DIN 4150-3 notes that a vibration level in excess of the DIN criterion does not necessarily result in building damage. The definition of 'damage' in DIN 4150-3 is: "any permanent effect of vibration that reduces serviceability of a structure or one of its components".

Examples of a 'reduction of serviceability' include:

- the impairment of stability of the building and its components;
- a reduction in the bearing capacity of floors.

For dwelling type buildings (Table 3-4 – line 2) and structures sensitive to vibration (Table 3-4– line 3), the serviceability is considered to have been reduced if:

- cracks form in plastered surfaces of walls;
- existing cracks in the building are enlarged;
- partitions become detached from loadbearing walls or floors.

These effects are deemed 'minor damage'.

There are no buildings within 100m of the Project alignment which are considered to be sensitive to vibration, in accordance with line 3 of Table 3-4.

3.2.3 Auckland Transport construction vibration criteria

The following criteria are the recommended Project construction vibration criteria for both building damage and amenity applicable for all NoRs.

The two category criteria, detailed in Table 3-5 are to facilitate a progressive management response to the increasing risks and effects during construction.

Category A sets the criteria for the amenity effects where vibrations may be perceived by occupants within a building, as adopted from the AUP:OP, and an indicator of when communication and consultations should be initiated to manage effects. Category B are based on DIN 4150 building damage criteria for daytime.

Table 3-5: Auckland Transport Construction vibration criteria

Vibration Level	Effect	Category A	Category B
Occupied Activities sensitive to noise	Night-time 2000h – 0630	0.3mm/s ppv	2mm/s ppv
	Daytime 0630h – 2000h	2mm/s ppv	5mm/s ppv
Other occupied buildings	Daytime 0630h – 200h.	2mm/s ppv	5mm/s ppv
All other buildings	All other times	Tables 1 and 3 of DIN4150-3:1999	

Where compliance with the vibration standards set out in Table 3-5 is not practicable, and unless otherwise provided for in the CNVMP (refer Section 7.2.1), a schedule (refer Section 7.2.2) will be required.

4 Receiving Environment

4.1 Existing Ambient Environment

Construction noise criteria and assessments are not dependent on existing noise levels. In addition, by the time of construction of the Project, the existing environment in the Project area is likely to have changed due to urbanisation of the area and the ambient conditions would be different. Instead, construction noise must comply with the relevant limits as set out in the AUP:OP taking into account receivers that exist at the time of construction.

4.2 Noise Monitoring Procedure

Noise survey equipment, meteorological conditions, data analysis and results are described below.

The noise monitoring was undertaken in general accordance with the relevant requirements of NZS 6801[2], 6802[3] and 6806. This meant the results could adequately inform the operational and construction noise assessments, whilst providing a robust baseline dataset for the Project.

A measurement position at 22 Trig Road was selected that was free-field to avoid reflections from buildings or extraneous factors which could influence the sound levels, where practicable. Measurement and calibration details required by NZS 6801 are held on file.

The unattended noise monitoring location can be found in Appendix 1. Monitoring was undertaken for approximately 7 days.

4.2.1 Meteorological conditions

During the surveys, meteorological data was obtained from Auckland, Motat Ews (41351) weather station operated by NIWA. This is the closest station where data was available at an hourly resolution or less.

The meteorological data from this weather station was used to identify periods when conditions were likely to have been outside the meteorological restrictions given in NZS 6801, and data measured during these periods has been excluded from the noise analysis.

4.2.2 Data analysis

Road traffic was the dominant noise source with birdsong also clearly audible. There is a natural variation in the noise environment throughout the day, and often variations for the weekends. Each day's data was analysed, and abnormal events excluded. A summary of the measured noise levels has been included in Table 4-1. The times in the table reflect the key periods for construction and operational noise as assessed against the criteria in section 3.

[2] New Zealand Standard 6801:2008 Acoustics – Measurement of environmental sound.

[3] New Zealand Standard 6802:2008 Acoustics – Environmental noise.

Table 4-1: Summary of measured noise levels

Date	Time Periods	LA_{eq} (dB)	LA_{FMax} (dB)	LA_{90} (dB)
19/11/2019	7:30 – 18:00	65	84	49
	18:00 - 20:00	63	89	46
	20:00 – 06:30	58	87	39
20/11/2019	06:30 – 7:30	67	89	55
	7:30 – 18:00	65	91	50
	18:00 - 20:00	63	83	46
	20:00 – 06:30	58	88	35
21/11/2019	06:30 – 7:30	66	80	51
	7:30 – 18:00	65	90	49
	18:00 – 20:00	63	83	45
	20:00 – 06:30	58	87	35
22/11/2019	06:30 – 7:30	66	91	52
	7:30 – 18:00	65	90	48
	18:00 – 20:00	63	89	46
	20:00 – 06:30	56	86	35
23/11/2019	06:30 – 7:30	60	82	43
	7:30 – 18:00	64	94	45
	18:00 – 20:00	61	78	45
	20:00 – 06:30	57	93	32
24/11/2019	06:30 – 7:30	56	80	39
	7:30 – 18:00	61	81	44
	18:00 – 20:00	61	87	48
	20:00 – 06:30	58	95	35
25/11/2019	06:30 – 7:30	67	88	51
	7:30 – 18:00	64	88	48
	18:00 – 20:00	62	86	45
	20:00 – 06:30	57	87	33
26/11/2019	06:30 – 7:30	66	84	53
	7:30 – 18:00	63	93	47
	18:00 – 20:00	63	88	46
	20:00 – 06:30	58	88	36
27/11/2019	06:30 – 7:30	67	87	56

	7:30 – 18:00	63	97	48
	18:00 – 20:00	63	85	47
	20:00 – 06:30	58	87	36
28/11/2019	06:30 – 7:30	65	83	51
	7:30 – 18:00	63	91	47

5 Indicative Construction Methodology

An indicative construction methodology has been prepared to inform the assessment of the Project and, while subject to change, assists in determining the envelope of effects. An overview of the indicative construction methodology is set out in the AEE. The final construction methodology for the Project will be confirmed during the detailed design phase and finalised once a contractor has been engaged for the work.

A summary of the key components of the indicative construction methodology that are relevant to this report are outlined in the sub-sections below.

5.1 General Construction Overview

The total construction phase of the Project is expected to take approximately 18 to 24 months. It is anticipated that the works will be broken down into separate construction zones based on the type of works required and the nature of the work environment. These anticipated zones are:

- **Zone 1:** Trig Road North of the SH18 bridge
- **Zone 2:** Trig Road South including the SH18 bridge
- **Zone 3:** Hobsonville Road.

Each zone has different construction activities depending on the type of work to be done and the surrounding environment. In all cases the general sequence of construction is likely to be:

1. Divert or remove services
2. Construct permanent and temporary stormwater drainage and controls
3. Move traffic away from works longitudinally
4. Construct earthworks and any retaining structures
5. Construct new longitudinal drainage
6. Construct new pavement to half of the road
7. Move traffic onto newly constructed pavement
8. Complete longitudinal drainage
9. Complete pavement and median
10. Move traffic to new alignment
11. Complete footpath and cycleway

5.2 Plant and equipment

Table 5-1 provides an indicative list of plant and equipment which may be required for the construction across the three zones. This list of equipment has been used to identify a preliminary worst case scenario in the construction noise assessment below.

Table 5-1: Trig Road Corridor Upgrade plant and equipment summary

Construction Type	Construction Activity
Typical across all works	• Site facility • Light vehicles • Hiab truck

	• Small tools and plant
Clearing	• 20T excavator • Mulcher • Tandem tipper
Overhead line relocation	• Line crew • Elevated work platform or cherry picker • Directional drilling equipment
Bulk Earthworks	• 30T excavator • 20T excavator • Compactor/Sheepsfoot roller • Water cart • Tippers/ADT's
Drainage	• 20T excavator • Trench shields • Tandem tipper • Loader • Plate compactor
Pavement Construction	• Grader • Smooth drum roller • Tandem tippers • Kerbing machine • Plate compactor • Paver

Buildings located within the designation boundary have not been included within the construction assessment as these will be removed to accommodate Project works as confirmed by the Project team. The buildings on property addresses not included within the assessment are identified in **Error! Reference source not found.** below.

Table 5-2: Building addresses not included within assessment

Buildings removed
2-4 Trig Road
72C Hobsonville Road
19 Trig Road

6 Assessment Methodology

Predictions of the construction noise and vibration have been undertaken for the Project in accordance with NZS 6803 based on assumptions of construction type, activities and equipment as provided by the Project team in section **Error! Reference source not found.**. The designation boundary has been assumed as the construction boundary and a reasonable worst-case approach has been applied to assessing the level of effect from the predicted construction noise and vibration emission radii.

Affected receivers have been identified using construction noise setback distances and vibration emission radii. The construction noise setback distances and vibration emission radii were used to determine where any potential construction noise and vibration exceedances of the relevant criteria could occur. Potential effects of construction noise and vibration have then been assessed and construction management and mitigation measures identified where appropriate.

This report proposes a framework for construction noise and vibration management such that the most effective and practicable methods for mitigation will be planned and implemented, taking into account the extent of predicted effects. At the core of this framework is the Construction Noise and Vibration Management Plan (CNVMP) in Section 7.2.1 which will be developed prior to commencement of construction and updated as necessary throughout the duration of construction.

Construction of the Project is likely to occur in stages as urbanisation of the surrounding area occurs or is confirmed to occur. For some parts of the Project, construction could be several years into the future. Therefore, receivers are likely to have changed and there could potentially be new receivers in the vicinity of the Project due to increased development. Construction noise and vibration effects will therefore need to be recalculated at the time of construction to take account of these receivers also.

6.1 Construction Noise

Predictions for the Project have been assessed against the “long-duration” noise criteria for works greater than 20 weeks under NZS6803:1999 as presented in Table 3-1 and Table 3-2. It is expected the majority of noisy works will be carried out between 7am – 6pm on weekdays with some night time and weekend works for the pavement and surfacing stage as required, especially to tie in to the existing network.

Various construction activities and pieces of equipment will act as noise sources on site during construction works. A list of the most dominant noise sources based on the equipment list provided by the Project team have been compiled in Table 6-1Table 6-1 and an indicative sound power level for each construction type/activity has been provided in Table 6-2Table 6-2. Given construction will occur in the future, the current methodology may not be inclusive of all equipment used nearer the time of construction. Equipment tables will need to be updated to reflect selection at the development of the management plan. The minimum set back distance required from receivers for each activity to comply with the day-time noise criterion of 70 dB LA_{eq} without any mitigation has also been calculated.

Table 6-1 details the sound power levels from the likely significant noise sources and the various receiver setback distances required to achieve compliance with the 70 dB LA_{eq} day time noise criterion without mitigation. The noise data has been taken from British Standard 5228-1:2009 “Code

of practice for noise and vibration control on construction and open sites", manufacturers data or the AECOM database of noise measurements.

Table 6-1: Construction equipment sound levels and indicative compliance distance

Equipment	Source BS5228	Sound power level (dB LA_{eq})	Minimum set back distance from receivers to comply with day-time limit (70 dB LA_{eq}) without mitigation, meters (based on propagation over soft ground)
30T excavator	C.2.19	105	30
20T excavator	C.2.21	99	13
Roller Compactor	C.2.40	101	20
Tipper Truck	C.2.30	107	36
Loader	C.5.14	114	69
Plate Compactor	C.5.29	110	45
Smooth Drum Roller	C.5.20	103	25
Paver	C.5.30	103	25

Table 6-2 details the sound power levels from key construction activities/types. The equipment sound power levels in Table 6-1 have been combined according to the various construction types as presented in Table 5-1 to provide an indicative activity sound power level. From this combined level a minimum set back distance at which compliance can be achieved has been determined.

Table 6-2: Activity sound power levels and indicative compliance distance

Construction Type	Activity Sound power level (dB LA_{eq})	Minimum set back distance from receivers to comply with day-time limit (70 dB LA_{eq}) without mitigation, meters
Typical across all works	110	45
Clearing	113	65
Overhead Line relocation	93	10
Bulk Earthworks	115	76
Drainage	117	95
Pavement construction	117	95

6.2 Construction Vibration

Vibration generation and propagation is highly site specific. The generation of vibration is dependent on the local site geology, the equipment being used, the nature of the works, and even the operator.

To account for the inaccuracy in the prediction of vibration, the likely worst-case vibration has been calculated based on the equipment and hard ground geology.

Vibration from a source transmits in a spherical pattern and reduces with distance. There will be a particular distance from each source at which the vibration level equals the relevant vibration criteria. This distance is called the 'emission radius'. The vibration criteria and emission radii for high vibration generating equipment are detailed in **Error! Reference source not found.**.

Table 6-3: Vibration sources and indicative emission radii

Equipment	Building Damage (DIN 4150) emission radii	
	Residential (5 mm/s)	**Commercial (10 mm/s)**
Plate Compactor	1 m	1 m
Roller Compacter	8 m	4 m
Excavator	6 m	2 m
Tipper Truck	1 m	0.5 m

We recommend that vibration measurements are undertaken at specific locations as identified through the CNVMP and schedules at the commencement of construction activities to establish vibration propagation site laws for vibration generating equipment. This approach will confirm the emission radii used in this assessment and ensure the applicable criteria are complied with. It has been found on other major construction projects, that the measured vibration levels for a particular activity are much lower than those predicted during the assessment stage.

7 Overview of Construction Effects and Mitigation

7.1 Overview of Construction Effects

Potential construction noise and vibration effects are summarised in this section.

7.1.1 Construction noise

Table 7-1 gives examples of the potential effects on receivers at different noise levels based on NZS6803 with most exposed façades providing a 20 dB reduction. Depending on the construction of the house, facades may provide up to a 25 – 30 dB reduction, therefore assumptions and effects provided below are based on a conservative approach.

Table 7-1: Potential construction noise effects on receivers

External Noise Level	Potential Daytime Effects Outdoors	Corresponding Internal Noise Level	Potential Daytime Effects Indoors
65 dB LA_{eq}	Conversation becomes strained, particularly over longer distances	45 dB LA_{eq}	Noise levels would be noticeable but unlikely to interfere with residential or office daily activities.
65 to 70 dB LA_{eq}	People would not want to spend any length of time outside, except when unavoidable through workplace requirements	45 to 50 dB LA_{eq}	Concentration would start to be affected. TV and telephone conversations would begin to be affected.
70 to 75 dB LA_{eq}	Businesses that involve substantial outdoor use (for example garden centres such as Bunnings) would experience considerable disruption.	50 to 55 dB LA_{eq}	Phone conversations would become difficult. Personal conversations would need slightly raised voices. Office work can generally continue, but 55 dB is considered by the experts to be a tipping point for offices. For residential activity, TV and radio sound levels would need to be raised.
75 to 80 dB LA_{eq}	Some people may choose protection for long periods of exposure. Conversation would be very difficult, even with raised voices.	55 to 60 dB LA_{eq}	Continuing office work would be extremely difficult and become unproductive. In a residential context, people would actively seek respite.
80 to 90 dB LA_{eq}	Hearing protection would be required for prolonged exposure (8 hours at 85 dB) to prevent hearing loss.	60 to 70 dB LA_{eq}	Untenable for both office and residential environments. Unlikely to be tolerated for any extent of time.

With effective management of construction activities, which includes consultation and communication with affected parties and scheduling noisy works during the daytime rather than night-time period,

noise levels can be controlled so that the effects on the nearest residential receivers are reduced. Barriers will not be effective at all locations, particularly where receivers are more than one storey. Where barriers are not going to be effective, the use of enclosures or local screening of equipment should be considered and implemented, where practicable. If noisy activities must take place during the night-time, and screening or other mitigation measures do not provide sufficient attenuation to meet the night-time noise criteria or are not practicable, it may be necessary to offer temporary relocation to affected residents. Temporary relocation should be considered on a case-by-case basis and as a last resort.

7.1.2 Construction Vibration

The vibration effects associated with construction of the Projects are considered in terms of human response and building damage. However, in our experience the main concern for building occupants during construction is damage to the building itself.

Humans can generally perceive vibrations at a much lower level than when building damage is likely to occur. The adverse effects of construction vibration on building occupants may be significant in some buildings adjacent to the areas of works. Adverse effects may range from annoyance to loss of amenity or inability to carry out work. Vibration effects will reduce with distance from the source, and the level of vibration transmission into a building will depend on a number of factors, such as the foundation type and building construction.

Potential effects and human perception of the vibration levels found within the AUP:OP/DIN criteria have been combined below and adopted for this assessment.

Table 7-2: Potential vibration effects on human perception summary against AUP:OP/DIN criteria

External Noise Level	Potential Daytime Effects Outdoors
0.14 mm/s	The threshold of perception for stationary people. Just perceptible in particularly sensitive environments.
0.3 mm/s	Can be just perceptible during normal residential activities, particularly for more sensitive receivers. Levels above may wake most people from their sleep. This is the AUP:OP limit for construction vibration generated at night-time for sensitive receivers.
1 mm/s	Is typically tolerable with prior notification. Complaint or adverse reaction is likely in office or residential environments, particularly if there is no prior warning. What people actually feel would be subject to the source but could include a steady vibration from sources such as vibratory compaction, or a small jolt such as from the movement of a large digger either of which could rattle crockery and glassware. Sleep disturbance would be almost certain for most people.
2 mm/s	Vibration would clearly be felt. However, it can typically be tolerated in indoor environments such as offices, houses and retail if it occurs intermittently during the day and where there is effective prior engagement. Effects

	experienced would be somewhere between levels of 1 and 5 mm/s. This is the AUP:OP limit for large construction projects generating vibration.
5 mm/s	Unlikely to be tolerable in a workplace. Highly unsettling for both workplaces and dwellings. If exposure is prolonged, some people may want to leave the building Computer screens would shake and items could fall off shelves if they are not level. This is the threshold below which no cosmetic damage will occur in the DIN standard.
10 mm/s	Likely to be intolerable for anything other than a very brief exposure.

The AUP:OP sets the criteria for amenity at 0.3mm/s for night time and 2 mm/s during the day. Based on the worst-case source of a roller compactor, any receiver within a 21m radius of the construction area may experience vibration of 2 mm/s inside their property. Whilst at this level building damage is highly unlikely to occur, human perception may result in slight concerns but can generally be tolerated if activity occurs intermittently and with prior notice.

At 0.3 mm/s the emission radii could be up to 140m from construction areas, and at this level people could feel slight vibrations especially during the night-time, which may cause sleep disturbance. High vibratory activities should therefore be avoided, where practicable, during the night-time and careful management of the type of equipment used at night should be included within the CNVMP (refer Section 7.2.1)

Construction vibration effects generally have a short timeframe, typically a few days at a time. The use of high vibratory equipment, such as a roller compactor, should be controlled through a CNVMP to limit potential vibration effects, and alternative equipment with lower vibratory effect should be used where practicable.

7.2 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

7.2.1 Construction Noise and Vibration Management Plan

Implementing noise management and mitigation measures via a CNVMP is the most effective way to control construction noise and vibration impacts. The objective of the CNVMP should provide a framework for the development and implementation of best practicable options to avoid, remedy or mitigate the adverse effects on receivers of noise and vibration resulting from construction.

E25.6.29(5) sets out the minimum level of information that must be provided in a CNVMP. Accordingly, as a minimum, we recommend that the CNVMP should include the following content:

- Description of the works and anticipated equipment/processes;
- Hours of operation, including times and days when construction activities would occur;
- The construction noise and vibration standards for the Projects;
- Identification of receivers where noise and vibration standards apply;

- A hierarchy of management and mitigation options, including any requirements to limit night works and works during other sensitive times, including Sundays and public holidays as far as practicable;
- Methods and frequency for monitoring and reporting on construction noise and vibration;
- Updates of the predicted noise and vibration levels based on the final methodology and construction activities;
- Confirmation of which buildings will be included in a pre and post building condition survey;
- Identification of appropriate monitoring locations for receivers of construction noise and vibration;
- Procedures to respond to complaints received on construction noise and vibration, including methods to monitor and identify noise and vibration sources;
- Procedures for responding to monitored exceedances; and
- Procedures for monitoring construction noise and vibration and reporting to the Auckland Council Consent Monitoring officer.
- Procedures for maintaining contact with stakeholders, notifying of proposed construction activities, the period of construction activities, and handling noise and vibration complaints;
- Contact details of the Project Liaison Person;
- Procedures for the regular training of the operators of construction equipment to minimise noise and vibration as well as expected construction site behaviours for all workers;
- Identification of areas where compliance with the noise and/or vibration standards will not be practicable and the specific management controls to be implemented and consultation requirements with owners and occupiers of affected sites;
- Procedures and requirements for the preparation of a Schedule to the CNVMP (Schedule) for those areas where compliance with the noise and/or vibration standards will not be practicable and where sufficient information is not available at the time of the CNVMP to determine the area specific management controls; and
- Procedures and timing of reviews of the CNVMP.

7.2.2 Schedules

In addition to a CNVMP, it may be necessary to produce Site Specific or Activity Specific Construction Noise and Vibration Management Schedules (“Schedules”) where noise and/or vibration limits are predicted to be exceeded for a more sustained period or by a large margin. A schedule to the CNVMP provides a specific assessment of an activity and/or location and should include details such as:

- Activity location, start and finish dates;
- The nearest neighbours to the activity;
- A location plan;
- Predicted noise/vibration levels and BPO mitigation for the activity and/or location;
- Communication and consultation with the affected neighbours;
- Location, times and type of monitoring; and
- Any pre-condition survey of buildings predicted to receive vibration levels exceeding the Category B criteria, which document their current condition and any existing damage.

7.2.3 Noise mitigation measures

A hierarchy of mitigation measures will be adopted through the CNVMP and Schedules (where produced), as follows:

- Managing times of activities to avoid night works and other sensitive times;
- Liaising with neighbours so they can work around specific activities;
- Selecting equipment and methodologies to restrict noise;
- Using screening/enclosures/barriers; and
- Offering neighbours temporary relocation.

By following this hierarchy, the BPO for mitigation will be implemented, whilst avoiding undue disruption to the community. In particular, temporary relocation of neighbours can cause significant inconvenience and should only be offered where other options have been exhausted and noise levels still require mitigation.

Some activities are likely to be set back a considerable distance from the nearest receivers and require very little or no mitigation to achieve compliance with the relevant Project noise limits. Alternative methodologies, careful equipment selection and use of noise barriers or localised screening (e.g. for concrete cutting) would be suitable management and mitigation measures and should be implemented where they are practicable and effective.

7.2.4 Vibration mitigation

Similar to noise, a hierarchy of vibration mitigation measures will be adopted through the CNVMP and Schedules (where produced) as follows:

- Managing times of activities to avoid night works and other sensitive times (communicated through community liaison);
- Liaising with neighbours so they can work around specific activities;
- Operating vibration generating equipment as far from sensitive sites as possible;
- Selecting equipment and methodologies to minimise vibration;
- Offering neighbours temporary relocation; and
- In specific situations, a cut-off trench may be used as a vibration barrier if located close to the source.

In general, there are less options available to mitigate vibration propagation and insulate receiver buildings, compared to noise. Mitigation will therefore focus on scheduling of activities, effective communication with neighbours, and selection of appropriate equipment and methods, where practicable.

Appropriate vibration mitigation measures for each activity will be listed in the CNVMP and Schedules (where produced).

7.2.5 Building Condition Survey

A detailed building precondition survey should be undertaken by a suitably qualified engineer prior to the start of construction at all buildings where the daytime Category B criteria may be exceeded. The survey shall include, but not be limited to, the following:

- Determination of building classification: commercial, industrial, residential or a historic or sensitive structure;
- Determination of building specific vibration damage risk thresholds; and

- Recording (including photographs) the major features of the buildings including location, type, construction (including foundation type), age and present condition, including existing levels of any aesthetic damage or structural damage.

A post-construction condition survey of the same buildings shall be conducted when construction is completed, and any damage shown to have been caused by the Project construction rectified by the Project Team.

7.2.6 Night Works

Night works have the potential to cause the greatest disturbance to residents and should be avoided where possible. However, it is possible that night works will be required during the construction period for critical activities. Before night works are programmed, it is important to determine if there are alternative options that would avoid working at night and, if so, whether those options are technically and practicably feasible.

Where there are no practicable alternative options to night works, it may be necessary to implement enhanced noise and vibration management measures, but this will depend on the location of the worksite and the proposed activities.

When work must be carried out at night, it may be necessary to:

- Increase the frequency of communications with stakeholders;
- Carry out regular noise and vibration monitoring to confirm noise and vibration levels; or
- Offer temporary relocation to neighbours if unreasonable noise and/or vibration levels cannot be avoided.

8 Construction Noise and Vibration Assessment

8.1 Existing and Likely Future Environment

8.1.1 Planning Context

Within the Project area there are a range of zones under the AUP:OIP which influence the existing and likely future land use patterns for assessment purposes.

Table 8-1 provides a summary of the existing and likely future environment as it relates to the Project area.

Table 8-1: Existing and Future Environment Likelihood of Change

Project area	Environment today	Current Zoning	Likelihood of Change	Likely Future Environment
Context A	Rural	Future Urban	High	Urban
Context B	Urban – Low Density	Future Urban	High	Urban
Context C	Urban – Medium Density	Urban	Moderate	Urban
Context D	Urban	Urban	Moderate	Urban

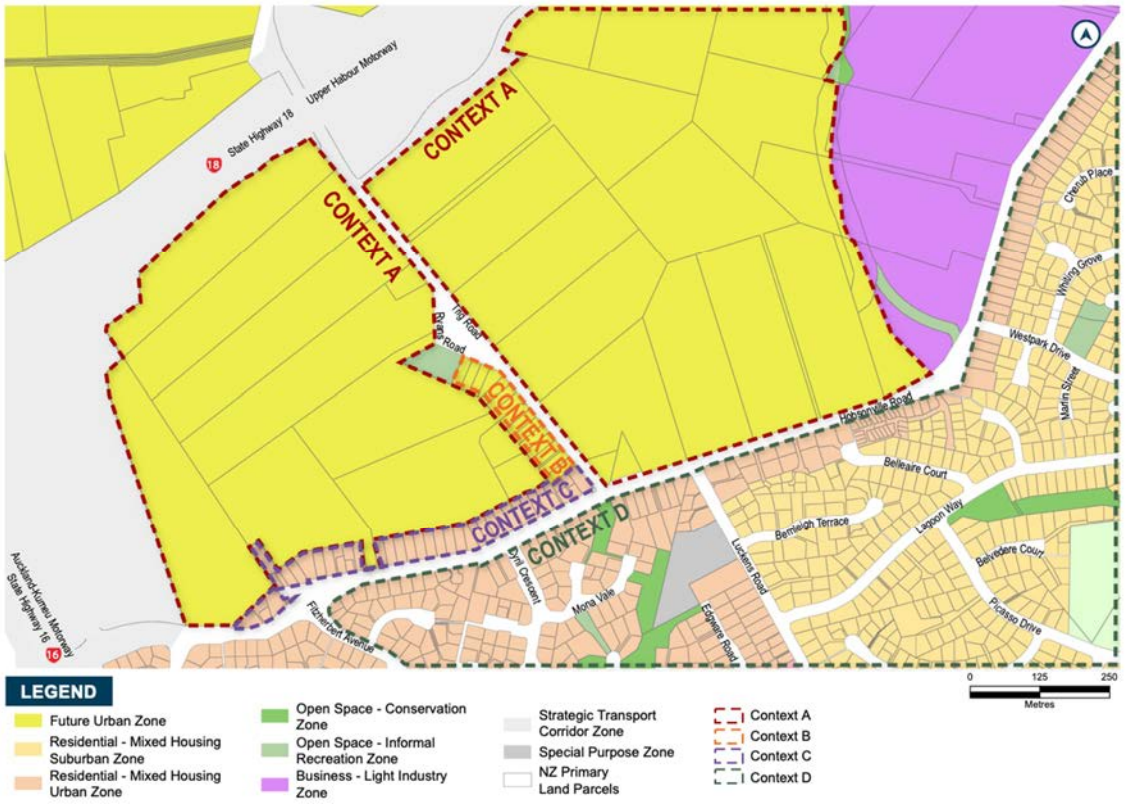


Figure 8-1: Existing and Future Zoning

Please refer to the AEE for further information on the planning context.

8.1.2 Noise Environment

Trig Road is an existing urban corridor with development still occurring in the surrounding area. The noise environment is dominated by road traffic noise from vehicles on Hobsonville Road. Although development is still occurring in the area, ambient noise levels are unlikely to increase significantly above their current level.

8.2 Assessment of Construction Noise and Vibration Effects

8.2.1 Construction Noise Effects

Receivers are located at varying distances from the construction boundary along the alignment with the closest existing receiver being 2m from the alignment.

Receivers within 90m of the works could experience unmitigated noise levels that exceed the daytime noise criterion during high noise generating activities such as the pavement works. Based on the footprint of the designation boundary, this would correspond to 135 existing dwellings that could experience noise levels above the 70 dB LA_{eq} daytime noise criterion.

The exclusion zone distance reduces to 28m with noise barriers implemented effectively around working sites. This would correspond to 69 existing dwellings that could experience noise levels up to 70 dB LA_{eq}.

We note that the existing receivers may not be present at the time of construction.

With mitigation in place, as set out in section 7.2, noise levels of up to 90 dB LA_{eq} could still occur intermittently at the closest receivers, if high noise generating activities occur on the construction boundary. At this level effects could include loss of concentration, annoyance, and a reduction in speech intelligibility.

Operation of construction equipment will be intermittent in nature. Construction will be linear so as the equipment moves away from the receiver noise levels will reduce. The worst-case situations, where mitigated noise levels could reach 90 dB LA_{eq} at the closest receivers, are not expected to be frequent, due to the setback distances to the majority of the proposed works and the use of equipment with lower source noise levels for large portions of the works. It is therefore predicted that mitigated noise levels can comply with the 70 dB LA_{eq} noise criterion for most of the construction works.

If a critical activity has to be carried out during the night-time in close proximity to residential receivers, consultation and mitigation measures will be essential. The use of noisy equipment should be avoided, where practicable, to prevent sleep disturbance. Any night-time works are likely to be limited in duration and will be managed through the CNVMP (as per Section 7.2.1) and a Schedule (as per Section 7.2.2).

Provided that the works are mitigated and managed through the CNVMP and Schedules at the time of construction, we consider that noise effects from construction works as currently planned will be reasonable.

8.2.2 Construction Vibration Effects

If the roller compactor is used at the edge of the construction boundary, dwellings within 8m of the works and commercial buildings within 4m of the works may experience vibration levels above the daytime Category B criterion, if the roller compactor is used on the construction boundary in the closest position to them. Based on the designation boundary footprint, 36 existing dwellings may experience vibration levels up to 5 mm/s.

Once the compactor is 8m away from the dwellings and 4m from commercial buildings the Category B criterion will be met. The Category B criteria would be met at future residential structures that are 8m or more from the proposed works and commercial structures that are 4m or more from the proposed works.

At buildings in close proximity to the proposed works, there is the potential for cosmetic damage to buildings (such as cracking) and annoyance from perception of vibration. Buildings where the daytime Category B criteria may be exceeded must be identified at the time of construction, and pre-condition surveys must be carried out at these buildings.

The Category A vibration amenity criteria could be exceeded in existing or future buildings if they are occupied during the works and within 21m of the roller compactor or within the emission radii identified for the other vibration generating equipment in **Error! Reference source not found.**. The effect on receivers would be subject to their respective proximity to the works but could include steady vibration from the roller compactor or a small jolt from a digger which could rattle crockery and glassware.

Vibration can typically be tolerated inside buildings if it occurs intermittently during the day, is of limited duration and where there is effective prior engagement.

High vibration generating activities should not occur during the night-time in close proximity to residential receivers to avoid sleep disturbance, unless it is a critical activity and there is no alternative.

It should also be noted that the emission radii are conservative and vibration levels measured on site tend to be much lower than those predicted at the NoR stage of a project.

Provided that the works are mitigated and managed through the CNVMP and Schedules at the time of construction, we consider that vibration effects from construction works as currently planned will be reasonable.

9 Conclusion

An assessment of the construction noise and vibration effects has been undertaken for the Project considering a reasonable worst case scenario. The predicted noise levels and effects are based on indicative information as provided by the Project team and any assessment conclusions should be confirmed when the CNVMP is prepared, taking account of the final equipment selections, methodology and receivers as they exist at the time of construction.

Construction noise and vibration can be mitigated and managed, utilising the measures set out in Section 7.2, to comply with the applicable limits for the majority of the works. Exceedances of the criteria could occur intermittently across all NoRs, if high noise or vibration generating equipment is used near occupied buildings.

Night works will be limited to critical activities that cannot be carried out at any other time.

A CNVMP will be prepared prior to construction commencing in accordance with Section 7.2.1 of this report. The CNVMP will provide a framework for the development and implementation of best practicable options to avoid, remedy or mitigate the adverse effects of construction noise and vibration on receivers that exist at the time of construction. Communication and consultation will occur with the affected receivers and a site specific schedule will be prepared if required.

Elevated noise levels should be avoided and mitigated where possible to reduce the likelihood of adverse effects such as loss of concentration, annoyance and sleep disturbance (for night works).

Whilst vibration levels at the Category A criterion of 2mm/s PPV can generally be tolerated if activity occurs intermittently and with prior notice, communication and consultation will be the key management measure to avoid annoyance and concern. Where vibration levels are predicted to exceed the Category B criteria, and where the construction methodology cannot be changed to reduce vibration levels, building conditions surveys are recommended.

Overall, construction noise and vibration can be controlled to reasonable levels with the implementation of appropriate mitigation and management measures.

Appendix 1. Noise Monitoring Results

Noise Logger Report

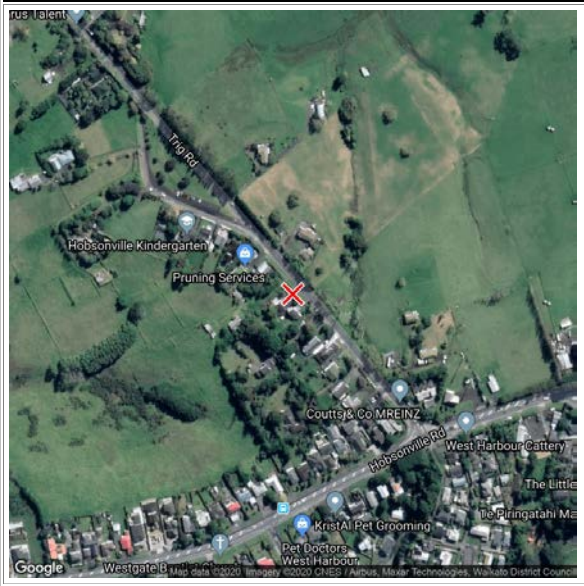
22 Trig Road, Whenuapai

Item	Information
Logger Type	NL-52
Serial number	898331
Address	22 Trig Road, Whenuapai
Location	Front yard
Facade / Free Field	Free field
Environment	Ambient nosie controlled by Trig Road

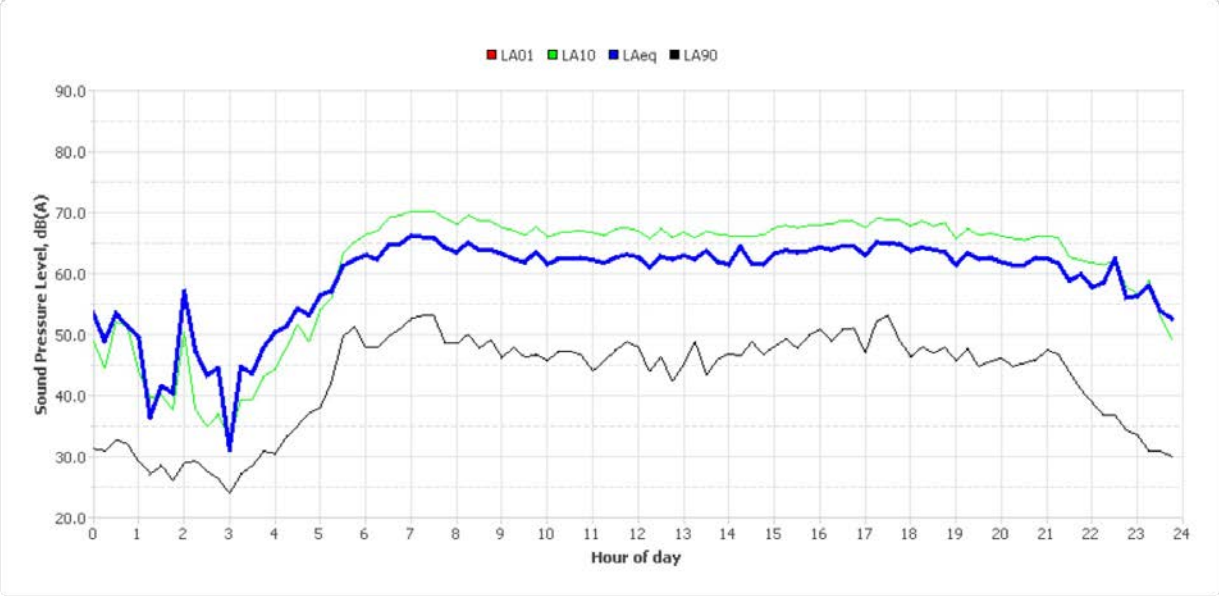
Measured noise levels

Logging Date	$L_{Aeq,24hr}$	$L_{Aeq,day}$ 7am-6pm	$L_{Aeq,evening}$ 6pm-10pm	$L_{Aeq,night}$ 10pm-7am	ABL Day	Eve	Night
Tue Nov 19 2019	62	65	62	58	-	42	-
Wed Nov 20 2019	63	65	62	58	48	38	31
Thu Nov 21 2019	63	64	62	58	45	38	28
Fri Nov 22 2019	62	64	62	58	45	40	26
Sat Nov 23 2019	61	63	61	56	42	39	28
Sun Nov 24 2019	60	62	62	54	41	40	23
Mon Nov 25 2019	62	64	61	58	45	36	27
Tue Nov 26 2019	62	63	62	58	43	39	24
Wed Nov 27 2019	62	63	63	58	45	42	28
Thu Nov 28 2019	-	63	-	58	44	-	26
Summary	**62**	**64**	**62**	**58**	**45**	**39**	**27**

Note: Results denoted with '-' do not contain enough valid data for a value to be calculated. The data has been excluded either manually or automatically as a result of adverse weather conditions.

Logger Location	Logger Deployment Photo
	

Typical Day



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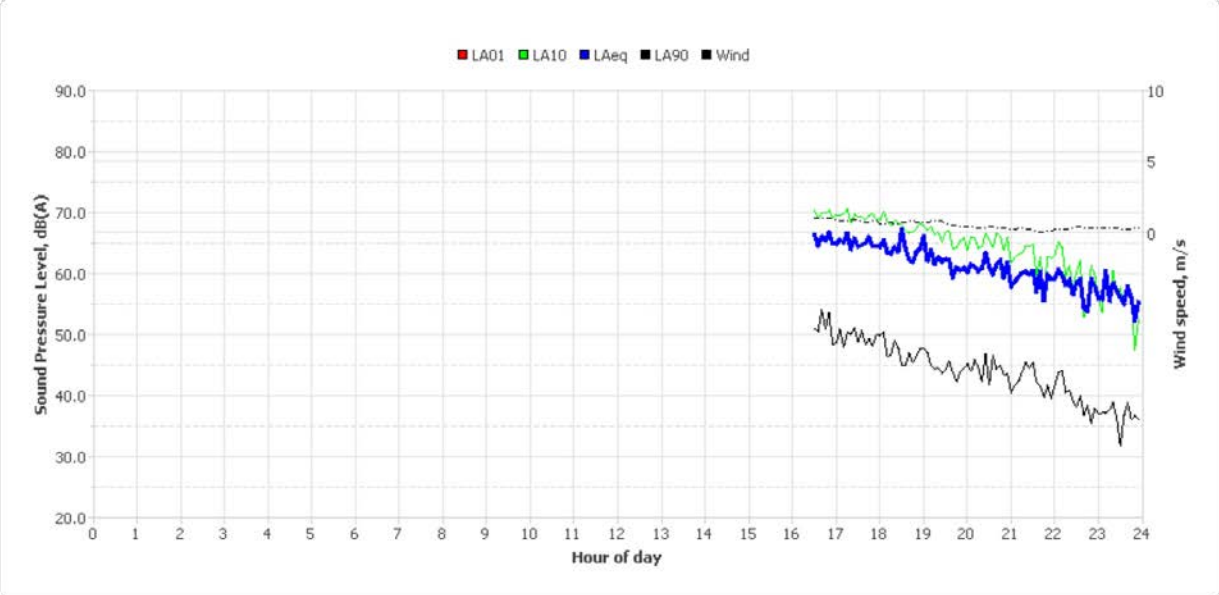

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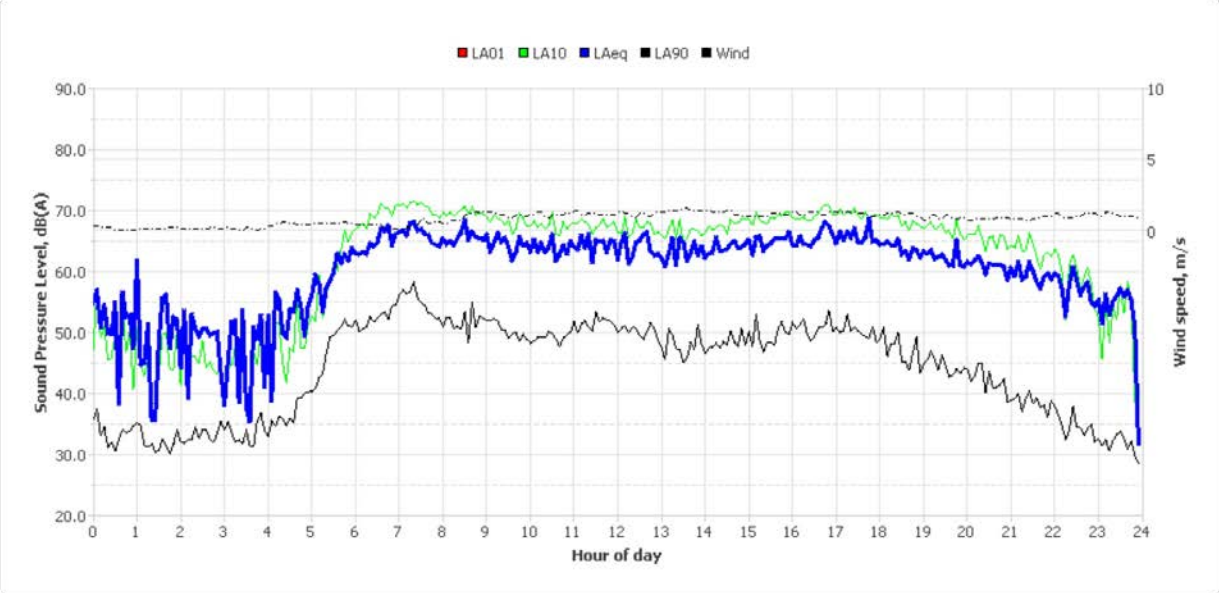

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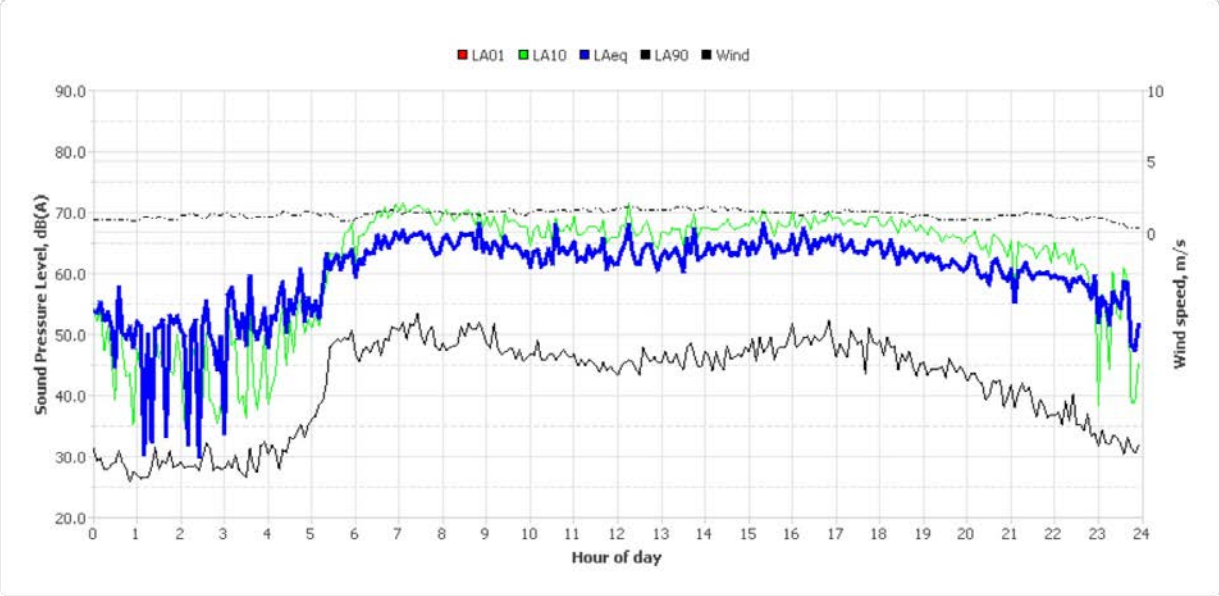

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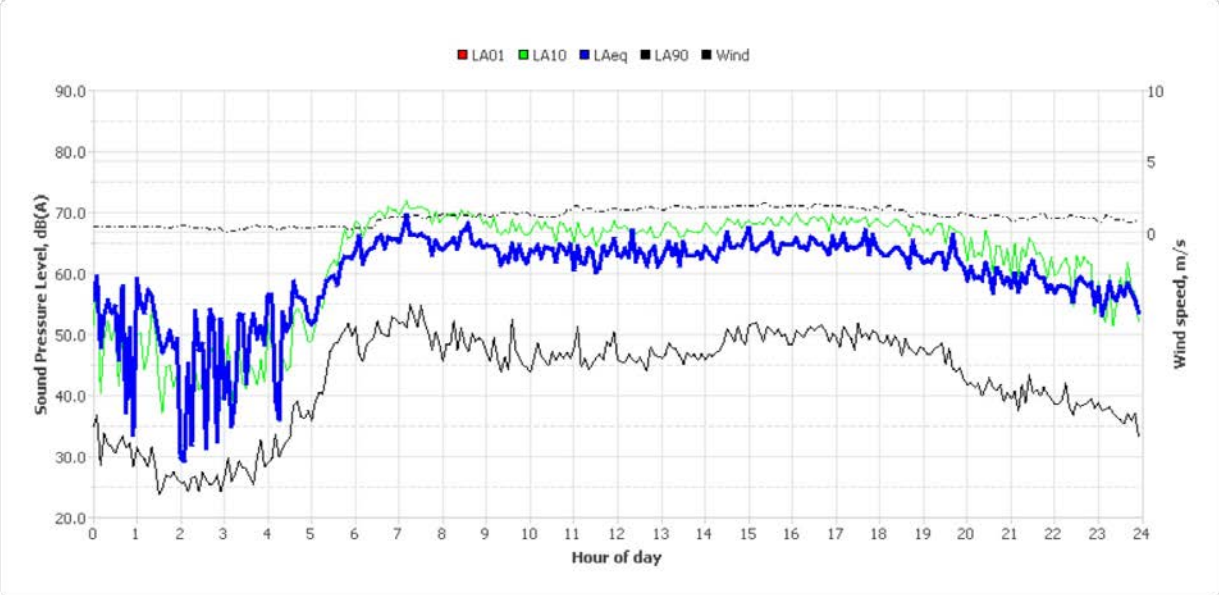

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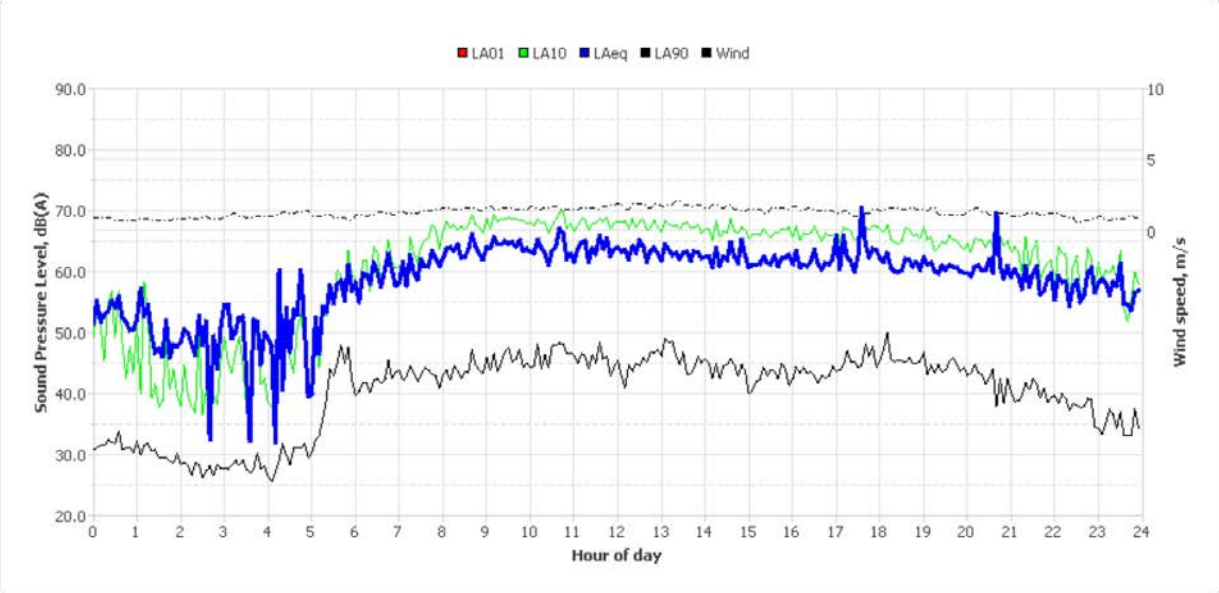

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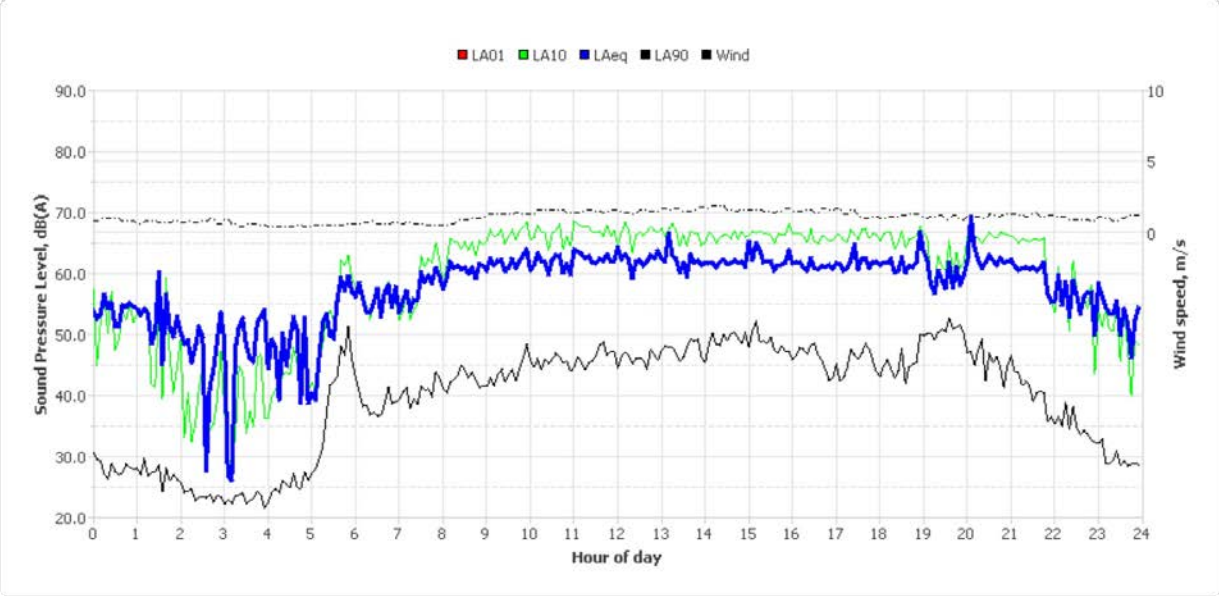

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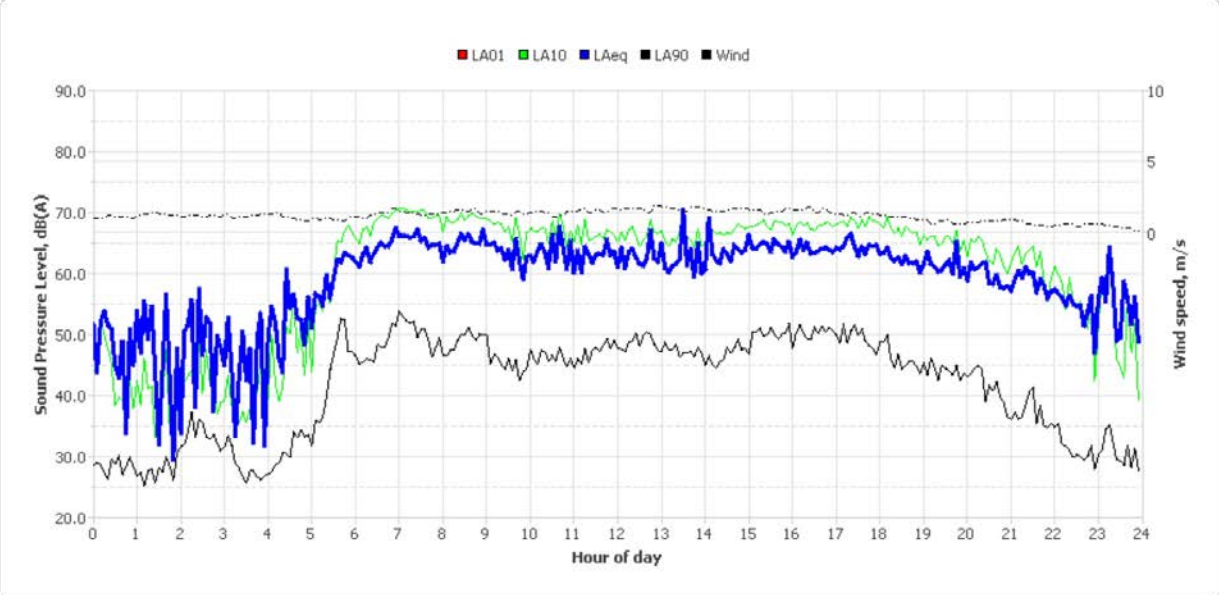

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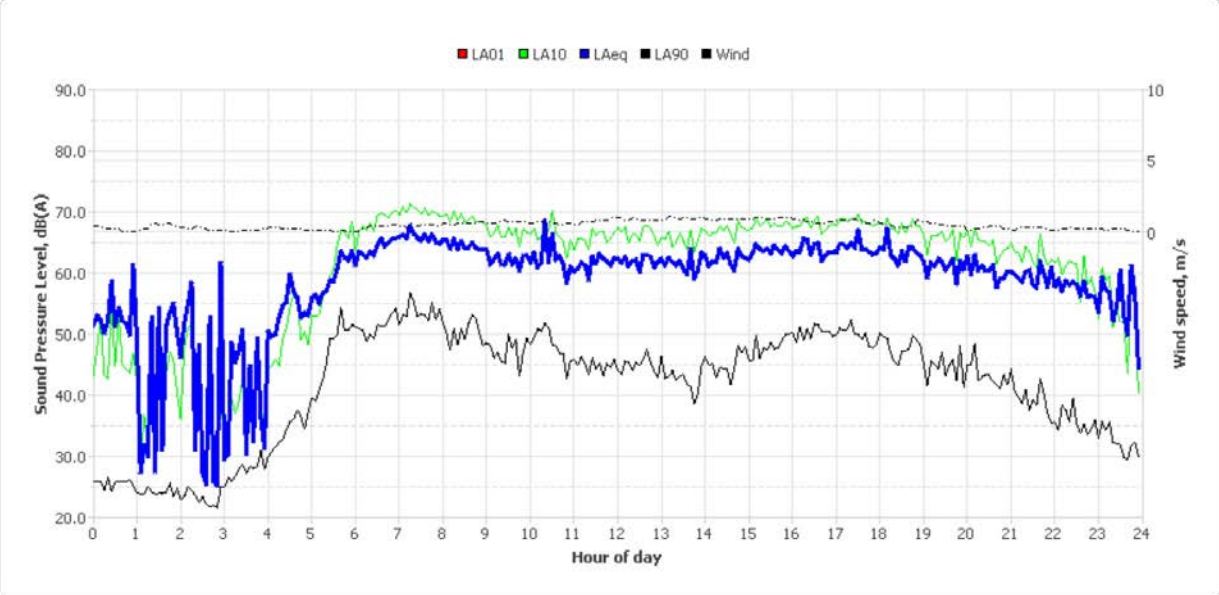

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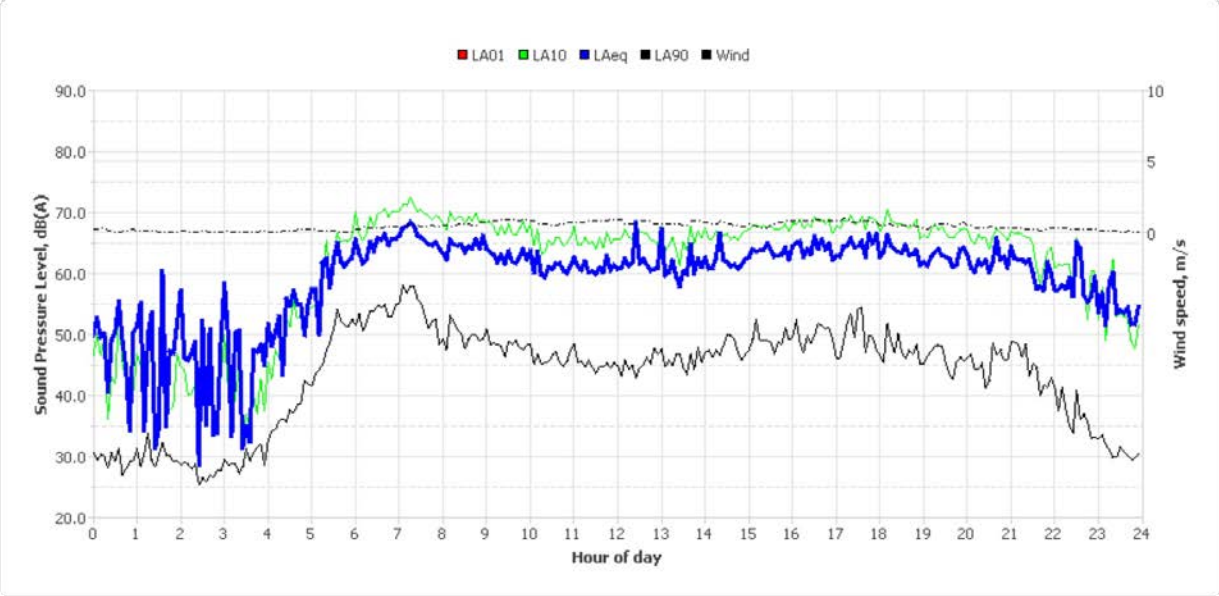

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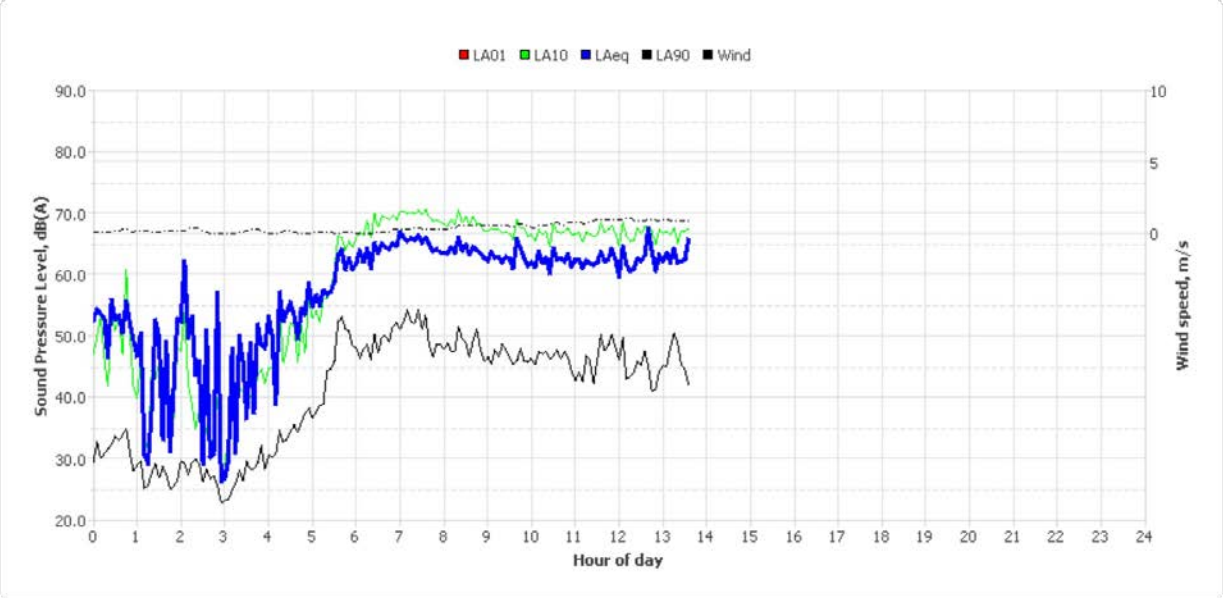

ATTACHMENT 15

TRIG ROAD CORRIDOR UPGRADE ASSESSMENT OF TRAFFIC NOISE AND VIBRATION EFFECTS

TE TUPU NGĀTAHI
SUPPORTING GROWTH

Trig Road Corridor Upgrade
Assessment of Traffic Noise and Vibration Effects

December 2022

Version 1

WAKA KOTAHI
New Zealand Government

Document Status

Responsibility	Name
Author	Jack Robinson, Shivam Jakhu
Reviewer	Rachel Foster, Claire Drewery
Approver	Bridget O'Leary

Revision Status

Version	Date	Reason for Issue
1.0	December 2022	Final for Lodgement

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Abbreviations

Acronym/Term	Description
AADT	Annual Average Daily Traffic
AEE	Assessment of Effects on the Environment
AC	Auckland Council
AT	Auckland Transport
AUP: OP	Auckland Unitary Plan Operative in Part
BPO	Best Practicable Option
FTN	Frequent Transit Network
FUZ	Future Urban Zone
NIWA	National Institute of Water and Atmospheric Research
NoR	Notice of Requirement (under the Resource Management Act 1991)
NZS 6806	NZS 6806:2010 Acoustics - Road-traffic noise - New and altered roads
OGPA	Open Graded Porous Asphalt
PPF	Protected Premises and Facilities
RMA	Resource Management Act 1991
SH16	State Highway 16
SH18	State Highway 18
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth Programme
Waka Kotahi	Waka Kotahi NZ Transport Agency

Glossary of Acronyms / Terms

Acronym/Term	Description
Auckland Council	Means the unitary authority that replaced eight councils in the Auckland Region as of 1 November 2010.
Altered Road	As defined in NZS 6806:2010 Section 1.5.2: Subject to 1.5.4, an altered road means an existing road that is subject to the alterations of the horizontal or vertical alignment where at any assessment position at any one or more PPF meets criteria 1.5.2 (a) or (b).
New Road	As defined in NZS 6806:2010 Section 1.6: A new road is any road which is to be constructed where no previously formed legal road existed. A new road excludes any existing road and any altered road but includes the formation of previously unformed legal road.

Executive Summary

Assessment undertaken

This report provides an assessment of predicted road traffic noise effects for Trig Road Corridor Upgrade.

The report contains a review of the relevant traffic noise criteria and discussion of the appropriate criteria and assessment methodology for the Project. Predictions of road traffic noise were carried out using the method recommended in NZS 6806 in accordance with rule E25.6.33 of the Auckland Unitary Plan – Operative in Part (AUP:OP).

The assessment of effects undertaken was two-fold: in accordance with NZS 6806, and in relation to the predicted noise level changes comparing the future traffic noise levels with and without the project.

As required by NZS 6806, the assessment methodology included the prediction of existing and future traffic noise levels, both without the Project (Existing and Do Nothing scenarios) and with the Project with no acoustic mitigation applied (Do Minimum scenario).

The Existing scenario represents the current road network with current traffic volumes, i.e. the existing environment as it is experienced now. The Do Nothing scenario represents the current road network with future traffic volumes, assuming a full build out of the area. The Do Minimum scenario represents the proposed future road network. This scenario assumes a full build out of the area, and the transport infrastructure to enable the development. This is a realistic scenario at a point in time when the Project is operational.

Noise effects of road traffic on existing noise-sensitive locations, referred to as Protected Premises and Facilities (PPFs) within NZS 6806, have been assessed. PPFs within a 100m radius of the Project area have been included. Roads have been assessed by comparing the predicted noise levels in the design year without the Project (Do Nothing) with the predicted noise levels in the design year with the Project (Do Minimum).

Each PPF has been assessed against Noise Criteria Categories as set out in NZS 6806, with Category A setting the most stringent external noise criteria and being the preferred category. Where this cannot practicably be achieved, then Category B is the next-preferred, having higher external noise criteria. Category C, an internal noise criterion, is the least-preferred category and should only be applied where Category A and Category B external noise criteria cannot be achieved and where external noise levels cannot practicably be reduced any further. Where Category A noise levels can be achieved, no further mitigation is required.

Mitigation options have been considered for the Project where required under NZS 6806. The BPO mitigation in this case has been determined to be the implementation of low-noise road surface finish. The BPO mitigation formed the basis of determining the relevant Noise Criteria Category for each PPF. Since the project will be built some time in the future this BPO will be confirmed for all PPFs current at the time of construction. The review, confirmation and refinement of the BPO will aim to achieve the same noise criteria categories as determined with the current BPO as presented in Appendix 3.

In addition to an assessment against the Noise Criteria Categories of NZS 6806, the Project is also assessed against the change in noise level without and with the Project constructed, and a general subjective response is applied to the predicted changes in noise levels at PPFs.

Traffic from new or upgraded road projects is not generally expected to create any vibration issues. The smooth and even surface typical of urban roads would likely generate no more than negligible traffic vibration impacts. Therefore, traffic vibration has not been assessed for the Project.

Assessment assumptions

All predictions are based on traffic flow along roads at a significant time in the future (in the Design Year 2048). These traffic volumes rely on the urbanisation of the area and implementation of surrounding transport projects. A full list of assumptions is included in Appendix 1.

Development of the surrounding areas and urbanisation of the receiving environment over time and implementation of surrounding transport projects will likely increase activity and associated ambient noise levels. Therefore, any change predicted in this assessment may not hold the same significance at the Design Year, due to the change in environment at the time of construction.

As such, the results are indicative of a possible future scenario, but effects cannot be definitively determined at this stage. Reassessment of the road traffic noise at PPFs covered in this report should be carried out at the time of construction to determine if the recommended mitigation is still relevant at the time of construction.

Results of assessment and recommended measures

The Project involves the widening and upgrade of Trig Road between the SH18 off-ramps and Hobsonville Road. The widening has capacity to provide for a two-lane arterial standard corridor including new footpaths on both sides of the road and a cycleway which is indicatively shown as a dedicated bi-direction cycleway on the eastern side of the corridor. The Project will upgrade the current corridor to an urban standard, which is appropriate to support the future urban environment on either side of Trig Road.

For the Do Minimum scenario, 92 PPFs are predicted to fall within Category A, 9 PPFs are predicted to fall within Category B and 5 in Category C. Predicted noise levels range from 45 dB $L_{Aeq(24h)}$ to 69 dB $L_{Aeq(24h)}$.

One mitigation option modelled (Mitigation Option 1) comprised the implementation of a low-noise road surface of Asphaltic Concrete with a maximum nominal aggregate size of 14 mm (AC-14) or an equivalent low noise road surface for the entire road alignment. With the recommended mitigation option in place, all PPFs would achieve Category A with the exception of two PPFs in which fall into Category B.

Implementation of noise barriers was considered as a potential mitigation option. However, they were not considered BPO mitigation options as there is a need to maintain access to houses via driveways, which would mean that line-of-sight would still be achieved between specifically mitigated PPFs and the road. This means that the minimum 5 dB(A) reduction at individual PPFs (as required by NZS 6806 set out in Section 2.1.5) would not be achieved. Therefore, noise barriers were not considered a suitable mitigation option.

For Mitigation Option 1, noise levels are predicted to change by a negligible margin at 75 out of 106 PPFs. Noise levels are predicted to increase by a perceptible amount (more than 2 dB increase in

noise levels between the Do Minimum and Do Nothing Scenario) at 2 PPFs due to the required demolition for this Project of dwellings which would otherwise have provided screening from the road to PPFs behind. Noise levels will reduce by at least a perceptible margin (more than 2 dB reduction in noise levels between the Do Minimum and Do Nothing Scenario) at 29 PPFs due to implementation of the low-noise road surface.

1 Introduction

This traffic noise assessment has been prepared to support Auckland Transport's (**AT**'s) Notices of Requirement (**NoRs**) for the Trig Road Corridor Upgrade (the **Project**). The NoRs are to designate land for future local arterial transport corridors as part of the Te Tupu Ngātahi Supporting Growth Programme (**Te Tupu Ngātahi**) to enable the future construction, operation and maintenance of the Project.

Auckland's population is growing rapidly; driven by both natural growth (more births than deaths) and migration to the area from overseas and other parts of New Zealand. The Auckland Plan 2050 anticipates that this growth will generate demand for an additional 313,000 dwellings and require land for approximately 263,000 additional employment opportunities.

In response to this demand, the Auckland Unitary Plan Operative in Part 2016 (**AUP:OP**) identifies 15,000 hectares of predominantly rural land for future urbanisation. To enable the urban development of this greenfield land, appropriate bulk infrastructure such as significant roads needs to be planned and delivered.

This report assesses the traffic noise effects of the proposed Trig Road Corridor Upgrade identified in Figure 1-1 below.

Figure 1-1: Whenuapai - Trig Road Corridor Upgrade

The Project consists of the widening and upgrade of Trig Road between the SH18 off-ramps and Hobsonville Road. The widening has capacity to provide for a two-lane arterial standard corridor including new footpaths on both sides of the road and a cycleway which is indicatively shown as a dedicated bi-direction cycleway on the eastern side of the corridor. The Project will upgrade the current rural standard corridor to an urban standard, which is appropriate to support the proposed urban environment on either side of Trig Road.

To tie into the existing road network, the Project also includes the signalisation of the intersections at Trig Road/Hobsonville Road and Luckens Road/Hobsonville Road, and the upgrade of Hobsonville

Road between these intersections. This will require some localised widening of the road corridor along Hobsonville Road.

1.1 Purpose and Scope of this Report

Trig Road, Whenuapai has been identified in the Supporting Growth Programme as a future arterial corridor which is needed to support the urban development of Whenuapai.

This report has been prepared to support **AT**'s notice of requirement (**NoR**) and application for resource consents for the Trig Road Corridor Upgrade (the **Project**). The NoR under the Resource Management Act 1991 (**RMA**) is to designate land for the construction, operation and maintenance of the Project.

Funding for the upgrade of Trig Road between Hobsonville Road and State Highway 18 (**SH18**) has been made available through the Housing Infrastructure Fund[1]. As there is funding available for construction, AT is also applying for the necessary resource consents under the RMA, concurrently with the NoR process.

This report provides an assessment of road traffic noise and vibration effects associated with the operation of the Project. This assessment has been prepared to inform the Assessment of Environmental Effects (**AEE**) for the NoR and resource consent application.

The key matters addressed in this report are as follows:

a. Identify and describe the existing noise environment;
b. Describe the predicted actual and potential adverse traffic noise and vibration effects of operation of the Project;
c. Recommend measures as appropriate to avoid, remedy or mitigate potential adverse noise and vibration effects (including any conditions/management plans required); and
d. Present an overall conclusion of the level of actual and potential adverse noise and vibration effects of the Project after recommended measures are implemented.

This report is structured to reflect the key matters listed above.

[1] See *North West Housing Infrastructure Fund Assessment of Environmental Effects* for further detail regarding the Housing Infrastructure Fund.

2 Assessment Criteria

2.1 Road Traffic Noise

Rule E25.6.33 of the Auckland Unitary Plan (AUP:OP) requires that New Roads and Altered Roads which are within the scope of NZS 6806:2010[2] comply with the requirements of that standard. The assessment has addressed the requirements of NZS 6806.

NZS 6806 provides criteria and an assessment method for road-traffic noise. The standard is a tool which provides performance targets and requires assessment of varying options for noise mitigation (ranging from low-noise road surfaces and barriers to building modification mitigation). These options are subject to an integrated design process in which the costs and benefits are considered. The performance targets in NZS 6806 are set to achieve reasonable noise levels considering adverse health effects associated with noise on people and communities, the effects of relative changes in noise levels, and the potential benefits of New and Altered Roads. NZS 6806 is an appropriate tool to assess road traffic noise from the Project as it provides a suitable and tested traffic noise assessment and mitigation methodology and includes relevant noise criteria.

NZS 6806 is not applicable to New and Altered Roads predicted to carry less than an Annual Average Daily Traffic ("AADT") of 2000 vehicles per day at the design year, or where the change in noise level due to a project (i.e. the horizontal or vertical realignment of a road) does not reach certain thresholds of effects (e.g. a change of at least 3 dB for at least one PPF).

To be defined as an Altered Road in accordance with NZS 6806 the following must apply:

- The Do Minimum noise environment would be greater than or equal to 64 dB $L_{Aeq(24h)}$ and, if no specific noise mitigation was undertaken, the alterations would increase road traffic noise at the assessment position by 3 dB $L_{Aeq(24h)}$ or more at the design year, when compared with the Do Nothing noise environment; or
- The Do Minimum noise environment is greater than or equal to 68 dB $L_{Aeq(24h)}$ and, if no specific noise mitigation was undertaken, the alterations would increase road-traffic noise at the assessment position by 1 dB $L_{Aeq(24h)}$ or more at the design year, when compared with the Do-Nothing noise environment.

2.1.1 Protected premises and facilities

NZS 6806 requires noise effects to be assessed at noise-sensitive locations within set distances of any project. These locations are known as Protected Premises and Facilities (PPFs), and include existing houses, schools, marae and various other premises as defined in NZS 6806. Commercial and industrial premises do not fall within the definition of a PPF. Future (unbuilt) noise-sensitive premises are also not PPFs, unless they have already been granted building consent at the time of this assessment.

The distances from the road within at which properties are considered to be PPFs is set in the Standard as:

- Urban Areas – 100 metres from the edge of the nearside traffic lane.

[2] New Zealand Standard 6806:2010 Acoustics - Road Traffic Noise

- Rural Areas – 200 metres from the edge of the nearside traffic lane.

The Project extent falls within an Urban Area as defined by Statistics New Zealand[3] and therefore PPFs within 100 metres of the Project's road alignments have been assessed in this report. Buildings outside of these areas have not been assessed.

The assessment distance of 100 metres ensures the assessment is made at the most relevant receivers. Potential noise effects are still controlled at receivers further away by virtue of noise criteria applying at receivers nearest to the road.

2.1.2 NZS 6806 Noise Criteria

For this Project, the noise criteria as summarised below are applicable.

Table 2-1: NZS 6806 noise criteria

Category	Criterion	Altered Road	New Roads with a predicted traffic volume of 2000 to 75000 AADT at the design year
A	Primary (External)	64 dB $L_{Aeq(24h)}$	57 dB $L_{Aeq(24h)}$
B	Secondary (External)	67 dB $L_{Aeq(24h)}$	64 dB $L_{Aeq(24h)}$
C	Internal	40 dB $L_{Aeq(24h)}$	40 dB $L_{Aeq(24h)}$

The Project is an "Altered Road" as defined by NZS 6806 because:

- Trig Road and Hobsonville Road are existing roads;
- The Do Minimum (the Project implemented, but without any specific noise mitigation) noise environment is greater than or equal to 68 dB $L_{Aeq(24h)}$ at one or more Protected Premises and Facilities (PPFs) and the alteration would cause a predicted increase in road traffic noise at that assessment position by 1 dB or more.

Traffic volumes will likely change from current predictions with development intended for the Project area, and traffic noise will need to be reassessed nearer the time of detailed design and construction to confirm the recommended mitigation measures for the existing PPFs.

2.1.3 Noise Prediction Scenarios

In accordance with NZS 6806 the following scenarios have been modelled:

- The "Existing noise environment", which is the ambient noise levels at the date of assessment (2022).
- A "Do Nothing" scenario, which represents the traffic noise levels at the PPFs at the design year assuming no physical alterations are made to the existing road.
- A "Do Minimum" scenario, which represents the traffic noise levels at the PPFs at the design year with the Project implemented, but without any specific noise mitigation. Road surfaces, safety

[3] New Zealand: An Urban/Rural profile, Statistics New Zealand

barriers and other structures which are required for non-acoustic purposes may provide incidental noise mitigation and are included in this scenario.
- "Mitigation" scenarios, which represent the traffic noise levels at the PPFs at the design year with various specific noise mitigation options implemented with the aim of achieving the noise criteria categories.

Noise mitigation options have been determined based on comparison of the "Do Minimum" scenario results against the traffic noise criteria identified in Section 2.1.2.

Further to the requirements of NZS 6806, in order to determine the potential change in noise levels at PPFs due to operation of the Project, the chosen Mitigation scenario has been compared with the "Do Nothing" scenario.

Under NZS 6806, PPFs do not include premises which are not yet built, other than those for which building consent has already been obtained but not yet lapsed. Although the NZS 6806 assessment does not consider sites unless they contain, or have building consent for a PPF, the predicted noise levels can be considered indicative of the noise environment at adjacent sites without a PPF. This includes sites that are earmarked for residential redevelopment in the near or medium future.

2.1.4 Design Year

The criteria apply to a design year 10 to 20 years after the completion of the altered road. In this case, the opening year has not yet been determined, but the year 2048 has been selected as the design year for assessment purposes. This decision was made in conjunction with the Project team on the basis that urban development envisaged within the wider area, which will influence traffic flow data along the Project, is likely to be completed by 2048. Adopting the design year therefore provides appropriate traffic data for assessment purposes.

We note that the traffic flows used in the Do Nothing and Do Minimum scenarios were modelled assuming other planned roading projects in the area are implemented. A full list of assumptions is included in Appendix 1.

2.1.5 Noise Mitigation

NZS 6806 requires that noise mitigation options are to be assessed, and if practicable, the category A criterion should be achieved. If this is not practicable then mitigation should be assessed against category B. However, if it is still not practicable to comply with categories A or B then mitigation should be implemented to ensure the internal criterion in category C is achieved. Depending on the specific building, mitigation in category C could include ventilation and/or noise insulation improvements ranging from upgraded glazing through to new wall and ceiling linings. The achievement of category C provides no additional protection of outdoor amenity.

In circumstances where noise mitigation is warranted, NZS 6806 adopts a "Best Practicable Option" (BPO) approach. BPO considers the extent to which a mitigation option will achieve compliance with the relevant noise criteria and result in a noticeable noise reduction at assessment locations. The value-for-money of the option and the potential visual, shading and safety effects are also considered, amongst other things.

Where a requirement to consider mitigation measures is identified, NZS 6806 states that structural mitigation (low-noise road surfaces and noise barriers) should only be implemented if it achieves the following:

a. An average external noise reduction of at least 3 dB $L_{Aeq(24h)}$ at relevant assessment positions of all PPFs which are part of a cluster; or

b. A minimum external noise reduction of 5 dB $L_{Aeq(24h)}$ at any assessment position(s) for each PPF not in a cluster.

2.1.6 Road Traffic Vibration

Traffic vibration from new or upgraded roading projects is not generally expected to create issues at receivers. A key factor with new roads is the uniformity of the basecourse/pavement and the absence of near surface services. This is due to new or upgraded roads being designed to be smooth and even and avoiding vibration generated from passing traffic over uneven surfaces. Therefore, traffic vibration effects arising from operation of the Project has not been assessed.

3 Existing Ambient Noise Environment

The criteria in NZS 6806 to assess road traffic noise are not dependent on the existing noise levels. Measurements of existing levels are therefore not required for the assessment against that standard. However, an appreciation of the existing environment is useful to understand the potential noise effects, regardless of compliance with any particular noise criteria.

Measurement results have also been used to verify the computer noise model for the existing environment, ensuring that predictions are accurate to within the relevant tolerance.

3.1.1 Noise Monitoring Procedure

Noise survey equipment, meteorological conditions, data analysis and results are described below.

The noise monitoring was undertaken in general accordance with the relevant requirements of NZS 6801[4], 6802[5] and 6806. This means that the results could adequately inform the operational noise assessment, whilst providing a robust baseline dataset for the Project.

A measurement position at 22 Trig Road was selected to represent an existing environment which is unlikely to change significantly up until the design year, and where road traffic is currently the controlling noise source. The measurement position was free-field to avoid reflections from buildings or extraneous factors which could influence the sound levels, where practicable. Measurement and calibration details required by NZS 6801 are held on file.

The unattended noise monitoring results can be found in Appendix 2.

3.1.2 Meteorological Conditions

During the survey, meteorological data was obtained from Electronic Weather Station (EWS) 41351 weather station operated by the National Institute of Water and Atmospheric Research (NIWA). This is the closest station to the Project area at which data was available at an hourly resolution or less.

The meteorological data from this weather station was used to identify periods during which conditions were likely to have been outside the meteorological restrictions given in NZS 6801; data measured during these periods has been excluded from the noise analysis.

3.1.3 Data Analysis

Road traffic was the dominant noise source, with birdsong clearly audible. There is a natural variation in the noise environment throughout the day, and often variations for the weekends. Each day's data was analysed, and abnormal events excluded. A summary of the measured noise levels has been included in Table 3-1. The $L_{Aeq(24h)}$ was calculated for each day where there was sufficient data after unsatisfactory meteorological conditions and abnormal events were excluded.

The average $L_{Aeq(24h)}$ for the unattended measurement period was 59 dB.

[4] New Zealand Standard 6801:2008 Acoustics – Measurement of environmental sound

[5] New Zealand Standard 6802:2008 Acoustics – Environmental noise

Table 3-1: Summary of measured noise levels – 22 Trig Road

Date	**$L_{Aeq\ (24h)}$ (dB)**
19/11/2019	62
20/11/2019	61
21/11/2019	61
22/11/2019	61
23/11/2019	59
24/11/2019	59
25/11/2019	61
26/11/2019	62
27/11/2019	62
28/11/2019	61
Average	**59**

4 Assessment Methodology

Road traffic data provided for the Trig Road Corridor Upgrade relies on the development and urbanisation of the local areas, as it forms part of the wider strategic transport network. Other projects will have a direct impact on the traffic flow and have been accounted for in the future road traffic data as set out in Section 2.1.4.

The purpose of this assessment is to determine the future potential impacts to support the future growth within the area. Therefore, it has been assumed all transport infrastructure developments will be constructed by the design year 2048 as indicated in Section 2.1.3.

It should be noted a planned urban speed reduction is expected within the transport model at the time of growth and at the "Do Nothing" scenario (design year without Project). The planned speed limit change has been included in both the Do Nothing and Do Minimum scenarios, as it will go ahead regardless of whether or not the Project is constructed.

NZS 6806 sets criteria for road traffic noise levels, considering health issues associated with noise and other matters. It is considered that external road traffic noise levels in compliance with NZS 6806 Category A would generally result in acceptable noise effects. Achieving the Category B criteria may also give rise to acceptable noise effects when considered in conjunction with the existing environment.

To determine the potential change in noise level due to the Project, the "Do Minimum" (design year with Project) scenario has been compared with the "Do Nothing" (design year without Project) scenario.

Under NZS 6806, PPFs do not include premises which are not yet built, other than those where building consent has already been obtained but not yet lapsed. No such premises that fall under this Category were known at the time of this assessment.

Although the NZS 6806 assessment does not consider sites unless they contain, or have building consent for, a PPF, the predicted noise levels shown in the noise contour maps in Appendix 4 can be considered indicative of the noise environment at adjacent sites without a PPF, including the future urbanisation areas.

4.1 Road Traffic Noise Model

A computer noise modelling software SoundPLAN (V8.2) has been used to predict road traffic noise impacts. The road traffic noise modelling employs the "*Calculation of Road Traffic Noise*" (CoRTN) algorithm, as recommended in NZS 6806. The CoRTN methodology has been adjusted for New Zealand Road Surfaces in accordance with Land Transport New Zealand (d) Report No. 326[6] and the Waka Kotahi *Guide to state highway road surface noise*[7]. The model settings are described in Table 4-1 below.

[6] https://www.nzta.govt.nz/assets/resources/research/reports/326/docs/326.pdf

[7] https://www.nzta.govt.nz/assets/resources/road-surface-noise/docs/nzta-surfaces-noise-guide-v1.0.pdf

Table 4-1: Road traffic noise modelling parameters

Parameter	Setting/source
Software	Sound Plan 8.2
Algorithm	CoRTN
Reflection	CoRTN
Ground absorption	0.6 for urban areas; 1 for grassed areas
Receiver height	1.5 m above height of each floor
Noise contour grid	1.5 m height, 5 m resolution
Receivers and grid position	Free-field

The CoRTN algorithm gives results in $L_{A10(18h)}$. To convert these results to $L_{Aeq(24h)}$ a minus 3 dB adjustment has been made. This adjustment has been implemented in the software in conjunction with the road surface adjustment detailed below.

The limitations and uncertainties of the prediction methodology, including input data, are discussed below.

4.1.1 Traffic data

All traffic data including AADT, percentage of heavy vehicles and posted speed limit has been sourced from the Project team and based on the Simulation and Assignment of Traffic to Urban Road Networks (SATURN) model.

2048 has been selected as the design year, based on the availability of traffic modelling data, and represents a conservative year for assessment purposes, as traffic will tend to increase over time as the area develops. The "Existing" scenario has been based on 2015 data as provided. Traffic modelling methodology and results are described in the *Project Integrated Transport Assessment*. Traffic volumes would need to change significantly to affect noise levels to a meaningful degree. Therefore, using traffic data from 2015 is appropriate to represent the existing circumstances. The change in traffic volume from 2015 to 2022 would amount to less than 1 decibel change in noise level.

The CoRTN model has been developed based on 18-hour traffic data. However, in accordance with the requirements of NZS 6806, traffic data has been entered as the 24-hour daily traffic (AADT), which results in noise levels in the order of +0.2 dB higher than those which would have been calculated by CoRTN based on the 18-hour AADT. The CoRTN model assumes that traffic is free-flowing, it does not apply to interrupted vehicle flows, such as at intersections, and for low volume roads (under 2,000 AADT).

4.1.2 Topography

Topographic contours for the existing scenario have been provided from the Project team at a 1m resolution.

Contours for the "Do Minimum" scenario were obtained from the Project team for the assessment area and joined with the existing contours for the surrounding areas. Road gradients and screening have been extrapolated by the SoundPLAN model from the contours.

4.1.3 Buildings

The footprints and heights for all buildings, building usage and all other structures within 100 metres of the roads have been obtained from the Project team. The number of floors was determined assuming 2.8 m height per floor.

Noise levels were calculated at the centre of each façade, 1.5 m above each floor height with the noise levels stated being the highest of any façade.

Any buildings or structures within the designation boundary for the Project have been removed from the model and not assessed for the "Do Minimum" scenario as they will be removed/demolished to provide for the Project road alignment.

Road alignments for existing roads were provided by the Project team as centrelines and widths for each carriageway section. Road gradients were calculated within the SoundPLAN model.

4.1.4 Road Surfaces

Surfaces of existing roads in the "Do Nothing" scenario have been modelled as the current surfaces recorded by the Project team, which is two-coat chipseal. For the "Do Minimum" scenario the road surface has also been modelled as two-coat chipseal, retaining the existing surface type, as advised by the Project team.

The procedure used to incorporate different road surfaces in the model is as follows:

- A minus 2 dB adjustment was applied for New Zealand conditions in accordance with Transit Research Report 28
- A surface correction relative to asphaltic concrete was made in accordance with LTNZ Research Report 326 and the Waka Kotahi Guide to state highway road surface noise.
- The combination of surface corrections for cars and heavy vehicles was made using the equation in the Waka Kotahi Guide to state highway road surface noise.
- The combined correction was entered in the modelling software as a total road surface correction applied to the source line.

4.1.5 Existing noise barriers

Existing noise barriers along the Project route were identified during site visits and confirmed by the Project team. The only existing noise barrier identified was between SH18 and 46 Trig Road.

Existing boundary fences of private properties have not been included in the noise model as their condition is unknown and they may not provide effective acoustic shielding nor be retained by property owners during the course of the Project development.

This means that for some properties, the predicted traffic noise levels may be slightly higher than would actually be experienced. However, the assessment process will identify properties which need new noise barriers to be erected or existing fences to be upgraded to provide adequate attenuation, as part of the mitigation appraisal.

4.1.6 Bridges

The SH18 over-bridge is configured to be a 'self-screening' road, which blocks the noise of the road passing through it and its parapets. The existing screens will remain on the SH18 over-bridge as no widening works are proposed.

4.1.7 State Highway 18

SH18 runs perpendicular to the Project alignment and is approximately 70m from the nearest PPF at 52 Trig Road. The property is at an approximately 9m elevation above the highway with a 2m high barrier sitting between SH18 and the dwelling.

Future scenario data was not provided for this section of SH18, thus a test model to consider the noise impact from SH18 on 52 Trig Road was run using existing State Highway traffic data obtained directly from Waka Kotahi. The test model shows that the inclusion of SH18 results in a + 2dB increase on the north façade directly facing the highway. The eastern façade located closest to Trig Road has minimal difference of +0.6dB. Since the noise impact from SH18 is minimal in relation to the façade closest to the Project area, SH18 has not been included into the assessment model.

4.2 Uncertainties and Limitations

The predicted road traffic noise levels presented in the following sections are based on a road traffic noise model developed in accordance with NZS 6806 and relevant guidance. The accuracy of the model is largely dependent upon the limitations of the available input data as detailed above.

Uncertainties in the modelled noise levels can occur for a number of reasons. Uncertainties are typically related to the effects of topographical screening, appropriateness of the traffic data in terms of volumes of light and heavy vehicles, and speeds (observed vs signposted) and road surface type.

As stated, the model has been developed by the Project team based on 1m vertical resolution, which provides sufficient detail to accurately account for any acoustic shielding from localised topographical features. The traffic data has been sourced from the Project team and it is accepted that the forecasting of future traffic flows may not necessarily reflect the actual flows when the Design Year is reached. The sensitivity of the noise predictions to changes in traffic data is not as significant as the effects of topographical screening. For example, if all other factors of the traffic data remain unchanged (speed and % of heavy vehicles), then a doubling or halving of the traffic data will only result in a 3 dB change which is only just perceptible by most people. A change in traffic volume data by +25 % or -25% will result in up to a 1 dB change in predicted noise level.

The resulting accuracy of the model can be quoted to a reasonable degree based upon known validations of the CoRTN model and comparisons with the measured existing noise levels. Generally, road traffic noise levels can be predicted with an accuracy of 2 dB. NZS 6806 states in section 5.3.4.2 that "The difference between measured and predicted levels should not exceed ±2 dB."

Table 4-2 compares the measured data (date of measurements) with the predicted noise levels. The predicted traffic noise levels are within the tolerance of NZS 6806 and therefore the existing model is appropriately validated for the calculation of traffic noise levels for all scenarios.

Table 4-2: Comparison of measured and predicted noise levels

Address	Measured noise level, $L_{Aeq,24hr}$, dB(A)	Predicted noise level, $L_{Aeq,24hr}$, dB(A)	Difference, dB(A)	Notes
22 Trig Road	61.0	62.8	+1.8	Within tolerance

4.3 Potential Traffic Noise Mitigation Options

For those PPFs where the NZS 6806 Category A criterion is predicted to be exceeded, the effect of the mitigation options on road traffic noise levels at each PPF were modelled.

Traffic noise mitigation measures can be broadly categorised into three methods; low noise road surfaces, traffic noise barriers, and building modification. The first two methods involve structural mitigation as described in NZS6806, whilst the third involves at-building modification mitigation.

4.3.1 Road surfaces

The noise mitigation measure with the largest influence on the generation of road traffic noise is the road surface material.

The "Do Minimum" road surface has been modelled as two-coat chip seal as advised by Auckland Transport. Where mitigation of noise through selection of a low-noise road surface has been investigated, AC-14 has been used.

The Project team raised concerns about the use of Open Graded Porous Asphalt (OGPA) in place of AC-14, which reduces noise levels further, as it is considered to be impractical for durability and maintenance reasons and is better suited to high-speed environments with limited side friction from driveways. The possibility of Epoxy OGPA was discussed with the Project team, however the limited supply in New Zealand and costs associated with the production meant that this has not been considered further as a potential mitigation option by direction of AT.

4.3.2 Noise barriers

If low-noise road surfaces do not provide the required level of noise mitigation or are not practicable, traffic noise barriers may be considered. Generally, barriers will only mitigate noise if they block the line-of-sight between the noise source and receiver. They are most effective and provide the widest area of mitigation when placed immediately adjacent to traffic lanes. In order to provide the most effective noise level reduction, an acoustic barrier must be of solid material (i.e. have no gaps) and have a minimum surface weight of 15 kg/m^2 (e.g. 17mm ply sheeting, 9 mm fibre cement, concrete, earth bunds etc.).

We note that as per Section 2.1.5, NZS 6806 requires noise barriers to achieve:

- An average reduction of at least 3 dB $L_{Aeq(24h)}$ at relevant assessment positions of all PPFs which are part of a cluster; or
- A minimum reduction of 5 dB $L_{Aeq(24h)}$ at any assessment position(s) for each PPF not in a cluster.

4.3.3 Building modification

NZS 6806 requires that structural mitigation, such as noise barriers and low-noise road surfaces, should be implemented in preference to building modification mitigation.

Building modification can potentially inconvenience residents, provides mitigation only to those receivers directly upgraded, and does not provide any protection to outdoor amenity. However, if low-noise road surfaces and noise barriers are not practicable or do not provide the required level of noise reduction, building modification to PPFs may be considered.

Depending on the level of reduction required, building modification measures may range from provision of mechanical ventilation only (to allow doors and windows to be closed), to the upgrade or replacement of windows, wall linings, floors and ceiling linings.

4.3.4 Maintenance of structural mitigation measures

The effectiveness of the acoustic performance of noise mitigation measures will need to be maintained over time. NZS 6806 states that "structural mitigation measures should be designed in such a way that they retain the same noise-reduction properties up to the design year".

This means that any barrier proposed for the Project should not develop gaps or other openings or material failure. Any damage and vandalism to the barrier affecting its material properties will need to be replaced/fixed, and asphalt surfaces should be maintained to be smooth and even, in order to achieve the same noise-reduction qualities as following initial installation.

Maintenance of structural mitigation measures to the performance standards of NZS 6806 should be undertaken for the Project up to the design year in order to achieve the noise level reductions on which the noise level predictions are based.

4.4 Overview of Traffic Noise Effects

Adverse noise effects as a result of high levels of traffic noise may include sleep disturbance, loss of concentration, annoyance, a reduction in speech intelligibility and reduced productivity. The effects are not restricted to PPFs but may also affect future residential and other noise-sensitive developments which are not included in the NZS 6806 definition of a PPF. Where new noise-sensitive developments are established in the vicinity of a road, their design should take account of the potential noise effects and care should be taken to avoid or minimise them.

The magnitude of effects will largely depend on noise levels received in noise-sensitive spaces within buildings, although there are also potential annoyance effects associated with a loss of amenity when high noise levels are received in outdoor living or recreation spaces.

The subjective perception can generally be correlated with the numerical change in noise level. A 3 dB change in noise level is just perceptible to the majority of people. A 10 dB increase in noise level is subjectively considered to be a doubling of loudness.

Table 4-3 Noise level change compared with general subjective perception

Noise level increases	General subjective perception
1 – 2 decibels	Insignificant change
3 – 4 decibels	Perceptible change
5 – 8 decibels	Noticeable change
9 – 11 decibels	Halving/doubling of loudness
> 11 decibels	More than halving/doubling of loudness

5 Road Traffic Noise Assessment

5.1 Project Corridor Features

The Project extends between intersections with Hobsonville Road in the south and ties in with the existing Trig Road just to the north of SH18. An overview of the proposed design has been provided in Section 1.

Figure 5-1: Overview of the Trig Road Corridor Upgrade

5.2 Existing and Likely Future Environment

5.2.1 Planning context

Within the Project area there are a range of zones under the AUP:OIP which influence the existing and likely future land use patterns for assessment purposes.

Table 5-1 provides a summary of the existing and likely future environment as it relates to the Project area.

Table 5-1 Existing and Future Environment Likelihood of Change

Project area	Environment today	Current Zoning	Likelihood of Change	Likely Future Environment
Context A	Rural	Future Urban	High	Urban
Context B	Urban – Low Density	Future Urban	High	Urban
Context C	Urban – Medium Density	Urban	Moderate	Urban
Context D	Urban	Urban	Moderate	Urban

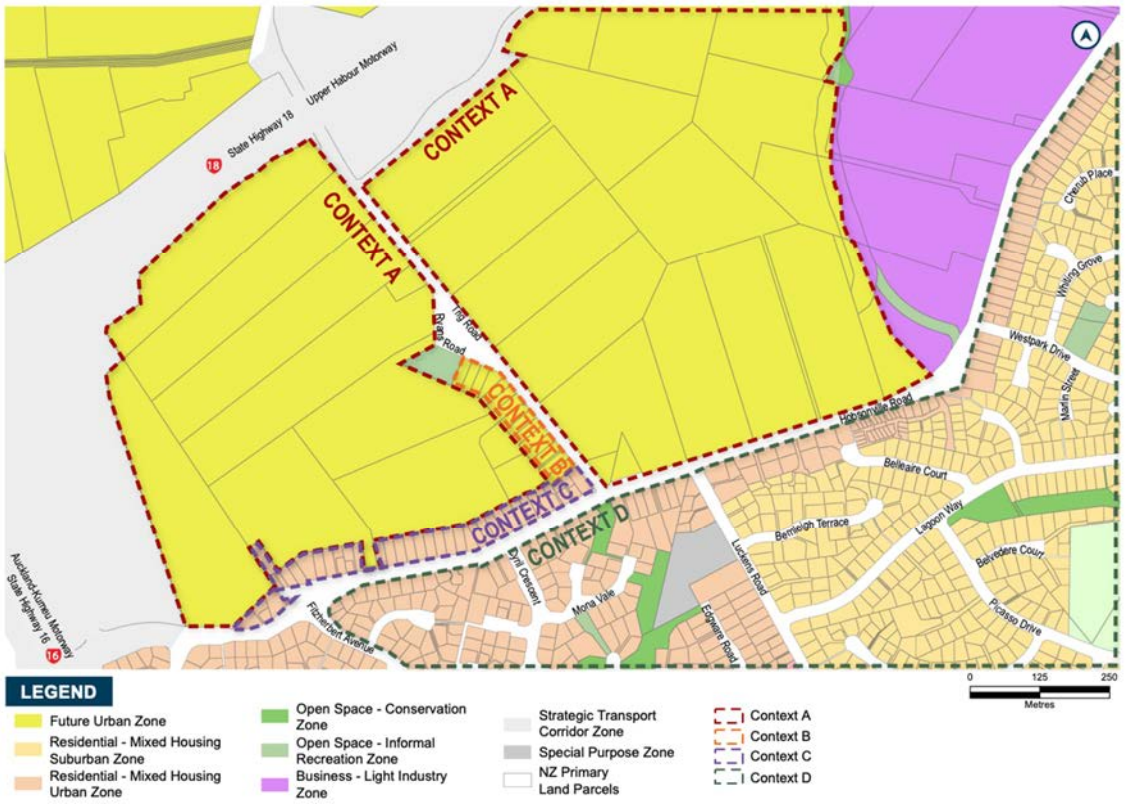


Figure 5-2 Existing and Future Zoning

Please refer to the AEE for further information on the planning context.

5.2.2 Noise Environment

The Trig Road Corridor Upgrade is currently located within an urban area (in accordance with the definition of urban areas as per Statistics New Zealand 2004). The noise environment is currently dominated by road traffic noise from vehicles on SH18, Hobsonville Road, Trig Road, and the surrounding road network as well as aircraft noise associated with the Whenuapai Air Base.

5.3 Assessment of Road Traffic Noise Effects and Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects

Predicted road-traffic noise levels at all existing PPFs for the "Existing", "Do Nothing", "Do Minimum" and "Mitigation Option" scenarios are shown in Appendix 3. The cells are colour-coded according to the NZS 6806 noise impact category: Category A – green, Category B – orange, and Category C – red. Where a property has multiple dwellings per address, only the most affected PPF is represented in the tables and maps.

Noise contour maps showing indicative levels across a 200m radius from the alignment are provided in Appendix 4. Specific noise level values should not be taken directly from the contours as they are interpolated from a grid, resulting in some localised inaccuracies.

Based on information provided by the Project team, the following residential buildings will be removed to make room for the Project alignment and have not been considered in the assessment:

- 19 Trig Road
- 72C Hobsonville Road
- 7 Trig Road
- 9 Trig Road

5.3.1 Road Traffic Noise Model Results Analysis

The Project meets the definition of an Altered Road in accordance with NZS 6806. A summary of the results of the NZS 6806 assessment is shown in Table 5-2.

Table 5-2: NZS 6806 Assessment and Summary

Category		Number of PPFs			
	Criterion	Existing	Do Nothing	Do Minimum	Mitigation 1
Cat A	64 dB $L_{Aeq(24h)}$	104	92	92	104
Cat B	67 dB $L_{Aeq(24h)}$	2	11	9	2
Cat C	40 dB Internal $L_{Aeq(24h)}$	0	3	5	0
Total		**106**	**106**	**106**	**106**

"Existing" scenario predictions show the noise level within the Project area is between 43 – 65 dB $L_{Aeq(24h)}$ with no PPFs in Category C.

Under the "Do Nothing" scenario, predictions show a traffic noise level range between 45 – 68 dB $L_{Aeq(24h)}$, with a total of 3 PPFs in Category C and 11 PPFs in Category B.

The "Do Minimum" scenario shows a similar predicted range of 45 – 69 dB $L_{Aeq(24hr)}$. A total of 5 PPFs are in Category C under the "Do Minimum" scenario.

One mitigation option (Mitigation Option 1) has been considered to reduce noise levels at PPFs. The mitigation option implements AC-14 road surface to the entire length of the Project. With this option, there are no PPFs predicted to remain in Category C. 2 PPFs are predicted to receive noise levels within Category B and 104 PPFs in Category A. Considering the above options regarding the construction of the Project, Mitigation Option 1 will result in the lowest number of PPFs remaining in Categories B & C.

Implementation of noise barriers was considered as a potential mitigation option. However, these were not considered to be BPO mitigation as there is a need to maintain access to houses via driveways, which would mean that line-of-sight would still be retained between the PPF and the road where screening would be required. This means that the minimum 5 dB(A) reduction at individual PPFs as required by NZS 6806 Section 2.1.5 would not be achieved at the PPF façades where barriers would be implemented. Therefore, noise barriers were not considered a suitable mitigation option.

Overall, Mitigation Option 1 is recommended as the BPO.

5.3.2 Assessment of Road Traffic Noise Effects

The effects associated with a change in noise level have been considered in addition to the NZS 6806 assessment. The "Do Nothing" scenario and Mitigation 1 scenarios can be compared to determine the predicted noise level increase or decrease at PPFs as a result of the Project. Figure 5-3 shows the predicted change in noise level at PPFs when comparing the "Do Nothing" and "Mitigation 1" scenarios.

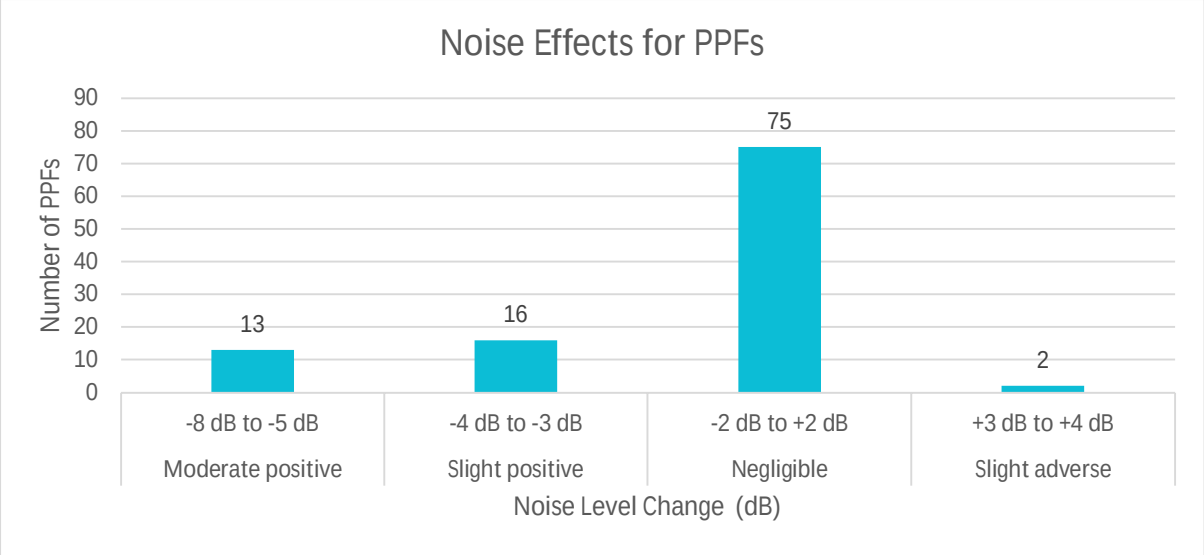


Figure 5-3: Noise change assessment – Do Nothing vs Mitigation Option 1

When comparing the Mitigation 1 scenario and the Do Nothing scenario, noise levels at the PPFs are generally expected to remain similar between the Do Nothing and Mitigation Option 1 scenarios with the majority of PPFs predicted to experience a negligible change in noise level of 2 dB or less as shown in Figure 5-3.

Two PPFs are predicted to experience an increase in noise level of 3-4 dB resulting in slight adverse effects. The increase in noise level is due to the demolition of several dwellings which would otherwise provide acoustic shielding to PPFs behind in the “Do Nothing” scenario when compared to the “Mitigation 1” scenario.

29 PPFs are predicted to experience a perceptible decrease in noise levels overall, with 16 PPFs experiencing a reduction of 3 to 4 dB resulting in slight positive effects, and 13 PPFs having reduced noise levels of 5 to 8 dB resulting in moderative positive effects. This is due to the proposed asphaltic concrete AC-10 road surface proposed in the “Mitigation 1” scenario providing a reduction in road traffic noise compared to the Do Nothing scenario.

It is noted that some PPFs may no longer exist at the time of road construction, particularly given the proposed zone change in the area allowing for urban development. Therefore, the predicted effects may not be experienced by current residents, where buildings between the proposed corridor and the residence have been demolished.

Ambient noise levels will likely increase as the area urbanises and therefore changes in noise level, due to the Project may not be as noticeable at the time.

We consider that noise effects from road traffic will be reasonable after construction of the project.

6 Conclusion

An assessment of traffic noise has been carried out for the Trig Road Corridor Upgrade based on NZS 6806 and predicted changes in noise levels at PPFs. To determine the change in noise level, comparisons were made between the predicted road traffic noise levels in the "Do Nothing" scenario (representative of the design year without the Project, assuming traffic from full area development on the existing road network) and "Mitigated" scenario.

All existing PPFs within 100m of each alignment have been considered within the assessment (in accordance with the definition of urban areas as per Statistics New Zealand 2004). Buildings which are within the NoR areas have been removed from the "Do Minimum" and "Mitigated" scenario as they will not remain following the Project implementation.

"Mitigation Option 1", consisting of a low noise road surface, provides the best practicable solution in terms of noise reduction and is therefore recommended. After implementation of "Mitigation Option 1", the Category A criterion will be achieved at 104 out of 106 PPFs, with the remaining two PPFs achieving the Category B criterion. There are no PPFs which are predicted to receive noise levels in Category C.

Implementation of noise barriers was considered as a potential mitigation option. However, these were not considered to be BPO mitigation as there is a need to maintain access to houses via driveways, which would mean that line-of-sight would be retained between the PPF and road. This means that the minimum 5 dB reduction at individual PPFs as required by NZS 6806 set out in Section 2.1.5 would not be achieved at the exposed façades. Therefore, noise barriers were not considered part of the BPO mitigation.

For "Mitigation Option 1", noise levels are predicted to change by a negligible margin (±2 dB) at 75 out of 106 PPFs when compared to the Do Nothing scenario. Noise levels will reduce by at least a perceptible margin at 29 PPFs due to implementation of the low noise road surface resulting in slight to moderate positive noise effects. Noise levels are predicted to increase by a perceptible amount (3-4 dB) at 2 PPFs due to known demolition of dwellings which would otherwise have provided screening from the road, resulting in slight adverse noise effects.

All predictions are based on traffic flow along Altered Roads at the design year (2048). These traffic volumes are predicated on the anticipated urbanisation of the area and implementation of surrounding infrastructure projects. Development of the surrounding areas will likely increase activity and associated ambient noise levels. Therefore, any changes predicted for the traffic noise effects related to this Project are not likely to represent such a significant change at the time of construction due to the change in environment resulting from other development.

As such, the results are indicative of a possible future scenario, but effects cannot be definitively determined at this stage. Reassessment of the road traffic noise at current PPFs will be carried out nearer the time of construction to confirm that the recommended mitigation still represents the best practicable option. The review, confirmation and refinement of the BPO shall aim to achieve the same noise criteria categories as determined with the current BPO.

Nevertheless, the predictions show that most PPFs (with the exception of two Category B PPFs) will receive levels within the Category A criterion, which is the most stringent Category and represents the lowest design noise levels.

We consider that noise effects from road traffic will be reasonable after construction of the project.

Traffic vibration from new or upgraded roading projects is not generally expected to create any vibration issues regarding structural damage. There are no notable operational factors which would be likely to generate more than negligible operational vibration impacts. Therefore, operational vibration has not been assessed for the Project.

Appendix 1: Assumptions

Package	Project(s)	Existing	Do Nothing	Do Minimum
Whenuapai Arterials	Trig Road upgrade (NoR W1)	x	x	√
	Māmari Road upgrade (NoR W2)	x	x	√
	Brigham Creek Road upgrade (NoR W3)	x	x	√
	Spedding Road upgrade (NoR W4)	x	x	√
	Hobsonville Road upgrade (NoR W5)	x	x	√
Redhills Arterials	Fred Taylor Drive FTN upgrade	x	√	√
	Northside Drive East extension	x	√	√
	Don Buck Road FTN upgrade	x	√	√
	Royal Road FTN upgrade	x	√	√
Riverhead Arterials	Coatesville – Riverhead Highway upgrade	x	√	√
	Riverhead Road upgrade	x	√	√
Strategic Projects	Rapid Transit Corridor (RTC)	x	√	√
	Alternative State Highway (ASH)	x	√	√
	Brigham Creek Interchange	x	√	√
	Regional Active Mode Corridor (RAMC)	x	√	√
	SH16 Main Road upgrade	x	√	√
	Access Road upgrade	x	√	√
	Station Road upgrade	x	√	√
Growth	Land Use Assumptions	up to 2015	up to 2048+	up to 2048+

Key	
√	Included
x	Excluded
*	Minimal Network Change

Appendix 2: Noise Monitoring Results

Noise Logger Report

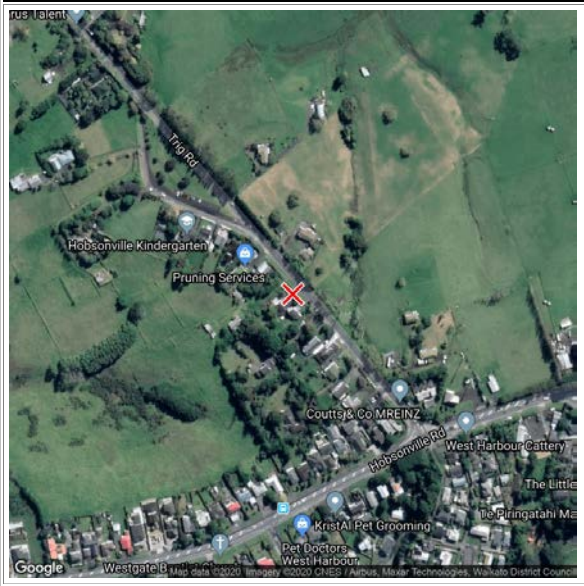
22 Trig Road, Whenuapai

Item	Information
Logger Type	NL-52
Serial number	898331
Address	22 Trig Road, Whenuapai
Location	Front yard
Facade / Free Field	Free field
Environment	Ambient nosie controlled by Trig Road

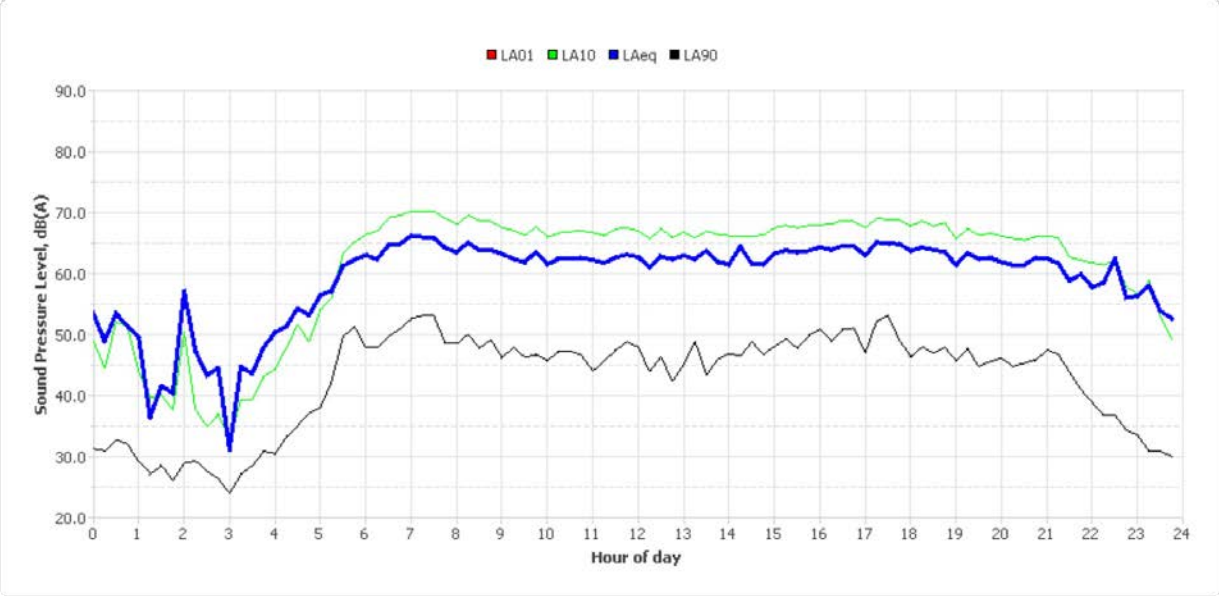
Measured noise levels

Logging Date	$L_{Aeq,24hr}$	$L_{Aeq,day}$ 7am-6pm	$L_{Aeq,evening}$ 6pm-10pm	$L_{Aeq,night}$ 10pm-7am	ABL Day	Eve	Night
Tue Nov 19 2019	62	65	62	58	-	42	-
Wed Nov 20 2019	63	65	62	58	48	38	31
Thu Nov 21 2019	63	64	62	58	45	38	28
Fri Nov 22 2019	62	64	62	58	45	40	26
Sat Nov 23 2019	61	63	61	56	42	39	28
Sun Nov 24 2019	60	62	62	54	41	40	23
Mon Nov 25 2019	62	64	61	58	45	36	27
Tue Nov 26 2019	62	63	62	58	43	39	24
Wed Nov 27 2019	62	63	63	58	45	42	28
Thu Nov 28 2019	-	63	-	58	44	-	26
Summary	**62**	**64**	**62**	**58**	**45**	**39**	**27**

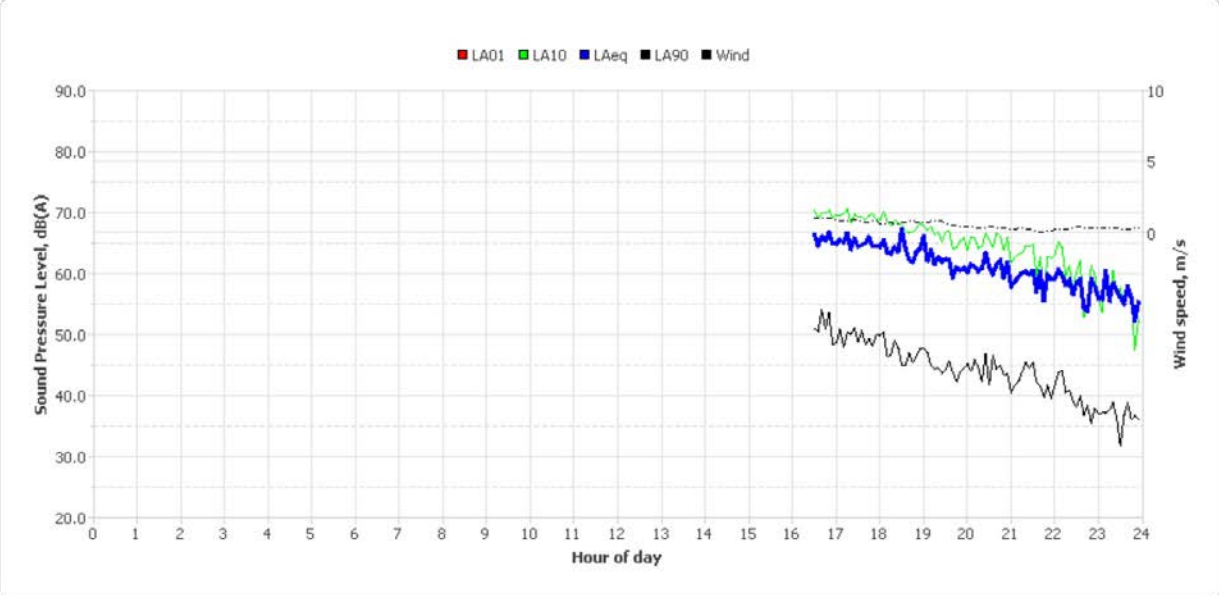
Note: Results denoted with '-' do not contain enough valid data for a value to be calculated. The data has been excluded either manually or automatically as a result of adverse weather conditions.

Logger Location	Logger Deployment Photo
	

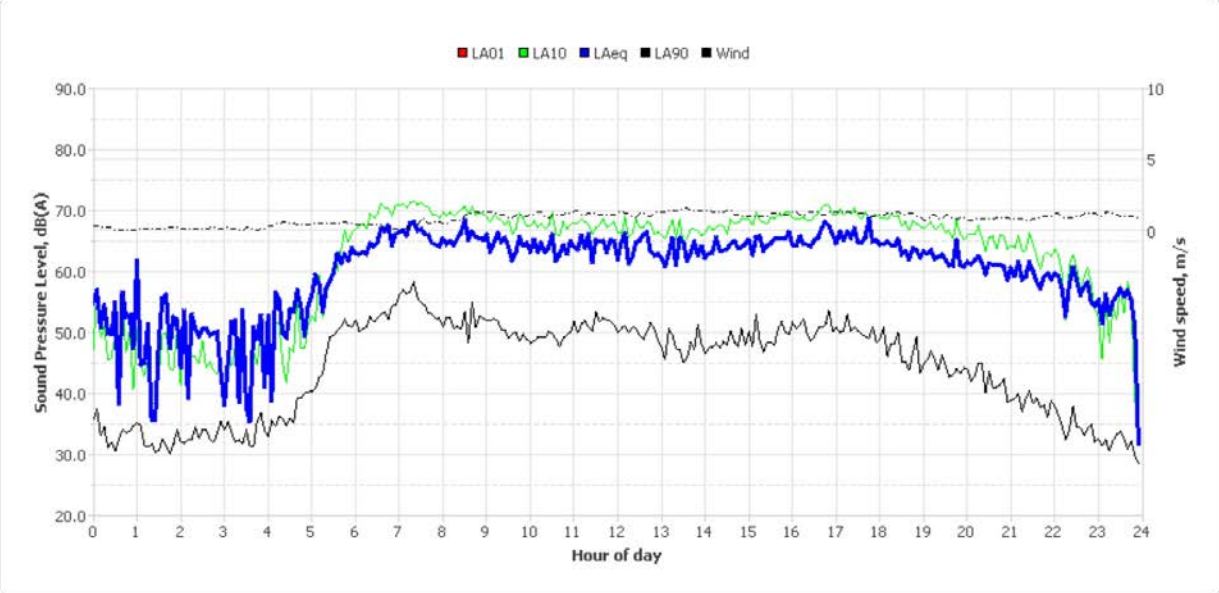
Typical Day



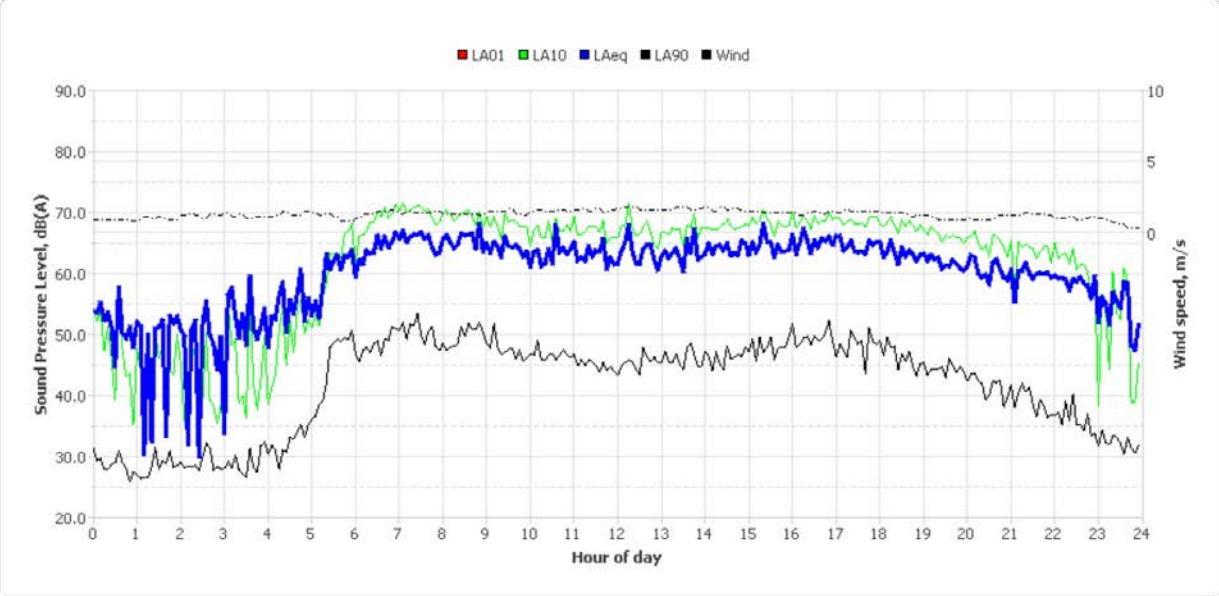
Tuesday, 19 Nov 2019



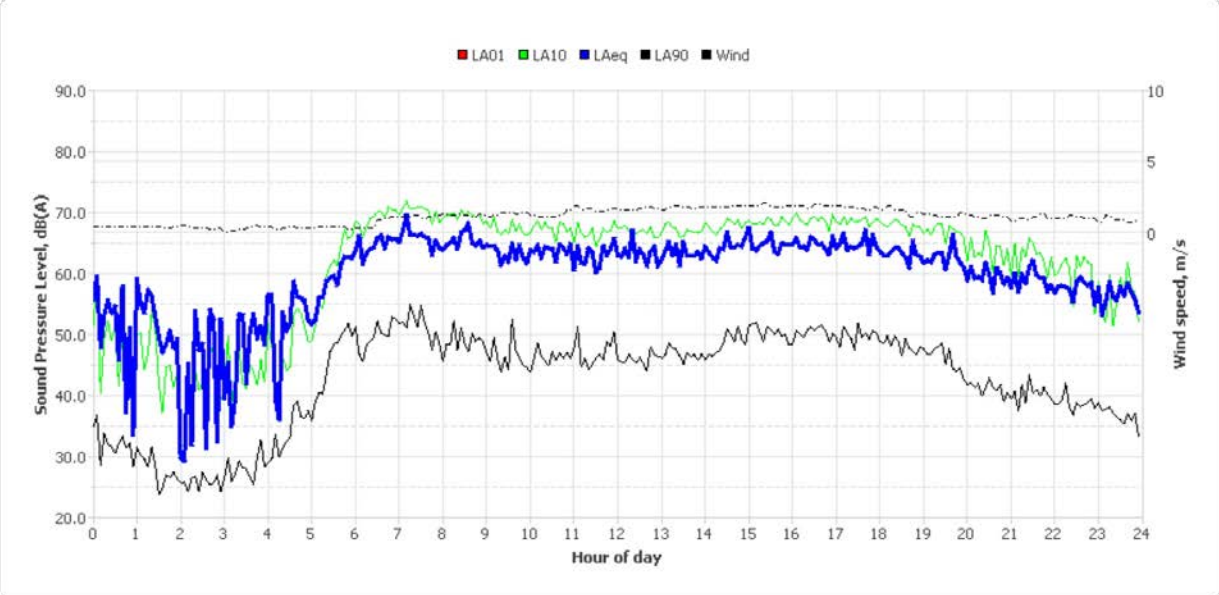
Wednesday, 20 Nov 2019



Thursday, 21 Nov 2019



Friday, 22 Nov 2019



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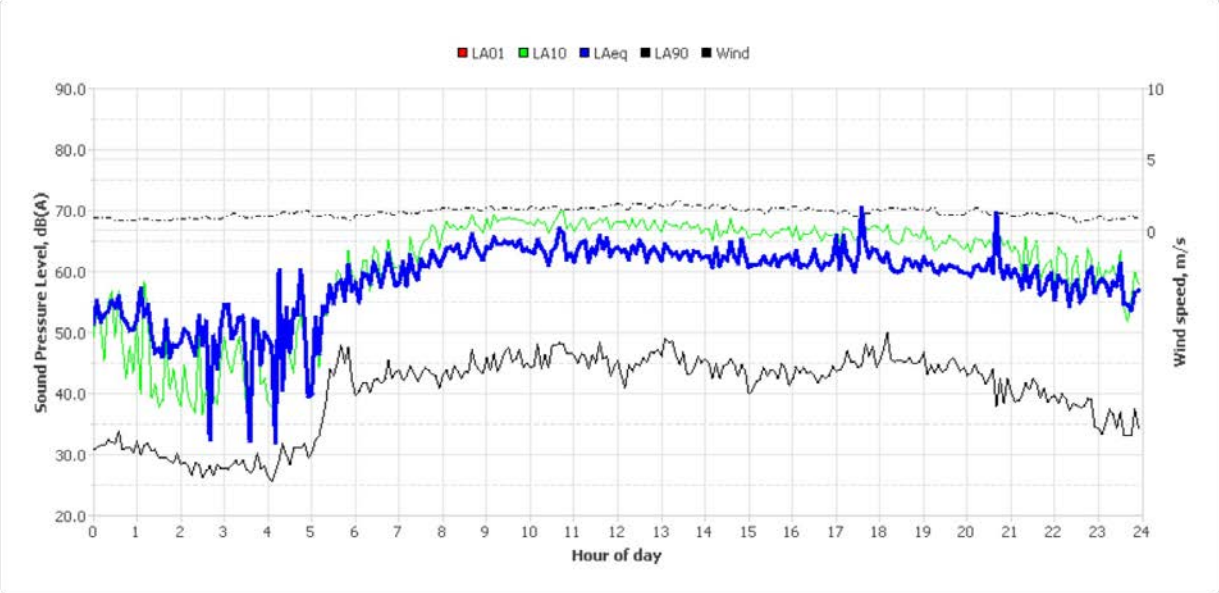
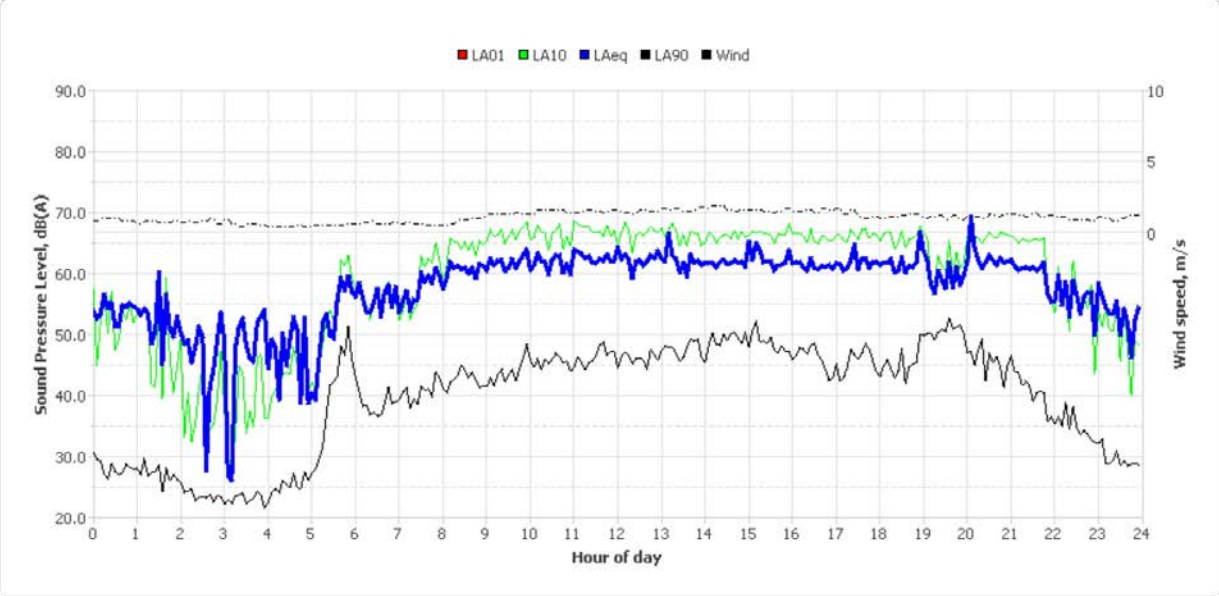


Sunday, 24 Nov 2019



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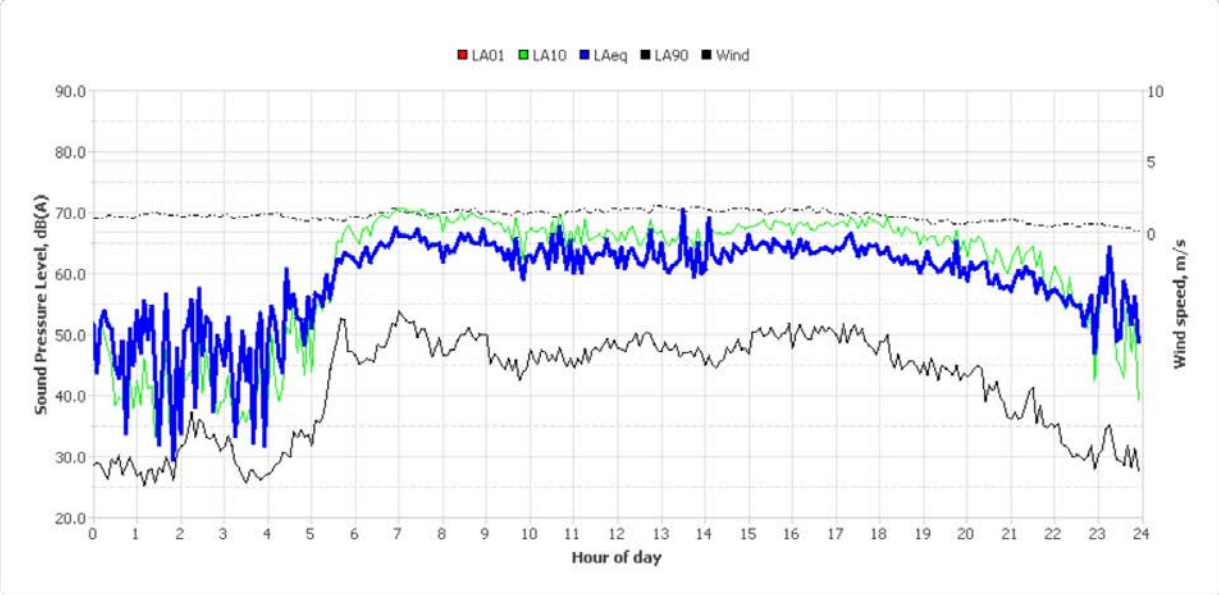

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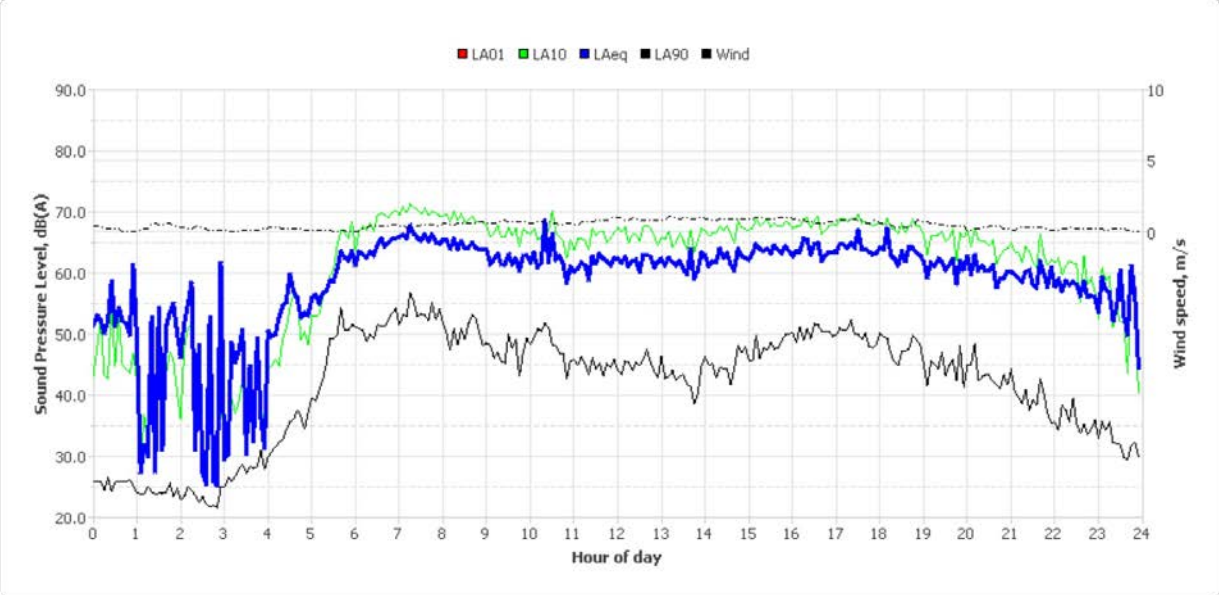
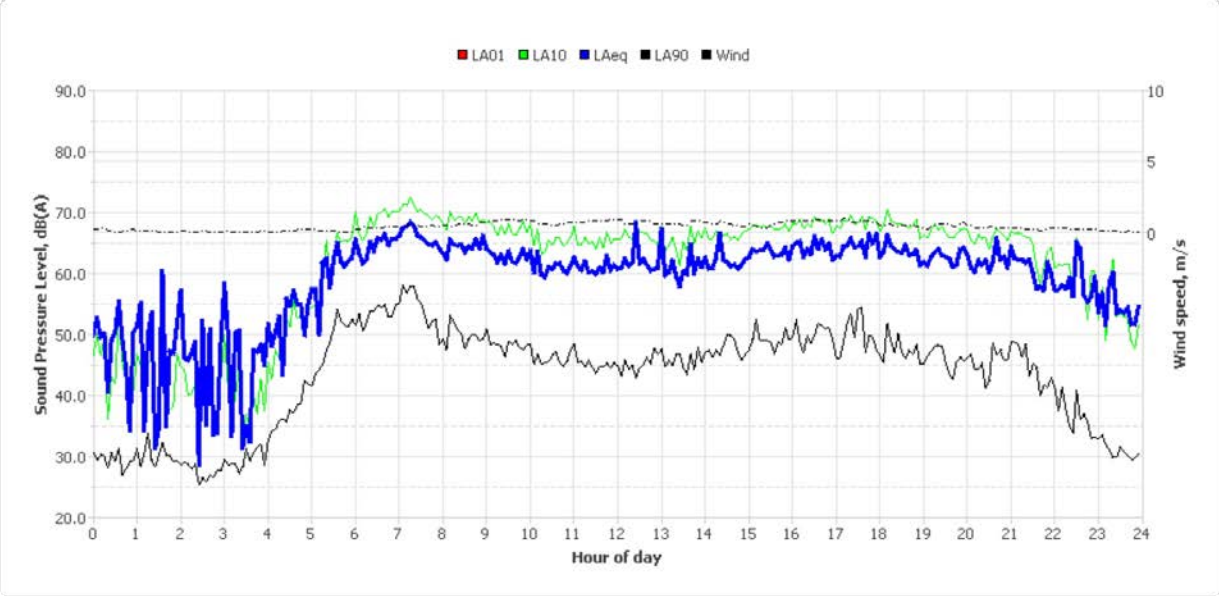
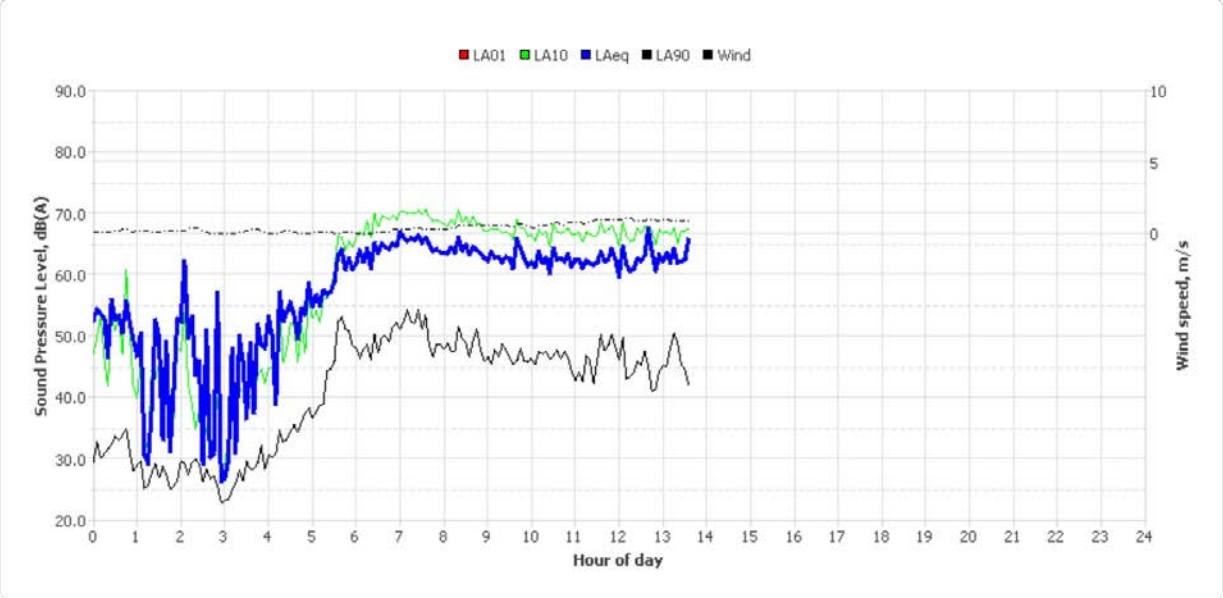


Wednesday, 27 Nov 2019



Thursday, 28 Nov 2019



Appendix 3: Predicted Traffic Noise Levels

KEY

Cat A	Cat B	Cat C

Address	Existing	Do Nothing	Do Minimum	**Mitigation 1**
72 Hobsonville Road	65	68	69	66
26 Trig Road	64	68	68	63
64 Hobsonville Road	65	68	68	64
66 Hobsonville Road	63	67	68	65
40 Trig Road	63	67	68	63
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	62	65	65	63
16 Trig Road	62	66	65	61
97 Hobsonville Road	62	65	65	63
6 Trig Road	61	64	65	61
22 Trig Road	62	66	65	60
62 Hobsonville Road	61	64	65	62
18, 2 Luckens Road	64	66	65	64
72B Hobsonville Road	59	62	65	60
16 Luckens Road	64	66	65	64
8 Trig Road	61	65	64	60
12 Trig Road	60	64	64	60
60 Hobsonville Road	60	63	64	62
119 Hobsonville Road	63	65	64	64

10 Luckens Road	63	66	64	64
1B Luckens Road	61	63	64	64
28 Trig Road	61	64	64	59
70 Hobsonville Road	60	63	64	60
24 Belleaire Court	61	63	63	62
30 Trig Road	61	63	63	58
75 Hobsonville Road	59	61	62	61
32 Trig Road	59	62	61	56
56 Hobsonville Road	58	61	61	61
76 Hobsonville Road	58	61	61	56
1/111, 2/111 Hobsonville Road	59	61	60	61
133 Hobsonville Road	57	58	60	58
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	57	60	60	56
72A Hobsonville Road	54	58	60	56
8 Luckens Road	59	61	60	59
52 Hobsonville Road	56	59	60	60
127 Hobsonville Road	58	59	60	59
5 Luckens Road	57	59	59	59
34 Trig Road	57	60	59	54
50 Hobsonville Road	56	59	59	60
46 Trig Road	57	60	59	54
54 Hobsonville Road	56	59	59	58
26 Belleaire Court	56	58	59	57
48 Hobsonville Road	55	58	58	59
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	53	56	58	54
107 Hobsonville Road	57	59	58	58
79A Hobsonville Road	48	51	58	54

68 Hobsonville Road	55	58	58	54
58 Hobsonville Road	54	57	57	58
19 Luckens Road	54	56	57	57
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	51	54	57	53
80 Hobsonville Road	55	57	57	57
5 Louise Place	47	50	56	52
22A Trig Road	52	56	56	51
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	54	57	56	52
2/12, 1/12 Mona Vale	50	53	56	52
34A Trig Road	54	56	56	51
8A, 10, 8 Louise Place	46	49	56	52
8A, 10, 8 Louise Place	47	49	56	51
3A Louise Place	49	52	55	51
18 Trig Road	50	54	55	50
6 Louise Place	46	49	54	50
10 Mona Vale	48	51	54	50
78 Hobsonville Road	52	53	54	54
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	48	50	54	50
33 Cyril Crescent	45	48	54	49
70A Hobsonville Road	51	54	54	49
97 Hobsonville Road	51	53	53	50
10 Trig Road	49	52	53	48
22 Cyril Crescent	47	50	52	49
99 Hobsonville Road	51	53	52	52
147F Hobsonville Road	50	52	52	51
29 Cyril Crescent	45	48	52	48
8A, 10, 8 Louise Place	45	48	51	47

1A Luckens Road	49	51	51	50
1/93, 2/93, 2/14, 3/93, 3/14, 4/14, 1/14 Hobsonville Road	48	51	51	47
3A Louise Place	45	48	51	46
131 Hobsonville Road	49	50	50	50
31 Cyril Crescent	46	48	50	48
145A Hobsonville Road	48	50	50	49
8 Bernleigh Terrace	48	50	50	49
4 Louise Place	44	47	49	45
127A Hobsonville Road	48	49	49	49
14 Luckens Road	48	50	49	48
121 Hobsonville Road	48	50	49	49
145B Hobsonville Road	47	49	49	48
2/95, 1/95, 95 Hobsonville Road	47	50	49	46
12 Luckens Road	47	49	49	49
123 Hobsonville Road	47	49	49	48
20 Belleaire Court	47	49	49	48
20A Belleaire Court	47	49	48	48
3A Luckens Road	46	48	48	47
3B Luckens Road	45	47	48	47
133A Hobsonville Road	46	48	48	48
131A Hobsonville Road	47	48	48	48
129 Hobsonville Road	46	48	48	48
129C Hobsonville Road	46	48	47	47
129B Hobsonville Road	46	48	47	47
22 Belleaire Court	45	47	47	46
121B Hobsonville Road	46	48	47	47
18 Belleaire Court	45	47	47	46
4 Bernleigh Terrace	45	47	47	46

133A Hobsonville Road	45	47	47	46
2/95, 1/95, 95 Hobsonville Road	45	48	46	44
121A Hobsonville Road	44	46	45	45
123A Hobsonville Road	44	46	45	45
123B Hobsonville Road	44	45	45	45
19 Belleaire Court	43	45	45	44

Appendix 4: Noise Contour Maps

Date Printed: 4/11/2022 10:53 AM

Name: 1_Trig_Existing

Path: C:\GIS\SGA HIF_JR\SGA_HIF_JR.aprx

PPFs Altered

dB $L_{Aeq\ 24\ hr}$

- ≤ 64
- 64 - 67
- ≥ 67
- Not Assessed
- Assessment Area

Roads

Noise Level

dB $L_{Aeq\ 24\ hr}$

- 55 - 60
- 60 - 65
- 65 - 70
- ≥ 70

Map Scale @ A3:

N

Revision	Author	Verified	Approved	Date
1	Author	DRAFT	DRAFT	dd/mm/yyyy

Title:

Supporting Growth

Trig Road - Existing Scenario

Working Plans of Te Tupu Ngatahi.
For the purpose of INTERNAL workshops (not for wider distribution)

Client: Supporting Growth

Project: North West HIF

TE TUPU NGĀTAHI Supporting Growth

Discipline: GIS

Drawing No: SGA-NV-NW-013

Date Printed: 4/11/2022 10:53 AM

Name: 2_Trig_Do_Nothing

Path: C:\GIS\SGA HIF_JR\SGA_HIF_JR.aprx

Upper Harbour Mtwy

Trig Rd

Ryans Rd

Hobsonville Rd

Weiarohia Stream

Belleaire Ct

Bernleigh Ter

Lagoon Way

Picasso Dr

Luckens Rd

Cyrill Cres

Mona Vale

46

40

PPFs Altered

dB $L_{Aeq\ 24\ hr}$

- ≤ 64
- 64 - 67
- ≥ 67
- Not Assessed
- Assessment Area

Roads

Noise Level

dB $L_{Aeq\ 24\ hr}$

- 55 - 60
- 60 - 65
- 65 - 70
- ≥ 70

This map contains data derived in part or wholly from sources other than those party to the Supporting Growth Alliance, and therefore, no representations or warranties are made by those party to the Supporting Growth Alliance as to the accuracy or completeness of this information.

Map intended for distribution as a PDF document.
Scale may be incorrect when printed.

Unitary plan data sourced from Auckland Council published web services.
Legend information can be viewed on Auckland Council unitary plan viewer.

Linework shown on this plan is conceptual only.
Not to be used for construction.

Map Scale @ A3:

N

Revision	Author	Verified	Approved	Date
1	Author	DRAFT	DRAFT	dd/mm/yyyy

Title:

Supporting Growth

Trig Road - Do Nothing Scenario

Working Plans of Te Tupu Ngatahi.
For the purpose of INTERNAL WORKshops (not for wider distribution)

Client: Supporting Growth

Project: North West HIF

TE TUPU NGĀTAHI Supporting Growth

Discipline: GIS

Drawing No: SGA-NV-NW-013

Date Printed: 4/11/2022 10:53 AM

Name: 3_Trig_Do_Min

Path: C:\GIS\SGA HIF_JR\SGA_HIF_JR.aprx

Upper Harbour Mtwy

Trig Rd

Ryans Rd

Hobsonville Rd

Waiarohia Stream

Luckens Rd

Belleaire Ct

Bernleigh Ter

Lagoon Way

Picasso Dr

Cyril Cres

Mona Vale

46

40

PPFs Altered

dB $L_{Aeq\ 24\ hr}$

- ≤ 64
- 64 - 67
- ≥ 67
- Not Assessed
- Assessment Area

Roads

Noise Level

dB $L_{Aeq\ 24\ hr}$

- 55 - 60
- 60 - 65
- 65 - 70
- ≥ 70

Map Scale @ A3:

N

Revision	Author	Verified	Approved	Date
1	Author	DRAFT	DRAFT	dd/mm/yyyy

Title:

Supporting Growth

Trig Road - Do Minimum Scenario

Working Plans of Te Tupu Ngatahi.
For the purpose of INTERNAL WIP maps (not for wider distribution)

Client: Supporting Growth

Project: North West HIF

TE TUPU NGĀTAHI Supporting Growth

Discipline: GIS

Drawing No: SGA-NV-NW-013

Date Printed: 4/11/2022 10:53 AM

Name: 4_Trig_Mit1

Path: C:\GIS\SGA HIF_JR\SGA_HIF_JR.aprx

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Revision	Author	Verified	Approved	Date
1	Author	DRAFT	DRAFT	dd/mm/yyyy

Title:

Supporting Growth

Trig Road - Mitigation 1 Scenario

Working Plans of Te Tupu Ngatahi.
For the purpose of INTERNAL workshops (not for wider distribution)

Client: **Supporting Growth**

Project: **North West HIF**

TE TUPU NGĀTAHI
Supporting Growth

Discipline: **GIS**

Drawing No: **SGA-NV-NW-013**

ATTACHMENT 16

TRIG ROAD CORRIDOR UPGRADE
ASSESSMENT OF HISTORIC HERITAGE EFFECTS

Supporting Growth

Trig Road Corridor Upgrade

Assessment of Historic Heritage Effects

Version 1.0

August 2020

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Document Status

Version no.	Responsibility	Name
1.0	Author	Sarah Macready (2020)
	Reviewer	Rod Clough (2020) Matthew Kerr-Ridge (2020)
	This report was authored in 2020 by Sarah Macready, who is no longer at Te Tupu Ngātahi Supporting Growth. I, Hans-Dieter Bader, have reviewed the report and approve it for release. I am satisfied it was accurate and complete when it was initially prepared. While some aspects may need to be updated due to changes since that time, these are minor and I am satisfied they would not materially change the assessment and conclusions reached.	
	Reviewer	Hans-Dieter Bader (2022)
	Approver	Bridget O'Leary (2022)

Revision Status

Version	Date	Reason for Issue
1.0	August 2020	Final for Lodgement

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Tables

Figures

Appendices

Appendix 1. Site Record Forms (CHI)

Acronyms

Acronym/Term	Description
ADR	Accidental Discovery Rule
AEE	Assessment of Environmental Effects
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan Operative in part 2016
CHI	Cultural Heritage Inventory (Auckland Council)
HNZPT	Heritage New Zealand Pouhere Taonga
HNZPTA	Heritage New Zealand Pouhere Taonga Act 2014
ICOMOS	International Council on Monuments and Sites
NoR	Notice of Requirement
NZAA	New Zealand Archaeological Association
PPC5	Proposed Plan Change 5
RMA	Resource Management Act 1991
SH18	State Highway 18

1 Introduction

1.1 Background

Auckland's population is growing rapidly; driven by both natural growth (more births than deaths) and migration from overseas and other parts of New Zealand. The Auckland Plan 2050 anticipates that this growth will generate demand for an additional 313,000 dwellings and require land for approximately 263,000 additional employment opportunities.

In response to this demand, the Auckland Unitary Plan Operative in Part (**AUP:OP**) identifies 15,000 hectares of predominantly rural land for future urbanisation. To enable the urban development of greenfield land, appropriate bulk infrastructure needs to be planned and delivered.

The Supporting Growth Programme is a collaboration between Auckland Transport (**AT**) and Waka Kotahi NZ Transport Agency to investigate, plan and deliver the transport network needed to support Auckland's future urban growth areas over the next 30 years.

1.2 Purpose of this Report

Trig Road, Whenuapai has been identified in the Supporting Growth Programme as a future arterial corridor that is needed to support the urban development of Whenuapai.

This report has been prepared to support AT's notice of requirement (**NoR**) and application for resource consents for the Trig Road Corridor Upgrade (the **Project**). The NoR under the Resource Management Act 1991 (**RMA**) is to designate land for the construction, operation and maintenance of the Project.

Funding for the upgrade of Trig Road between Hobsonville Road and State Highway 18 (**SH18**) has been made available through the Housing Infrastructure Fund[1]. As there is funding available for construction, AT are also applying for the necessary resource consents under the RMA, concurrently with the NoR process.

This report provides an assessment of historic heritage effects associated with the construction, operation and maintenance of the Project. This assessment has been prepared to inform the Assessment of Environmental Effects (**AEE**) for the NoR and resource consent application.

The key matters addressed in this report are as follows:

(a) Identify and describe the historical background of the Project area;

(b) Describe the recorded historic heritage sites in the Project area;

(c) Describe the actual and potential adverse historic heritage effects of the Project;

(d) Recommend measures as appropriate to avoid, remedy or mitigate actual and potential adverse historic heritage effects (including any conditions/management plan required); and

[1] See North West Housing Infrastructure Fund Assessment of Environmental Effects for further detail regarding the Housing Infrastructure Fund.

(e) Present an overall conclusion of the level of actual and potential adverse historic heritage effects of the Project after recommended measures are implemented.

1.2.1 Māori Cultural Values

This is an assessment of effects on archaeological and built heritage values and does not include an assessment of effects on Māori cultural values. Such assessments should only be made by Manawhenua. Māori cultural concerns may encompass a wider range of values than those associated with archaeological sites.

The historical association of the general area with the tangata whenua is evident from the recorded sites, traditional histories and known Māori place names.

2 Project Description

2.1 Whenuapai – Trig Road Corridor Upgrade

The Project consists of the widening and upgrade of Trig Road between the SH18 off-ramps and Hobsonville Road. The widening has capacity to provide for a two-lane arterial standard corridor including new footpaths on both sides of the road and a cycleway which is indicatively shown as a dedicated bi-direction cycleway on the eastern side of the corridor. The Project will upgrade the current rural standard corridor to an urban standard, which is appropriate to support the soon to be urban environment on either side of Trig Road.

To tie into the existing road network, the Project also includes the signalisation of the intersections at Trig Road/Hobsonville Road and Luckens Road/Hobsonville Road and upgrade of Hobsonville Road between these intersections. This will require some localised widening of the road corridor along Hobsonville Road. To tie into the northern section of Trig Road, the line markings on the existing road corridor will be remarked.

Figure 1: Whenuapai – Trig Road Corridor Upgrade

2.2 Indicative Construction Methodology

An indicative construction methodology has been prepared to inform the assessment of the Project and while subject to change, assists in determining the envelope of effects. An overview of the

indicative construction methodology is set out in the AEE. The final construction methodology for the Project will be confirmed during detailed design phase and finalised once a contractor has been engaged for the work.

A summary of the key components of the indicative construction methodology that are relevant to this report are outlined in the sub-sections below.

2.2.1 General Construction Overview

The total construction phase of the Project is expected to take approximately 18 to 24 months. It is anticipated that the works will be broken down into separate construction zones based on the type of works required and the nature of the work environment. These anticipated zones are:

- **Zone 1:** Trig Road North of the SH18 bridge
- **Zone 2:** Trig Road South including the SH18 bridge
- **Zone 3:** Hobsonville Road.

2.2.2 Construction Methodology

Each zone has different construction activities depending on the type of work to be done and the surrounding environment. In all cases the general sequence of construction is likely to be:

1. Divert or remove services
2. Construct permanent and temporary stormwater drainage and controls
3. Move traffic away from works longitudinally
4. Construct earthworks and any retaining structures
5. Construct new longitudinal drainage
6. Construct new pavement to half of the road
7. Move traffic onto newly constructed pavement
8. Complete longitudinal drainage
9. Complete pavement and median
10. Move traffic to new alignment
11. Complete footpath and cycleway

3 Assessment Framework

3.1 Statutory Context

3.1.1 Notice of Requirement

This assessment has been prepared to support the NoR process for the Project. Section 171 of the RMA sets out the matters that must be considered by a territorial authority in making a recommendation on a NoR. This includes consideration of the actual or potential effects (including positive effects) on the environment of allowing the requirement.

3.1.2 Resource Consent Applications

AT are also seeking regional resource consents under the AUP:OP and resource consent under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.

Overall, the application is assessed as a Discretionary Activity.

3.1.3 Resource Management Act 1991

Section 6 of the RMA sets out the matters of national importance that all persons exercising functions and powers under the RMA shall recognise and provide for when managing the use, development and protection of natural and physical resources. The matters of national importance of particular relevance to the Project and this assessment are: 'the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga' (section 6(e)); and 'the protection of historic heritage from inappropriate subdivision, use, and development' (section 6(f)).

Section 17 of the RMA states that there is a duty to avoid, remedy, or mitigate any adverse effects on the environment arising from an activity, including historic heritage.

Historic heritage is defined in section 2 of the RMA as:

> *'those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, deriving from any of the following qualities:*
>
> *(i) archaeological;*
> *(ii) architectural;*
> *(iii) cultural;*
> *(iv) historic;*
> *(v) scientific;*
> *(vi) technological'.*

Historic heritage includes:

> *(i) 'historic sites, structures, places, and areas;*
> *(ii) archaeological sites;*
> *(iii) sites of significance to Māori, including wāhi tapu;*
> (iv) *surroundings associated with the natural and physical resources'.*

Regional and district plans[2] also contain sections that help to identify, protect and manage archaeological and other heritage sites. The plans are prepared under the provisions of the RMA and reflect the requirements of Part 2 of the RMA through their relevant Objectives, Policies and Rules.

3.1.4 Heritage New Zealand Act Pouhere Taonga 2014

In addition to any requirements under the RMA, the Heritage New Zealand Act Pouhere Taonga 2014 (**HNZPTA**) protects all archaeological sites whether recorded or not. Those sites may not be damaged or destroyed unless an Authority to modify an archaeological site has been issued by Heritage New Zealand Pouhere Taonga (**HNZPT**) (under section 42 of the HNZPTA).

An archaeological site is defined by the section 6 of the HNZPTA as follows:

> '**archaeological site** means, subject to section 42(3),[3] –
>
> (a) any place in New Zealand, including any building or structure (or part of a building or structure) that –
>
> (i) was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900; and
>
> (ii) provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and
>
> (b) includes a site for which a declaration is made under section 43(1)'[4]

Authorities to modify archaeological sites can be applied for under the HNZPTA either in respect of archaeological sites within a specified area of land (section 44(a)), a specific archaeological site where the effects will be no more than minor (section 44(b)), or for the purpose of conducting a scientific investigation (section 44(c)). Applications that relate to sites of Māori interest require consultation with (and in the case of scientific investigations the consent of) the appropriate iwi or hapū and are subject to the recommendations of the Māori Heritage Council of HNZPT. In addition, an application may be made to carry out an exploratory investigation of any site or locality under section 56 of the HNZPTA, to confirm the presence, extent and nature of a site or suspected site.

Under section 52 of the HNZPTA, HNZPT may impose conditions on any Authority granted requiring an archaeological investigation to be carried out, if satisfied on reasonable grounds that the investigation is 'likely to provide significant information in relation to the historical and cultural heritage of New Zealand'. This ensures that information contained within a site that is affected by development (and any associated artefacts) is recorded and preserved, in mitigation of the modification of the site.

Under Part 4 of the HNZPTA, HNZPT has the power to list significant historic places and areas, wāhi tupuna, wāhi tapu and wāhi tapu areas on the New Zealand Heritage List. The purpose of the Heritage List is to inform members of the public and landowners about the values of significant places

[2] The AUP:OP is both the regional and district plan in the Auckland Region.

[3] Under section 42(3) HNZPTA an Authority is not required to permit work on a pre-1900 building unless the building is to be demolished.

[4] Under section 43(1) a place post-dating 1900 (including the site of a wreck that occurred after 1900) that could provide 'significant evidence relating to the historical and cultural heritage of New Zealand' can be declared by Heritage NZ to be an archaeological site.

and to assist in their protection under the RMA (section 65). HNZPT would be considered an affected party in relation to any consent application affecting an item on the New Zealand Heritage List. The criteria used to assign the level of significance (Category 1 or 2) are set out in section 66 of the HNZPTA.

3.2 Relevant Standards and Guidelines

Appropriate management of historic heritage sites should be based on an understanding of their values and significance. The following policies and guidelines have been developed to assist in assessing heritage sites and determining appropriate management.

3.2.1 Regional Policy Statement

The Ngā rawa tuku iho me te āhua - Historic heritage and special character chapter of the Regional Policy Statement in the AUP:OP outlines the criteria to be used in assessing the significance of historic heritage for scheduling purposes (B5.2.2).

3.2.2 HNZPT Guidelines

HNZPT (2006: 9-10) has provided guidelines setting out criteria that are specific to the assessment of archaeological sites. These are:

- condition;
- rarity;
- contextual value;
- information potential;
- amenity value; and
- cultural associations.

3.2.3 ICOMOS New Zealand Charter

The International Council on Monuments and Sites (**ICOMOS**) 'New Zealand Charter for the Conservation of Places of Cultural Heritage Value' (revised 2010) is intended to provide support for decision makers in statutory or regulatory processes. It sets out principles to guide the conservation of places of cultural heritage value, whose qualities are defined as:

- have lasting values and can be appreciated in their own right;
- inform us about the past and the cultures of those who came before us;
- provide tangible evidence of the continuity between past, present and future;
- underpin and reinforce community identity and relationships to ancestors and the land; and
- provide a measure against which the achievements of the present can be compared.

The charter promotes the use of conservation plans in the management of cultural heritage places and sets out conservation principles and processes.

4 Approach to Receiving Environment

A key objective of the Supporting Growth Programme is to protect land now to ensure that the transport networks required to support growth areas in the future, around Auckland, can be provided in an efficient and co-ordinated manner. This Project supports the development of housing in the immediate vicinity of Trig Road and has funding to be constructed in the near future.

In the context of an RMA assessment process, considering the environment as it exists today will not be a true reflection of the real-world environment in which the transport corridor will operate. Accordingly, when considering the environment within which the effects of the construction and operation of the transport corridor are likely to occur, this assessment considers both the existing environment and the likely future environment for the Project area.

The following outlines the key elements of the planning context for the Project:

- The existing corridor for Trig Road is approximately 20m wide and zoned 'Road' under the AUP:OP.
- The proposed designation will be wider than the existing corridor to provide for the construction and operation of a 24m wide transport corridor cross section, and additional space for construction activities and mitigation.
- Proposed Plan Change 5 (**PPC5**) to the AUP:OP was notified in September 2017 with the intent of re-zoning the Whenuapai Stage 1 area around Trig Road to Residential - Mixed Housing Urban Zone and Residential - Terrace Housing and Apartment Building Zone.

PPC5 zoning provides the future urban context in which the corridor is likely to operate. Table 1 sets out the direct likely future receiving environment of the Project based on PPC5 zoning provisions. This rezoning signals a high probability of land use change over time from the currently mostly rural character of the area. This likely future receiving environment has been used to inform the assessment.

Table 1: Whenuapai – Trig Road Corridor Upgrade receiving environment

Whenuapai – Trig Road Corridor Upgrade receiving environment	
Residential – Mixed Housing Urban Zone	• 'Reasonably high-intensity zone enabling greater intensity of development than previously provided for'. • Development 'typically up to three storeys in a variety of sizes and forms including detached dwellings, terraced housing and low-rise apartments'.
Residential – Terraced Housing and Apartment Building Zone	• 'A high-intensity zone…providing for urban residential living in the form of terraced housing and apartments…with the greatest density, height and scale of development of all the residential zones'. • Buildings enabled up to five, six or seven storeys. • 'Predominantly located around metropolitan, town and local centre zones and the public transport network', also providing for a range of non-residential activities within an 'urban residential character'.

5 Methodology and Analysis

The New Zealand Archaeological Association's (**NZAA**) site record database (ArchSite), Auckland Council's Cultural Heritage Inventory (**CHI**), AUP:OP schedules and the HNZPT New Zealand Heritage List/Rārangi Kōrero were searched to determine whether any archaeological or other historic heritage sites had been recorded on or in the immediate vicinity of the Project area. Literature and archaeological reports relevant to the area were consulted (see Bibliography). Early survey plans and aerial photographs were checked for information relating to past and present land use.

A visual inspection of the proposed alignments along Trig Road, Hobsonville Road and Luckens Road was carried out on 11 December 2019 – by car as the route follows existing road alignments. Heritage buildings recorded on the Auckland Council's CHI in proximity to the proposed works (shown in Figure 9) were also visited and inspected from the road, and a draft assessment prepared. This was subsequently reviewed against the designation plans and the report was updated.

6 Historical Background[5]

Chapter Summary

The Upper Waitematā Harbour is associated with a number of iwi who settled and/or exercised fishing rights in the area for centuries prior to the arrival of Europeans. This is evident in the Māori place names recorded for the area and a number of archaeological sites identified in the coastal areas and along navigable waterways, which were the foci of Māori settlement. Subsistence was based largely on seafood and cultivated crops such as kumara, with forested areas inland providing additional resources such as birds, rats and edible and medicinal plants.

Early European settlement from the 1840s initially had a similar coastal focus, with extensive logging of the kauri forests, followed by gum digging and conversion of former forest land to farmland. The closest settlements to the Project area were at Brigham Creek and on the Hobsonville peninsula (where a number of early pottery works established).

Large blocks of land in the Whenuapai and Hobsonville areas (the Rarawaru and Waipareira blocks) were sold by Māori in the 1850s and once acquired by the Crown were allocated to European settlers, who either onsold or farmed the land. The Project area was retained in Crown ownership until at least the mid-1850s. A century later it was still predominantly rural farmland, with a limited amount of development along the northern side of Hobsonville Road and at the southern end of Trig Road. The later 20th and the early 21st centuries have seen considerable further development south of Hobsonville Road and the construction of SH18 at the northern end of the Project area, though Trig Road itself has retained its rural residential character.

6.1 Māori Settlement

The Whenuapai area and other locations along the creeks and inlets of the inner reaches of the Upper Waitematā Harbour were occupied by Māori for generations before the arrival of Europeans, evidence of which survives in the form of recorded place names, oral traditions and archaeological sites (although many sites have been destroyed by 19th and 20th century development and natural processes). The name Whenuapai itself translates as ‘fertile land’ (Stewart 1997) or perhaps ‘good land’, although the original Māori name of the area was Waimarie, which means ‘calm waters’ (Morris 1995; Simmons 1987). The harbour provided not only abundant marine resources but also access to some significant communication and portage routes, such as the Rangitopuni River and Kaipatiki Creek (Lucas Creek). The Waitematā harbour was part of an inland water route stretching from north of Dargaville through to the centre of the North Island (via the Kaipara, Waitematā and Manukau Harbours and the Waikato River).

Through time a number of iwi have had influence over the Upper Waitematā Harbour region. Of particular significance were Te Kawerau a Maki, Waiohua and Ngati Whatua and the many hapu related to these groups (Clough and Tanner 2004). However, other hapu from outside the region also maintained rights to fish in the waters of the Waitematā through the summer months, and archaeological sites in the area may relate to any of these groups.

A number of Māori place names associated with the Whenuapai/Hobsonville area have been recorded, some but not all of which are in use today (Figure 2). Onekiritea refers to the Hobsonville peninsula generally, and refers to the whitish clays soils found in the area, used in earlier times as a pigment and as a form of soap (Te Kawerau a Maki 2008; NZHPT 2008). Te Okoriki refers to an important area (a small eroding headland) beside the Upper Harbour Bridge approaches (ibid.). Te Waiarohia o Ngariki (the Waiarohia Inlet) was an important fish and shellfish gathering place, and the

[5] The following historical background is derived from Clough & Associates and Matthews & Matthews Architects 2016.

name refers to an earlier tribe searching for water (ibid.). The headland opposite Herald Island was named Te Turerenga, or 'the slipping away', referring to the night-time escape of prisoners taken by Ngapuhi in this area (Simmons 1987). Onetaipu, applied to the headland to the north of Te Turerenga, means 'sandy foreshore', while Te Tauhokaiapi refers to 'the fishing net pole of Pi', a mud flat. Like the Waiarohia inlet, the Rarawaru and Kotukutuku inlets are known today by their Māori names, but Brigham Creek was previously known as Pitoitoi ('name of a bird' – ibid.). Kopupaka, at the head of Pitoitoi, where it separates into Totara and Waiteputa ('the water flowing forth') Creeks, translates as 'the scorched stomach' (ibid.). The name Waipareira ('the creek at the place before mentioned' – ibid.) applied to a stream flowing into Limeburners Bay, but at the time of the first land sales became the name of the large block of land which included the Hobsonville Peninsula. Bay, but at the time of the first land sales became the name of the large block of land which included the Hobsonville Peninsula.

Settlement focussed mainly on the coastal areas and along navigable waterways, as shown by the distribution of recorded archaeological sites in the area (see section 7.1). Subsistence strategies employed by Māori inland from the coast consisted of the hunting (by spear and snare) of kaka, kereru, kiwi, wood-hen, tui and other small birds, while rats were caught in pits or traps (Best 1903, cited in Hayward and Diamond 1978). Forest plants would also have provided a range of foods with fruits, bracts and tubers from a variety of plants all gathered and consumed, while those Māori who dwelt on the coastlines of the Waitematā Harbour would have had an abundance of fish and shellfish resources at their disposal as well as land for the cultivation of kumara and other crops in areas where suitable soils were present.

Figure 2: Māori place names in the Whenuapai area (source: Kelly and Surridge 1990)

6.2 European Settlement

When Europeans first began to settle the Upper Waitematā they would have encountered a landscape covered in kauri forest (North 2000). By 1840, after the arrival of numerous settlers, several timber mills were founded in the upper harbour at Lucas Creek, Paremoremo and Rangitopuni (North 2000; Morris 1995). In a little less than 20 years, practically all of the kauri was logged and gum diggers replaced the timber workers (North 2000; Morris 1995). Other mills were established in Henderson in the 1840s and Swanson in the 1850s, exploiting the forests of the Waitakere Ranges (Brown 1992).

The acquisition of land by the Crown for sale to settlers occurred in the 1850s, in some cases following the adjusting and settling of earlier land claims by those who had bought land from its Māori owners. The western part of Whenuapai contained the Rarawaru Block, sold to the Crown by Ngati Whatua in 1851 (Turton 1877: Deed 233). It extended from the Waitematā River in the north, to land already owned by the Crown in the south and west, and to land 'which formerly belonged to Wellesley Hughes' in the east (ibid.). A later map of old land claims shows the area claimed by Hughes and Somerville (Figure 3). A plan dated 1854 also shows land owned by Hughes and Others between the Waiarohia Inlet and Kotukutuku Inlet, as well as adjacent land owned by Bain and Others to the west, extending up to Rarawaru Creek (Figure 4).

On 2 June 1853, 600 acres of land named the 'Waipareira Block' were sold by two chiefs of Ngati Whatua, for £50. However, this sale proved to be controversial and later formed part of the 3000 acres of reserve land in West Auckland that was given back to Kawerau a Maki (Hahn 2007). In 1857, however, two European settlers named as Joseph Newman and Thomas Summerville managed to acquire the 600 acre Waipareira Block, reportedly for the sum of £250 (Hahn 2007).

The Project area appears to have been retained as Crown land during the 1850s (Figure 4).

A hydrographic plan compiled in 1854 at the time of the first Crown Grants describes the shores of the Whenuapai/Hobsonville area as 'undulating fernland' (Figure 5). It was an area of heavy clay soils that was difficult to farm, but provided the basis for a largescale pottery industry centred on the Hobsonville peninsula (Clough et al. 2008; Clough & Associates 2010). Most of the early landowners did not settle their land, but onsold it.

For the most part the Whenuapai area would have followed the classic pattern of rural land use in the greater West Auckland area. This is, that kauri forest was first logged and cleared, the ground was then excavated and worked by gum diggers, and then the ground improved by farmers to enable the development of good pasture for livestock or crop cultivation. Much of the land in the general area at the end of the 19th century would have appeared barren and devoid of large trees after the loggers and gum diggers had passed through (Hahn 2007).

An aerial view of the Project area taken in 1959 (Figure 6) shows the Project area in farmland, with sparse residential development at the southern end of Trig Road and along Hobsonville Road and Luckens Road. By 2010/11 there had been a considerable increase in residential development along, and particularly to the south, of Hobsonville Road and along Luckens Road, while extensive earthworks were underway to create SH18, and some additional residential development had occurred along Trig Road, which still maintained a predominantly rural residential character (Figure 7).

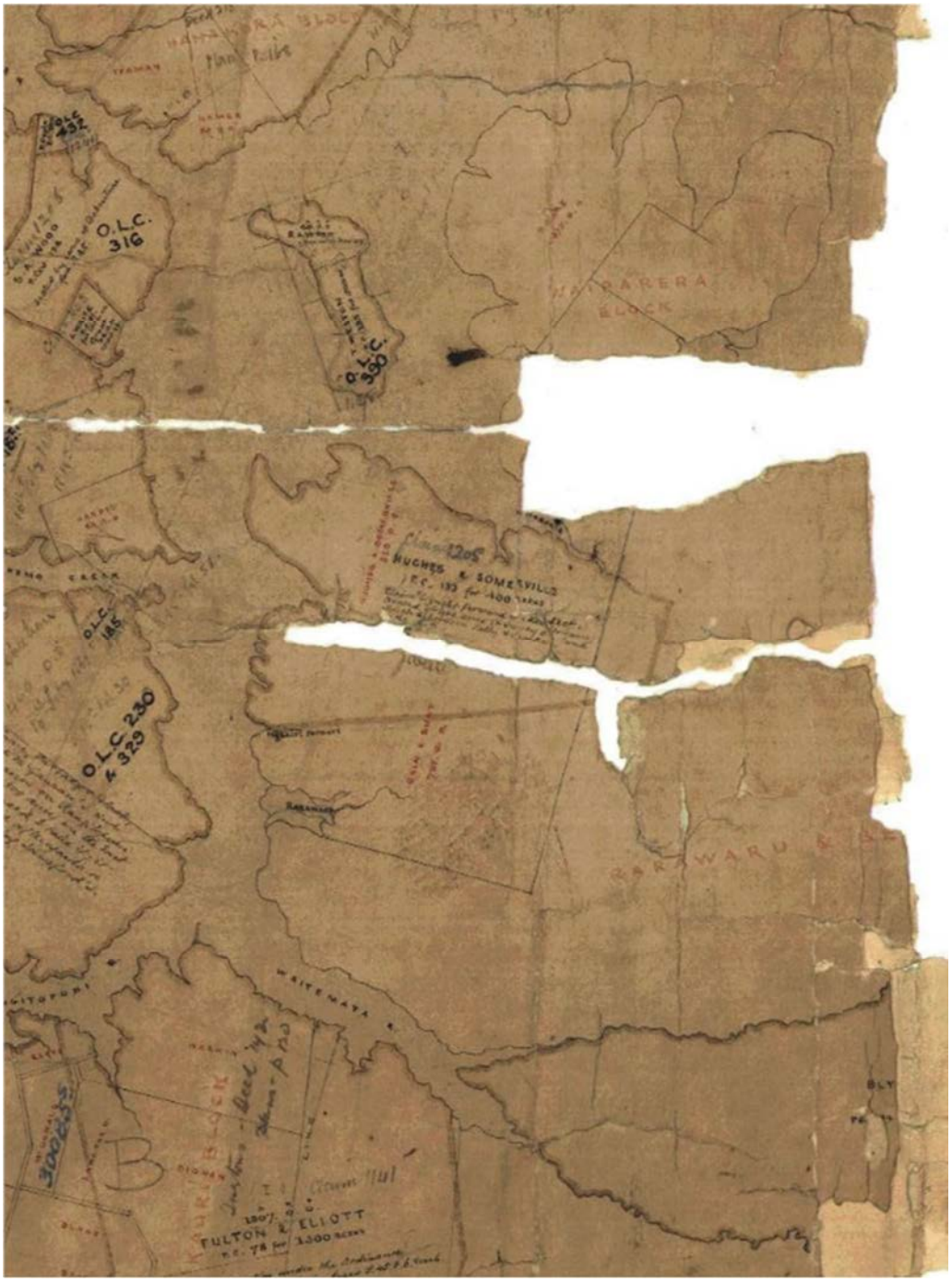

Figure 3: Detail from OLC 299 (1862) showing '… of Land within pre-emption claims up the Waitematā'. Oriented with north at left, identifying the Rarawaru block (Whenuapai) and Waipaereira Block (Hobsonville). Also showing land that had been claimed by Hughes & Somerville between the Waiarohia Inlet and Kotukutuku Inlet, adjacent to land owned by Bain and Burt extending up to the Rarawaru Inlet. NB. The name Waitematā River was also applied to what became Brigham Creek

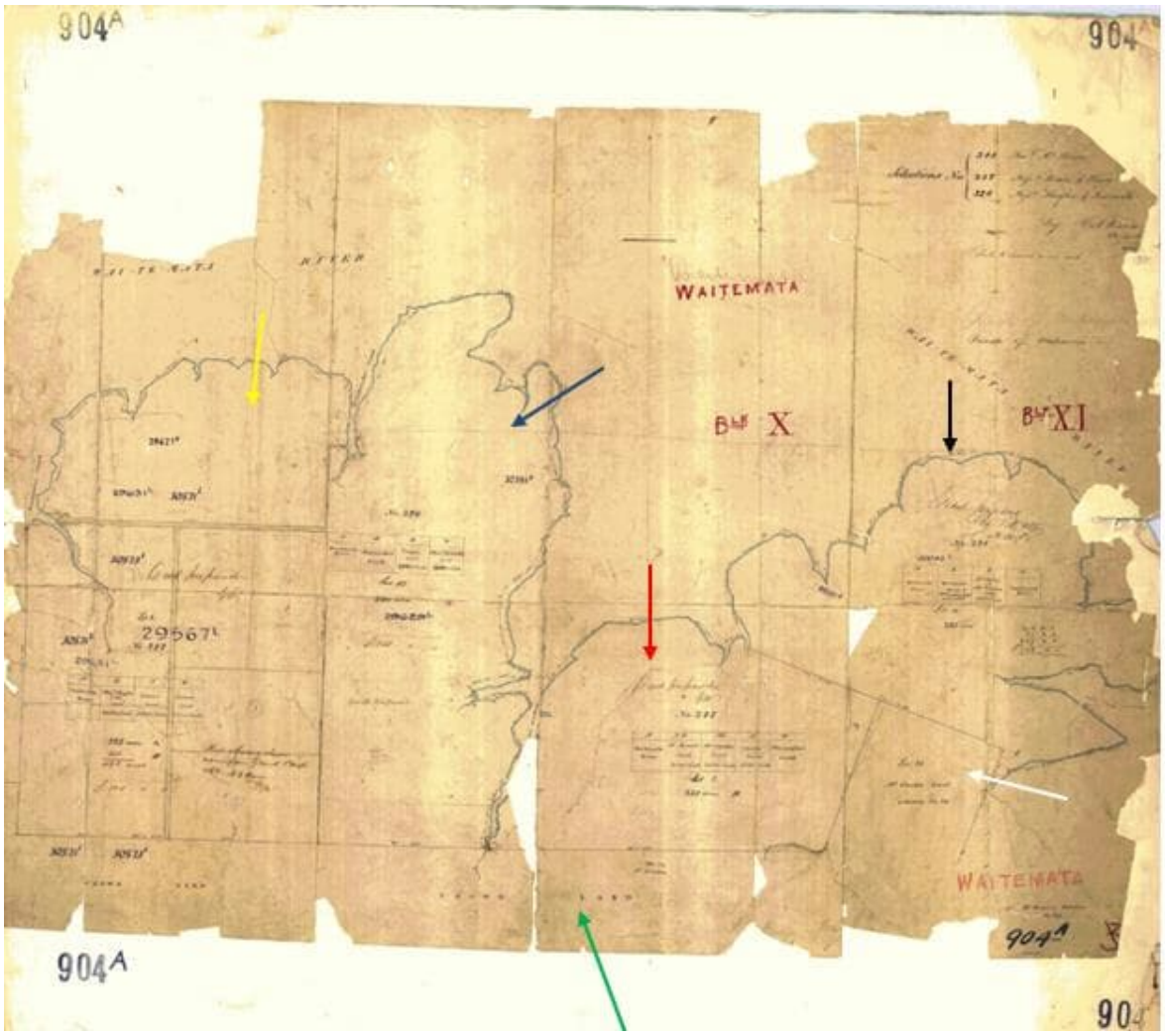

Figure 4: SO 904A dated 1854. Showing land between the Waiarohia and Kotukutuku inlets owned by Messrs Hughes & Others (blue arrow), and the land between the Kotukutuku and Rarawaru inlets by Messrs Bain & Others (yellow arrow). The line along the southern boundary defines Crown Land (green arrow), within which the Project area was located. Three large land blocks in the Hobsonville peninsula were owned by Mr Clark (eastern block, white arrow), Mr Bruce (northern block, black arrow) and Mr Burtt (western block adjacent to Waiarohia inlet, red arrow)

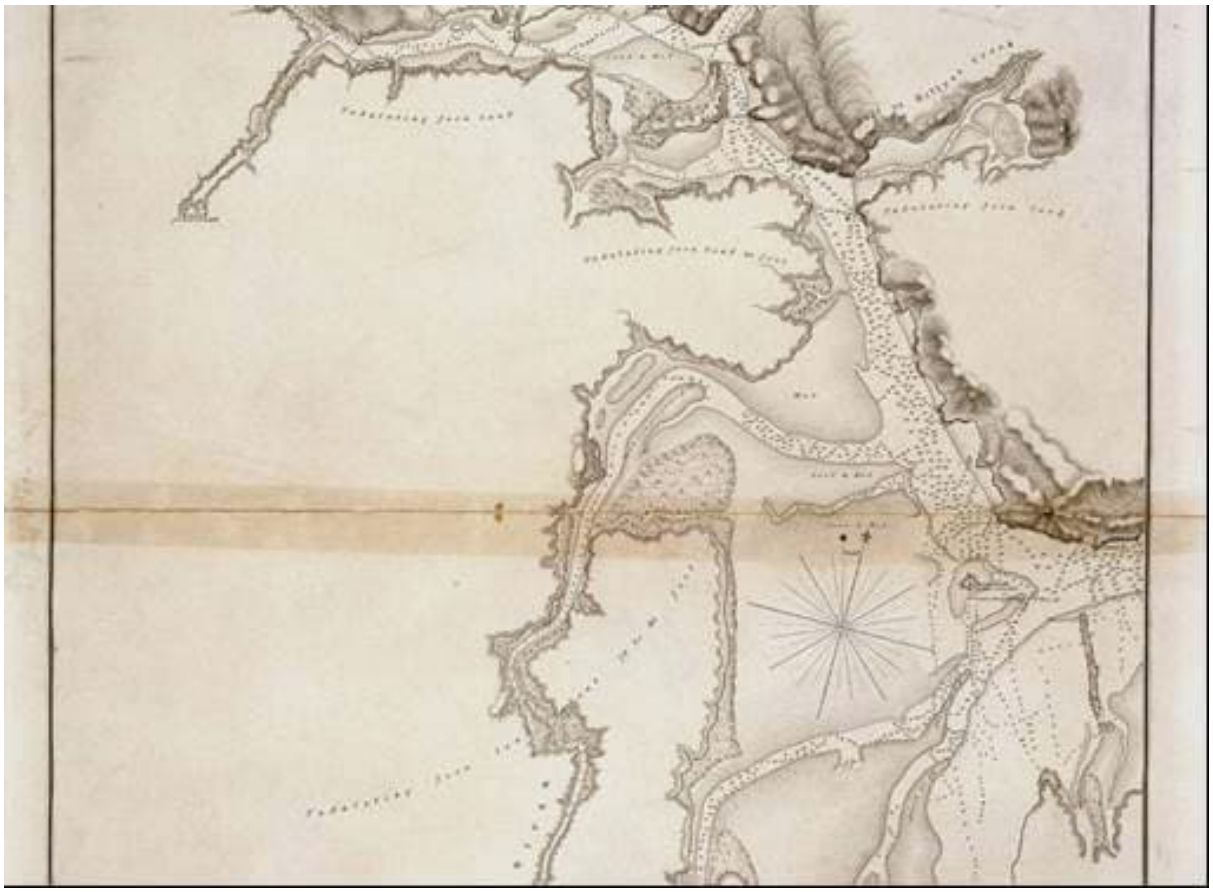

Figure 5: Detail from 1854 hydrographic map of the 'New Zealand North Island Waitematā River from Kauri Point, Auckland Harbour to its Sources ….', describing the Whenuapai and Hobsonville area as 'undulating fern land' (source: Sir George Grey Special Collections, Auckland Libraries, NZ Maps 3909)

Figure 6: 1959 aerial view (Trig Road indicated with red arrow) (source: Auckland Council Geomaps)

Figure 7: 2010/11 aerial view, showing earthworks for SH18 at the northern end of the Project area and extent of development along Trig Road and Hobsonville Road (source: Auckland Council Geomaps)

7 Historic Heritage Sites

Chapter Summary

The Project area is located inland some distance from the coast, where most Māori archaeological sites have been recorded. The nearest archaeological sites relating to Māori settlement are over 1.5km to the west along the coast and c.1km to the south along the Manutewhau inlet and stream. Evidence of early European occupation at Whenuapai is relatively sparse and associated with a few key settler families, and no sites of this period are recorded in the near vicinity of the Project area.

Prior to the survey there were two recorded historic heritage site in close proximity to the southern end of the Project at 80 Hobsonville Road and 1, 3 and 5 Luckens Road. The former is a two storey English style cottage with later additions, and the latter consists of two fibrolite houses and a fibrolite shed (CHI 3328). The CHI also recorded a small bungalow at 86 Trig Road c.80m north of the Project (CHI 3703) and a 1940s bungalow at 43 Trig Road c.150m north of the Project (CHI 3704). None of these sites are scheduled in the AUP:OP. Approximately 400m north of the Project at 2-4 Spedding Road are World War II gun emplacements (CHI 20469), which are proposed to be scheduled in the AUP:OP via Plan Change 5.

7.1 Archaeological Background

The creeks and inlets of the inner reaches of the Upper Waitematā Harbour were occupied by Māori for generations before the arrival of Europeans, evidence of which survives in the form of recorded place names, oral traditions and archaeological sites (although many sites have been destroyed by 19th and 20th century development and natural processes). The harbour provided not only abundant marine resources but also access to some significant communication and portage routes, such as the Rangitopuni River and Lucas Creek. The Waitematā harbour was part of an inland water route stretching from north of Dargaville through to the centre of the North Island (via the Kaipara, Waitematā and Manukau Harbours and the Waikato River).

An archaeological assessment for the Whenuapai Structure Plan Area was carried out in 2013 (Clough & Associate and Matthews and Matthew Architects 2013). This identified that there had been little in the way of archaeological field survey or investigation in the Whenuapai area in the past. However, in 1999 Clough & Associates had carried out a survey for a structure plan area at Waiarohia Creek, recording several shell middens, including some within the Whenuapai Structure Plan Area (Clough and Prince 1999). In 2010 the route of a proposed wastewater pipeline that crossed Brigham Creek on its path to Trig Road near the Whenuapai Airbase was assessed, with field survey identifying three new shell midden sites (Phear and Clough 2010). Site surveys by Druskovich had recorded remnant midden in the Brigham Creek area, and a number of coastal structures had been recorded by Auckland Council, often on the basis of reported information rather than field survey (CHI records). Investigations of historic buildings and surrounds had been carried out in connection with the SH16 and SH18 extensions. Sinton House at 2-4 Sinton Road was investigated by Foster (2006), who established that it was an early 20th century building. Investigation of the site of the Sinton store (R11/2000) found evidence for a brick paved floor but little else (Foster 2007). Ockleston House at 130 Hobsonville Road, dating back to 1885, was also investigated (Foster and Felgate 2008).

In general, as noted above, evidence for Māori occupation at Whenuapai is focused around the coast and waterways, while evidence of early European occupation is relatively sparse and associated with a few key settler families. The 2013 Whenuapai Structure Plan Area assessment considered it unlikely that further survey inland from the coast would significantly change this picture. However, one previously unrecorded archaeological site relating to World War II was identified from historic aerial

photographs. This is located at 2-4 Spedding Road, c.400m to the north of the proposed works, where a heavy Anti-Aircraft (AA) Battery was located to protect the Whenuapai Airbase during the war. The site was subsequently recorded on the CHI as #20469 and has been assessed (Macready 2017) and is proposed to be scheduled in the AUP:OP via PPC5.

There are no archaeological sites recorded within or in close proximity to the Project area (see Figure 8). The nearest sites (mainly shell midden relating to Māori occupation) are over 1.5km to the west along the coast and c.1km to the south along the Manutewhau inlet and stream.

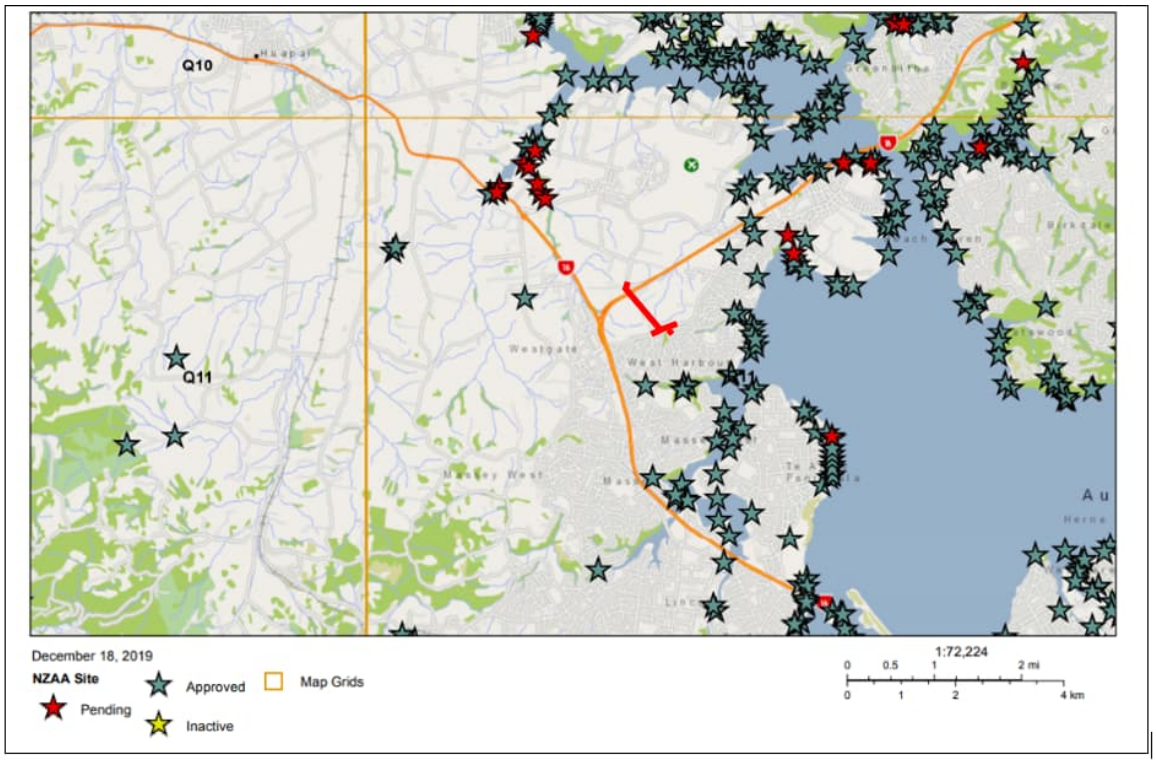

Figure 8: The distribution of recorded archaeological sites in the general area (source: NZAA ArchSite). Project area indicated in red

7.2 Recorded Historic Heritage Sites

Figure 9 shows the location of historic heritage sites recorded on the Auckland Council CHI at the time of the survey. All are buildings or structures. The nearest to the proposed works are at the southern end, being CHI 3328 at 1, 3 and 5 Luckens Road and CHI 3699 at 80 Hobsonville Road (see Appendix for site record forms). The record for the buildings at Luckens Road is brief but describes them as '*2 fibrolite houses, brick block base. 3 Luckens Road house-shed next to new house, double doors, high window, fibrolite panels and battens, large lean to attached – corru iron fibrolite panels, casement windows, lean to extensions*'. The record for the building at 80 Hobsonville Road describes a '*2 storey english style cottage, low eves gable at fornt [sic], brick chimney timber weatherbd with single pane casement windows fanlight windows on ground floor set in huge grounds. Has had later extensions on left of chimney*'.

The only other recorded historic sites in proximity to the proposed works are CHI 3703, a building at 86 Trig Road described as a '*small bungalow in original condition*'; and CHI 3704, a '1940s bungalow

in good condition …' at 43 Trig Road. The first is c.80m north of any proposed works and the second c.150m north.

None of these recorded sites are scheduled in the AUP:OP.

The World War II gun emplacements on Spedding Road (CHI 20469) referred to above are scheduled in the AUP:OP, but are located c.400m north of proposed Project works.

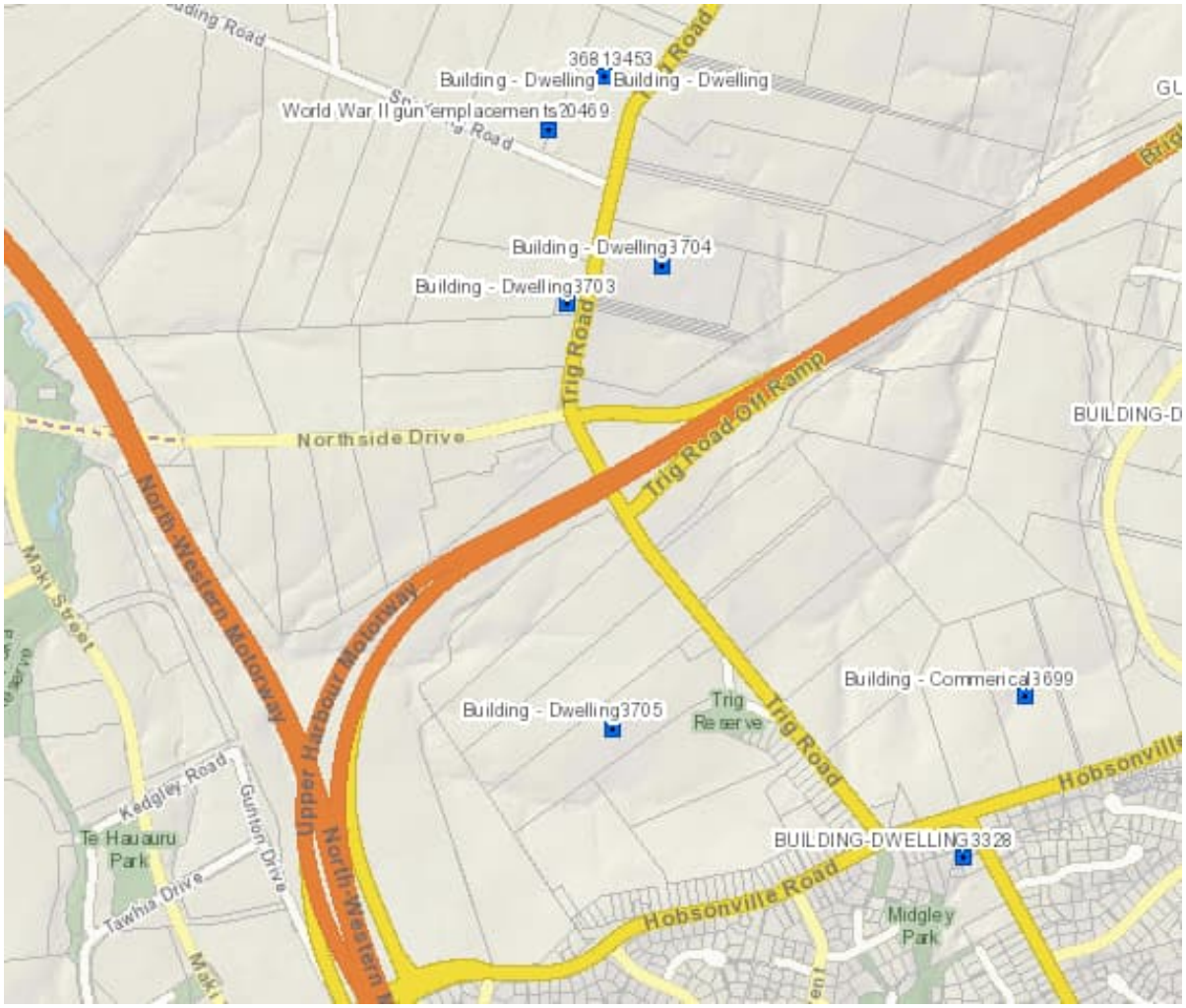

Figure 9: Historic buildings/structures recorded on the Auckland Council CHI in 2019

8 Field Assessment

Chapter Summary

The proposed Project works are along existing road alignments, which were inspected by car on 11 December 2019. The northern end of the Project area down to and including the SH18 off-ramp has already been modified during construction of the SH18 motorway, while the properties along the eastern side of Trig Road consist mainly of rural properties in open fields with a few houses and other buildings. The proposed stormwater pond is located in one of these properties. The western side of Trig Road north of Ryans Road also consists of rural residential properties, while south of Ryans Road are smaller residential properties. Properties along Hobsonville Road and Luckens Road have been extensively modified by urban residential development and, to a lesser extent, commercial development.

None of the buildings adjacent to or affected by the Project are identified heritage buildings apart from structures at 1, 3 and 5 Luckens Road and 80 Hobsonville Road, and all are of 20th century or more recent date. The front part of the property at 80 Hobsonville Road is affected by the Project but the building itself is not. However, inspection of the properties on Luckens Road and comparison with aerial photographs found the buildings on the properties to be recent builds replacing earlier structures, with exception of the house at 1 Luckens Road. Subsequent to the survey all the Luckens Road buildings were removed from the Auckland Council CHI.

Two other buildings recorded on the CHI to the north of the Project at 86 and 43 Trig Road were also briefly viewed. The first has been extensively modified and is no longer in its original form, while the second appears still to be in good condition. These buildings are north of the Project area and not affected by the Project, and subsequent to the survey have been removed from the Auckland Council CHI.

No archaeological sites have been recorded in the Project area and visual inspection indicated that there is little if any potential for archaeological remains.

The Project involves the widening of Trig Road from just north of the Trig Road on-ramp to SH18 to its southern termination at the Hobsonville Road intersection, improvements to the Trig Road/Hobsonville Road and Hobsonville Road/Luckens Road intersections, widening of Hobsonville Road both east and west of the intersection with Trig Road and a stormwater dry pond at 19 Trig Road.

The proposed areas of works along the road alignments were inspected by car, and the property at 19 Trig Road where the stormwater pond is proposed was inspected from the road but was not entered. The northern end of the Project area down to and including the SH18 off-ramp has already been modified during construction of the motorway (Figure 7), while the properties along the eastern side of Trig Road consist mainly of rural properties in open fields with a few houses and other buildings. The western side of Trig Road north of Ryans Road are also rural residential properties, while south of Ryans Road are smaller residential properties (Figure 10–Figure 15). The areas affected by road widening and the required batters on Trig Road are roadside berms with some encroachment into adjacent fields, while the location of the proposed stormwater pond is within a field immediately adjacent to a modern house (Figure 13). None of the buildings adjacent to the Project area are identified heritage buildings, with the exception of buildings at 80 Hobsonville Road and 1, 3 and 5 Luckens Road, and all are of 20th century or more recent date. No archaeological sites have previously been recorded in this area, which is some distance inland from the main focus of early settlement in pre- or early European times, and visual inspection indicated that there is little if any potential for archaeological remains.

The affected properties on the northern side of Hobsonville Road are 20th century or later residential buildings, with commercial buildings at the Trig Road junction, only one of which has heritage value. This is the property at 80 Hobsonville Road (CHI 3699) shown in Figure 17. The building is as

described in the site record in 2010 – a two-storey weatherboard English style cottage, with a low eaves gable at the front, a brick chimney and later extensions. The house was constructed on/relocated to the property between the 1960s and 1990s, based on brief review of aerial photographs, and it is not scheduled on the AUP:OP. The house is set back about 40m from the Hobsonville Road, with an in-and-out driveway. The house itself would not be affected but there would be effects on the front part of the property close to the road.

The properties at 1, 3 and 5 Luckens Road were inspected from the road, as two fibrolite houses and a shed had been recorded on the Auckland Council CHI (3328) at these properties. The property at 1 Luckens Road (Figure 18) appeared to be a board and batten building in a similar location and conformation to a building shown on the 1959 aerial shown in Figure 6, and is assumed to be the same building. However, the buildings at 1A, 1B, 3A and 5 Luckens Road are all recent builds (Figure 19–Figure 21) replacing any earlier structures, and presumably post-date 1993, when the fibrolite structures were recorded. The property at 1 Luckens Road will not be affected by the proposed works. Subsequent to the survey these buildings were removed from the CHI.

The property at 86 Trig Road just north of the Project recorded as CHI 3703 and described as a small bungalow in original condition, also appears to have been removed or considerably modified and extended (Figure 22). This was also recorded in 1993 and a review of aerial photographs indicates that the changes occurred sometime after 2003. However, as noted above, this property is c.80m north of the Project area and would not be affected. The second bungalow (CHI 3074) at 43 Trig Road c.150m north of the proposed works, appears to still be in place. These two properties will not be affected by the proposed works, and both were removed from the CHI subsequent to the survey.

Overall, the proposed areas of works contain no identified archaeological sites and the potential for unidentified subsurface archaeological remains to be present is low. However, it should be noted that archaeological survey techniques based on visual inspection cannot necessarily identify all sub-surface archaeological features or detect wāhi tapu and other sites of traditional significance to Māori, especially where these have no physical remains. The only heritage building in proximity to the Project area is the house at 80 Hobsonville Road (CHI 3699). This sits outside the proposed area of works, although the front part of the property close to the road is affected.

Figure 10: View north-west up Trig Road from Hobsonville Road intersection (to left and right) (source: Google street view)

Figure 11: View north-west up Trig Road (source: Google street view)

Figure 12: View north-west up Trig Road (source: Google street view)

Figure 13: Property at 19 Trig Road where stormwater pond would be located (house located at right behind trees) (source: Google street view)

Figure 14: View north-west from Trig Road, with SH18 off-ramp at left (source: Google street view)

Figure 15: View south along Trig Road from northern end of Project area (source: Google street view)

Figure 16: View west along Hobsonville Road from the junction with Trig Road (to the right), showing the commercial building on the corner and apartments and other residential buildings beyond (source: Google street view)

Figure 17: View of house at 80 Hobsonville Road (source: Google street view)

Figure 18: 1 Luckens Road (source: Macready 2019)

Figure 19: 1B Luckens Road, with 3A visible to rear at left (source: Macready 2019)

Figure 20: 1A Luckens Road, with 1B at left (source: Macready 2019)

Figure 21: 5 Luckens Road (childcare centre) (source: Macready 2019)

Figure 22: Property at 86 Trig Road (source: Google street view)

9 Assessment of Historic Heritage Effects

Chapter Summary

The construction of the Project will have no effects on any known archaeological or other historic heritage values. The house at 80 Hobsonville Road is the only recorded heritage site in the immediate vicinity of the Project and it will not be affected. While there will be effects on the front part of the property close to the road, this area has no archaeological values associated with the house. No archaeological sites were identified during the field survey. The potential for unidentified subsurface archaeological remains to be exposed during Project works is low.

Any effects on archaeological or other historic heritage sites would be confined to the construction phase.

Archaeological features and remains can take the form of burnt and fire cracked stones, charcoal, rubbish heaps including shell, bone and/or 19th century glass and crockery, ditches, banks, pits, old building foundations, artefacts of Māori and early European origin or human burials.

The construction of the Project will have no effects on any known archaeological or other historic heritage values. Only one recorded historic heritage site, a building located at 80 Hobsonville Road, is located within or in the immediate vicinity of the Project area and the house itself, which is set back a sufficient distance from the road, will not be affected by the proposed activity. There will be some effects on the front part of the property close to Hobsonville Road, but this area has no potential archaeological values relating to the house, which was constructed on/relocated to the property post-1959, and earthworks in this area appear unlikely to be extensive. A previously recorded heritage building at 1 Luckens Road was removed from Auckland Council's CHI subsequent to the survey, and will not be affected. No archaeological sites have previously been recorded within c.1km of the proposed works and none were identified during the field survey.

In any area where archaeological sites have been recorded in the general vicinity it is possible that unrecorded subsurface remains may be exposed during development. However, it is considered unlikely in this situation as the Project area is located some distance from the coast and navigable waterways where Māori and early European archaeological sites tend to be concentrated, the Project follows existing road alignments, and most of the Project area has been modified by roading and urban development.

10 Mitigation

Chapter Summary

As the Project will have no effects on any known archaeological or other historic heritage sites, apart from minor effects on the surrounds of an unscheduled recorded heritage building at 80 Hobsonville road, mitigation measures are not required.

The potential for unidentified subsurface archaeological remains to be exposed during construction is low, and can be appropriately managed under the AUP:OP Accidental Discovery Rule (**ADR**) (ED12.6.1), which should be adopted and included or referenced in the Construction Environmental Management Plan for the Project.

An archaeological Authority (under the HNZPTA) will not be required for the Project as no known archaeological sites would be affected and the potential for unidentified sites to be present is low. However, an Authority could be sought as a precaution prior to construction to minimise any delays in the unlikely event that an unknown site is exposed. If an archaeological Authority is in place, the ADR would no longer apply in respect to archaeological sites.

There are no scheduled historic heritage sites located within the Project area. This assessment has established that the proposed activity will have no effect on any known archaeological sites and has little potential to affect unrecorded subsurface remains. No heritage buildings will be affected. There will be minor effects on the front part of the property at 80 Hobsonville Road where a heritage building is recorded, but this area has no historic heritage values. Mitigation measures are therefore not required in respect to historic heritage.

10.1 Auckland Unitary Plan Operative in Part 2016

The very limited potential for unidentified archaeological remains to be exposed during construction is provided for under the AUP:OP ADR (E12.6.1), which should be adopted and included or referenced in the conditions of the NoR or resource consents for the Project. If suspected archaeological remains are exposed during future construction works, the ADR (E12.6.1) set out in the AUP:OP should be complied with. Under the ADR works must cease within 20m of the discovery and Auckland Council, HNZPT, Mana Whenua and (in the case of human remains) New Zealand Police must be informed. The ADR would no longer apply in respect to archaeological sites if an Authority under the HNZPTA were in place.

10.2 Heritage New Zealand Act Pouhere Taonga 2014

An archaeological Authority will not be required for the Project as no known sites will be affected, and it is unlikely that any undetected sites are present. However, should any sites be exposed during construction the provisions of the HNZPTA must be complied with and an archaeological Authority would be required if modification of any archaeological site is to occur.

If preferred for risk management purposes, an archaeological Authority could be sought as a precaution prior to construction to minimise construction disruption in the unlikely event an unknown site is exposed.

11 Recommendations and Conclusions

11.1 Recommendations

There should be no constraints on the Project on archaeological grounds, since no archaeological sites are known to be present and it is considered unlikely that any will be exposed during construction. Nor will any heritage buildings be affected.

The AUP:OP ADR (E.12.6.1) should be adopted to provide for the very limited possibility that unrecorded archaeological remains may be exposed during construction, and should be included in the Construction Environmental Management Plan for the Project. Under the ADR, if any subsurface archaeological evidence is unearthed during construction (e.g. intact shell midden, hangi, storage pits relating to Māori occupation, or cobbled floors, brick or stone foundation, and rubbish pits relating to 19th century European occupation), or if any human remains are exposed, work must cease within 20m of the discovery and Auckland Council, HNZPT, Mana Whenua and (in the case of human remains) the New Zealand Police must be notified. The relevant authorities will then determine the actions required.

If modification of an archaeological site does become necessary, an Authority must be applied for under section 44(a) of the HNZPTA and granted prior to any further work being carried out that will affect the site, noting that this is a legal requirement. Alternatively, consideration could be given to applying for an Authority in advance of earthworks as a precaution, to minimise delays in the unlikely event that archaeological sites are exposed by the Project.

Since archaeological survey cannot always detect sites of traditional significance to Māori, such as wāhi tapu, tangata whenua should be consulted regarding the possible existence of such sites within the Project area.

11.2 Conclusions

The Project area does not contain any previously recorded archaeological sites and none were identified during the field survey. The Project area is located some distance away from the main focus of Māori and early European settlement, which was along the coast and navigable waterways. The area has been modified by existing roading and adjacent residential development.

Only one heritage building has been identified in the immediate vicinity of the proposed works, at 80 Hobsonville Road. This is not a scheduled historic heritage place in the AUP:OP and will not be affected by the proposed works. There will be some minor effects on the front part of the property, but this area has no historic heritage values.

Overall the potential for unidentified subsurface archaeological remains to be present and affected by construction is very low, and the Project would have no known effects on archaeological or other historic heritage sites.

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Appendix 1. Site Record Forms (CHI)

Search results

Hide record View record details

CHI Places Number:	3328
WCC Computer Number:	172
Local Authority:	Waitakere City Council
Upgrade Exclusion:	None
Photograph and Map Filepaths:	
ArcView Category:	Historic Structure
Site Type:	BUILDING-DWELLING
Location:	1,3,5 Luckens Road, | West Harbour | Massey
Description:	2 fibrolite houses, brick block base. 3 Luckens Road house-shed next to new house, double doors, high window, fibrolite panels and battens, large lean-to attached - corru iron roof fibrolite panels, casement windows, lean-to extensions
Legal Description:	Lot 1 DP 137486
Grid Reference Source:	NZMS 260 Map Sheet
Metric Map Number:	R11
NZTM Easting:	1745116
NZTM Northing:	5924319
NZTM Map Sheet:	BA31
NZMG Easting:	2655558
NZMG Northing:	6486042
Metric Map Name:	None
Date Recorded:	15 12 93
Reported By:	Waitakere City Council
Owner:	Jack Bradlauch
Owners Address:	1 Luckens Road, Massey
State or Condition:	needs work
NZHPT Registration Type:	None

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Suggest changes to this record

Search results

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CHI Places Number:	3699
WCC Computer Number:	687
Date Record Updated:	20/09/2010 2:02:01 p.m.
Data Entered by:	Natasha Barrett
Local Authority:	Waitakere City Council
Upgrade Exclusion:	None
Photograph and Map Filepaths:	
ArcView Category:	Historic Structure
Site Type:	Building - Commerical
Location:	80 Hobsonville Rd | Hobsonville
Description:	| 2 storey english style cottage, low eves gable at fornt, brick chimney timber weatherbd with single pane casement windows fanlight windows on ground floor set in huge grounds. Has had later extensions on left of chimney.
Keywords:	COTTAGE | Lincoln Car Centre
Name:	Lincoln Car Centre
Legal Description:	Lot 10 DP 66045
Grid Reference Source:	NZMS 260 Map Sheet
Metric Map Number:	R11
NZTM Easting:	1745234
NZTM Northing:	5924628
NZTM Map Sheet:	BA31
NZMG Easting:	2655677
NZMG Northing:	6486350
Metric Map Name:	None
Date Recorded:	15/12/1993
Reported By:	Waitakere City Council
Last Visited:	Not visited
Owner:	E A Haines
Owners Address:	38 Pohutakawa Ave Whenuapai
State or Condition:	| Very good
NZHPT Registration Type:	None

Linked Biblio records:

- 9762
- 13458

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Suggest changes to this record

Search results

Hide record | View record details

CHI Places Number:	3704
WCC Computer Number:	692
Date Record Updated:	20/09/2010 2:03:14 p.m.
Data Entered by:	Natasha Barrett
Local Authority:	Waitakere City Council
Upgrade Exclusion:	None
Photograph and Map Filepaths:	
ArcView Category:	Historic Structure
Site Type:	Building - Dwelling
Location:	43 Trigg Road | Hobsonville
Description:	| 1940s bungalow in good condition, timber w-bd short length corr iron roof, gabled has french doors at side, has shed (later) lean-to at back - covered verandah addition
Keywords:	BUNGALOW
Legal Description:	Lot 1 DP 54988 BlXX Waitemata SD
Grid Reference Source:	NZMS 260 Map Sheet
Metric Map Number:	R11
NZTM Easting:	1744535
NZTM Northing:	5925455
NZTM Map Sheet:	BA31
NZMG Easting:	2654979
NZMG Northing:	6487179
Metric Map Name:	None
Date Recorded:	15/12/1993
Reported By:	Waitakere City Council
Last Visited:	Not visited
Owner:	JP Ford
State or Condition:	| Very good.
NZHPT Registration Type:	None

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NZTM Northing:	5925455
NZTM Map Sheet:	BA31
NZMG Easting:	2654979
NZMG Northing:	6487179
Metric Map Name:	None
Date Recorded:	15/12/1993
Reported By:	Waitakere City Council
Last Visited:	Not visited
Owner:	JP Ford
State or Condition:	| Very good.
NZHPT Registration Type:	None

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- 13458

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ATTACHMENT 17

TRIG ROAD CORRIDOR UPGRADE ASSESSMENT OF LANDSCAPE AND VISUAL EFFECTS

Supporting Growth

Trig Road Corridor Upgrade

Assessment of Landscape and Visual Effects

Version 1.0

August 2020

TE TUPU NGĀTAHI Supporting Growth

WAKA KOTAHI NZ TRANSPORT AGENCY

Document Status

Responsibility	Name
Author	Kathryn Holyoake NZILA Registered Landscape Architect
Reviewer	John Goodwin – Partner / Registered Landscape Architect – Boffa Miskell Ltd
Approver	Bridget O'Leary (2022)

Revision Status

Version	Date	Reason for Issue
1.0	August 2020	Final

Table of Contents

Tables

Figures

Appendices

Table 1: Glossary of Technical Terms / Acronyms

Acronym/Term	Description
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan Operative in Part 2016
FUZ	Future Urban Zone
HNC	High Natural Character
NoR	Notice of Requirement
NW HIF	North West Housing Infrastructure Fund
ONC	Outstanding Natural Character
ONF	Outstanding Natural Feature
ONL	Outstanding Natural Landscape
PPC5	Proposed Plan Change 5
RMA	Resource Management Act 1991
SEA	Significant Ecological Area
SH18	State Highway 18
UDLMP	Urban Design and Landscape Management Plan
Waka Kotahi	Waka Kotahi NZ Transport Agency
W1	Wetland 1
W2	Wetland 2

Table 2: Glossary of Defined Terms

Term	Meaning
Trig Road Corridor Upgrade Project (Project) or (Project Area)	Proposed road upgrade development works along Hobsonville Road and Trig Road, within the proposed designation boundary.
Auckland Council	Means the unitary authority that replaced eight councils in the Auckland Region as of 1 November 2010.
Landscape	Is the cumulative expression of natural and cultural features, patterns and processes in a geographical area, including human perceptions and associations[1].
Landscape Character	Is derived from the distinct and recognisable pattern of elements that occur consistently in a particular landscape. It reflects particular combinations of geology, landform, soils, hydrology, vegetation, land use and features of human settlement. These elements create a unique sense of place defining different areas of the landscape.
Natural Character	The level of natural character (or naturalness) varies within each landscape/seascape and is the result of the combined levels of indigenous nature and perceived nature. These are typically defined by the extent to which natural elements, patterns and processes occur and are legible, and the nature and extent of human modification to the landscape and ecosystems.
Landscape Effects	Landscape effects derive from changes in the physical landscape, which may give rise to changes in its character and how this is experienced. This may in turn affect the perceived value ascribed to the landscape.
Visual Effects	Visual effects relate to the changes to amenity values of a landscape including the "natural and physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes"[2].
Natural Character Effects	Natural character effects assessment is triggered by development proposed within the coastal environment, wetlands, lakes and rivers and their margins[3].
Baseline Landscape (BL)	The landscape and visual character as it exists at the commencement of the assessment process – i.e. prior to the construction of the proposed development.
Future Receiving Landscape (FRL)	The landscape and visual character as a result of the future development proposed in the AUP:OP, including specific precinct plans relating to the Project Area. The FRL includes any existing baseline landscape elements (i.e. ONL's, protected vegetation, water ways, landform, sites and/or elements of cultural significance, and existing land-use scenarios) that are likely to endure following anticipated future development resulting from the likes of future zones, AUP:OP overlays and land development projects (planned and/or under construction).
Change Management	Identification of ways to enhance the landscape and actions to avoid, remedy or mitigate adverse landscape effects.

[1] NZILA Landscape Assessment and Sustainable Management Practice Note 10.1.

[2] Resource Management Act 1991.

[3] Resource Management Act 1991 and New Zealand Coastal Policy Statement 2010.

Designation Boundary	The extent of the proposed NoR.
Development Site	Refers to the land being developed within the designation boundary and includes the carriageway, batter slopes, intersections, bridging, landscape mitigation planting, street trees and construction laydown areas.
Project Area	Refers to the local contextual landscape in which the new arterial network is proposed.
Temporary Effects (Construction Effects)	Describes the anticipated impacts on the bio-physical elements and features of the landscape resource (landform, vegetation and hydrology) resulting from the construction of the Project. It also includes visual amenity effects for both public and private viewing audiences from construction works.
Permanent Effects (Operational Effects)	Describes the effects on the landscape of completed works (including integrated landscape mitigation measures), the significance of physical landscape change and ultimately the resulting effects of the Project on landscape character, natural character and visual amenity for both public and private viewing audiences.

1 Introduction

1.1 Background

Auckland's population is growing rapidly; driven by both natural growth (more births than deaths) and migration from overseas and other parts of New Zealand. The Auckland Plan 2050 anticipates that this growth will generate demand for an additional 313,000 dwellings and require land for approximately 263,000 additional employment opportunities.

In response to this demand, the Auckland Unitary Plan Operative in Part 2016 (**AUP:OP**) identifies 15,000 hectares of predominantly rural land for future urbanisation. To enable the urban development of greenfield land, appropriate bulk infrastructure needs to be planned and delivered.

The Supporting Growth Programme is a collaboration between Auckland Transport (**AT**) and Waka Kotahi NZ Transport Agency (**Waka Kotahi**), to investigate, plan and deliver the transport network needed to support Auckland's future urban growth areas over the next 30 years.

1.2 Purpose of this Report

Trig Road, Whenuapai has been identified in the Supporting Growth Programme as a future arterial corridor that is needed to support the urban development of Whenuapai.

This Landscape and Visual Assessment (**LVA**) has been prepared to support AT's notice of requirement (**NoR**) and application for resource consents for the Trig Road Corridor Upgrade (the **Project**). The NoR under the Resource Management Act 1991 (**RMA**) is to designate land for the construction, operation and maintenance of the Project.

Funding for the upgrade of Trig Road between Hobsonville Road and State Highway 18 (**SH18**) has been made available through the Housing Infrastructure Fund[4]. As there is funding available for construction, AT are also applying for the necessary resource consents under the RMA, concurrently with the NoR process.

This report provides an assessment of landscape and visual effects associated with the construction, operation and maintenance of the Project. This assessment has been prepared to inform the Assessment of Environmental Effects (**AEE**) for the NoR and resource consent application.

The key matters addressed in this report are as follows:

(a) Identification and description of existing landscape character and visual amenity;

(b) Assessment of actual and potential adverse landscape character, natural character and visual amenity effects of construction of the Project;

(c) Assessment of actual and potential adverse landscape character, natural character and visual amenity effects of operation of the Project;

[4] See North West Housing Infrastructure Fund Assessment of Environmental Effects for further detail regarding the Housing Infrastructure Fund.

(d) Recommendation of landscape measures to avoid, remedy or mitigate potential adverse landscape character, natural character and visual amenity effects (including any conditions/management plan required); and

(e) Presentation of overall conclusion of the level of potential adverse landscape character and visual amenity effects of the Project after recommended measures are implemented.

2 Project Description

The Project consists of the widening and upgrade of Trig Road between the SH18 off-ramps and Hobsonville Road. The widening has capacity to provide for a two-lane arterial standard corridor including new footpaths on both sides of the road and a cycleway which is indicatively shown as a dedicated bi-direction cycleway on the eastern side of the corridor. The Project will upgrade the current rural standard corridor to an urban standard, which is appropriate to support the soon to be urban environment on either side of Trig Road.

To tie into the existing road network, the Project also includes the signalisation of the intersections at Trig Road/Hobsonville Road and Luckens Road/Hobsonville Road and upgrade of Hobsonville Road between these intersections. This will require some localised widening of the road corridor along Hobsonville Road

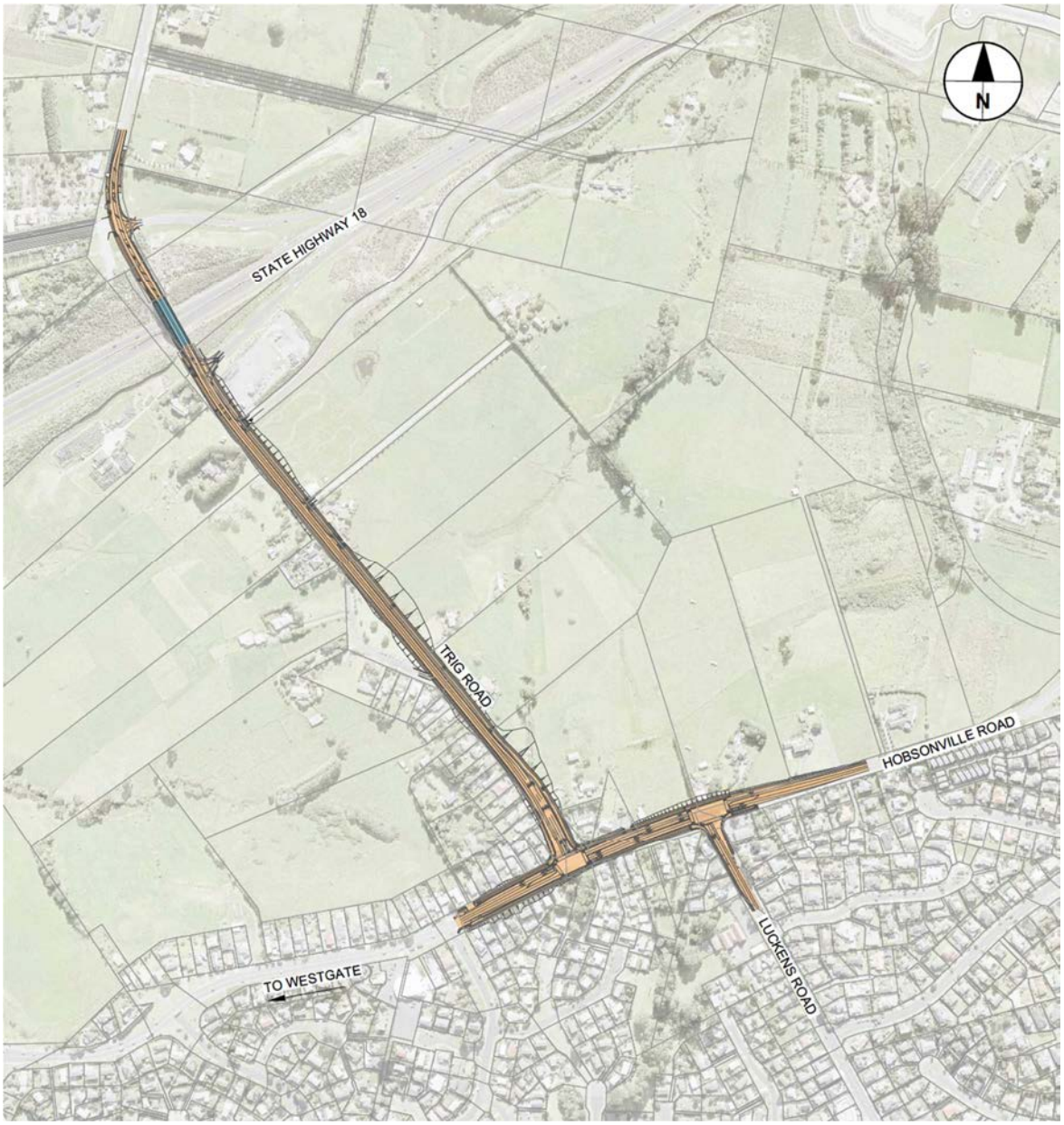


Figure 1: Whenuapai – Trig Road Corridor Upgrade

2.1 Project Features

The principle elements of the Project that have the potential to impact on landscape character, natural character and visual amenity include:

- Corridor widening and the subsequent earthworks and vegetation clearance required to implement the upgraded corridor;
- Earthworks and the formation of cut and fill slopes into existing landform and the wetland environments;
- Stormwater treatment and attenuation devices and how these integrate into the local setting;
- Changes to the visual composition of the road corridor and how this is experienced by users and residents of the private properties.

2.2 Indicative Construction Methodology

An indicative construction methodology has been prepared to inform the assessment of the Project and while subject to change, assists in determining the envelope of effects. An overview of the indicative construction methodology is set out in the AEE. The final construction methodology for the Project will be confirmed during detailed design phase and finalised once a contractor has been engaged for the work.

A summary of the key components of the indicative construction methodology that are relevant to this report are outlined in the sub-sections below.

2.2.1 General Construction Overview

The total construction phase of the Project is expected to take approximately 18 to 24 months. It is anticipated that the works will be broken down into separate construction zones based on the type of works required and the nature of the work environment. These anticipated zones are:

- **Zone 1:** Trig Road North of the SH18 bridge
- **Zone 2:** Trig Road South including the SH18 bridge
- **Zone 3:** Hobsonville Road.

2.2.1.1 Construction Methodology

Each zone has different construction activities depending on the type of work to be done and the surrounding environment. In all cases the general sequence of construction is likely to be:

1. Divert or remove services
2. Construct permanent and temporary stormwater drainage and controls
3. Move traffic away from works longitudinally
4. Construct earthworks and any retaining structures
5. Construct new longitudinal drainage

6. Construct new pavement to half of the road
7. Move traffic onto newly constructed pavement
8. Complete longitudinal drainage
9. Complete pavement and median
10. Move traffic to new alignment
11. Complete footpath and cycleway

3 Assessment Criteria

3.1 Statutory Guidance

3.1.1 Notice of Requirement

This assessment has been prepared to support the NoR process for the Project. Section 171 of the RMA sets out the matters that must be considered by a territorial authority in making a recommendation on a NoR. This includes consideration of the actual or potential effects (including positive effects) on the environment of allowing the requirement.

3.1.2 Resource Consent Applications

AT are also seeking regional resource consents under the AUP:OP and resource consent under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.

Overall, the application is assessed as a Discretionary Activity.

3.1.3 Resource Management Act (RMA)

Section 6 of the RMA sets out matters of national importance which shall be recognised and provided for. Section 6(a) requires the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers[5] and their margins, and the protection of them from inappropriate subdivision, use, and development. Section 6(b) requires the protection of outstanding natural features and landscapes from inappropriate subdivision, use and development. Section 6(f) requires the protection of historic heritage from inappropriate subdivision, use and development.

Section 7 of the RMA sets out matters that decision makers shall have particular regard to, including section 7(c) the maintenance and enhancement of amenity values and section 7(f) the maintenance and enhancement of the quality of the environment. Section 8 requires that the principles of Tiriti o Waitangi (Treaty of Waitangi) are taken into account in relation to managing the use, development, and protection of natural and physical resources.

3.1.4 Auckland Unitary Plan Operative in Part (AUP:OP)

3.1.4.1 Existing Transport Corridor

Trig Road, Hobsonville Road and Luckens Road are zoned Road under the AUP:OP, with the exception of the area of Trig Road crossing and immediately surrounding SH18 which is zoned Strategic Transport Corridor Zone.

[5] A 'river' is defined in the RMA as a continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse.

3.1.4.2 Adjacent land

The adjacent land within the Project Area is zoned Future Urban Zone (**FUZ**) and Residential – Mixed Housing Urban Zone. The land within the Project Area is proposed to be rezoned to Residential – Mixed Housing Urban Zone, Residential – Terrace Housing and Apartment Building Zone and Business – Local Centre Zone when decisions are made on Proposed Plan Change 5 (**PPC5**) to the AUP:OP.

Auckland-wide zone objectives and policies will apply to the future urban development of land adjacent to the Project, including the general Objectives and Policies included in Chapter E3 (Natural Resources), particularly section E.3 Lakes, rivers, streams and wetlands (E3.2 and E3.3) and section E15. Vegetation management and biodiversity (sections E15.2 and E15.3) are relevant to an assessment of landscape, natural character and visual effects under the RMA.

3.1.4.3 Proposed Plan Change 5, Whenuapai (PPC5)

The Project is positioned within the proposed Whenuapai 3 Precinct. Development of this area of land is guided by the objectives and policies of PPC5 and further structured in accordance with the Whenuapai 3 Precinct Plans 1-3. PPC5 is still progressing through the plan making process and may be subject to changes. The alignment of the Project is different to the indicative Trig Road alignment shown in the proposed Precinct Plan. This change reflects the further design work undertaken for the Project and is described in the AEE.

3.1.4.3.1 PPC5 Whenuapai 3 Precinct Stormwater Management Plan, 2017

The Whenuapai 3 Precinct Stormwater Management Plan (2017) provides a detailed description of the existing landform and hydrological features of the Whenuapai landscape. It also evaluates the level of health of the streams and overland flow paths and recommends a number of restoration measures.

3.2 Non Statutory Guidance

The following documents offer guidance as to how land within the study area might develop over time. PPC5 is of particular relevance to the Project and it is noted that some aspects of the guidance are subject to change as PPC5 progresses.

3.2.1 Whenuapai Structure Plan – September 2016

The Whenuapai Structure Plan provides guidance for ongoing development of land within Whenuapai, an area comprising approximately 1500 hectares northwest of Auckland, of which the Project forms a small part of the key infrastructure network. The structure plan provides guidance to proposed plan changes around land use, transport, infrastructure, natural environment, heritage, open space and recreation.

3.2.2 Te Tupu Ngātahi Design Framework – Version 1.0

The Te Tupu Ngātahi Design Framework provides measurable guidance for outcomes-based decisions throughout each phase of the wider programme. The guidelines in the Te Tupu Ngātahi Design Framework set out the environmental, cultural and growth context for the Project and principles for implementation. Principles 1.1 through to 2.5 are of particular relevance to this landscape and visual assessment.

3.2.3 Transport Design Manual – Auckland Transport

The Transport Design Manual (**TDM**) has three sections that allow end user outcomes, engineering design and construction requirements to be clearly identified and designed. The Urban Street and Road Design Guide forms part of section 1 of the TDM and is of particular relevance to this landscape and visual assessment.

3.2.4 Bridging the Gap: Waka Kotahi NZ Transport Agency Urban Design Guidelines (2013)

While the Project is an AT project, Bridging the Gap provides relevant guidance for all transport projects. The guidelines set out 10 over-arching urban design principles, and guidance on specific elements of transport projects including bridges, retaining walls, earthworks, noise barriers, highway furniture, stormwater management devices, signalised junctions, roundabouts, tunnels, stopping places, landscape planting and public art[6].

The 10 urban design principles are outlined as follows:

- Designing for the context
- Integrating transport and land use
- Contributing to good urban form
- Integrating all modes of movement
- Supporting community cohesion
- Maintaining local connectivity
- Respecting cultural heritage values
- Designing with nature
- Creating a positive road user's experience
- Achieving a low maintenance design

3.2.5 New Zealand Transport Agency Landscape Guidelines (Final Draft, 2014)

Again, while the Project is an AT project, the guidelines provide relevant guidance for all road transport projects. The guidelines set out 10 over-arching landscape principles, and offer guidance related to policy, assessment methodology and landscape design requirements[7].

The 10 landscape principles are outlined as follows:

- A context sensitive and place based approach
- Facilitate green infrastructure and landscape integration
- Understand the physical conditions

[6] https://www.nzta.govt.nz/assets/resources/bridging-the-gap/docs/bridging-the-gap.pdf

[7] https://www.nzta.govt.nz/assets/resources/nzta-landscape-guidelines/docs/nzta-landscape-guidelines-20140911.pdf

- The right plant in the right place
- Promote biodiversity and build in resilience
- Champion low impact design
- Deliver a quality user experience
- Low maintenance and whole of life value
- Safety in design
- Facilitate community engagement and a collaborative approach

4 Assessment Methodology

Chapter Summary

This assessment was undertaken by a suitably qualified and experienced NZILA Registered Landscape Architect in accordance with the NZILA Landscape Assessment and Sustainable Management Practice Note 10.1, and also, with reference to nationally recognised guidance documents outlined in section 3 of this report.

The following section outlines the best-practice approach that has been undertaken to identify the landscape values and sensitivity of the Project Area and adjacent landscape. This methodology section provides explanatory notes and guidance so that each of the following sections remain concise.

4.1 Overview

The consideration of the sensitivity of a particular landscape or Project Area is based on the identification of landscape character and an evaluation of the landscape values therein, including regionally significant values such as: Significant Ecological Areas (**SEA**s), Outstanding Natural Landscapes (**ONL**s), Outstanding Natural Features (**ONF**s) and areas of High or Outstanding Natural Character (**HNC** or **ONC**). Landscape character is derived from the distinct and recognisable pattern of elements that occur consistently in a particular landscape. It reflects particular combinations of geology, landform, soils, vegetation, land use and features of human settlement. These elements create a unique sense of place defining different areas of the landscape.

A landscape that exhibits a 'high' degree of sensitivity will likely be highly susceptible or vulnerable to potential adverse effects associated with landscape change. Conversely a landscape or site that exhibits a 'low' degree of sensitivity will have more capacity to absorb change without significantly impacting upon existing landscape character and values within a site or broader contextual setting.

Change in a landscape does not, of itself, necessarily constitute an adverse landscape or visual effect. Landscape is dynamic and is constantly changing over time in both subtle and more dramatic transformational ways. These changes are both natural and human induced. Within the context of continual landscape change, is the importance of managing human induced change so that significant adverse effects are avoided or sufficiently mitigated to reduce the effects of the change in land use. Furthermore, landscape and visual effects can be temporary or permanent and that also contributes to the significance of landscape and visual effects.

In many cases, landscape change can bring about improvements to the quality of the existing environment. Therefore, the nature and significance of landscape and visual effects generated by any particular project can be:

- Positive (beneficial), contributing to the visual character and quality of the environment;
- Negative (adverse), detracting from the existing character and quality of the environment; or
- Neutral (benign), with essentially no effects on existing character or quality of the environment.

4.1.1 Scale of Effects

In determining the magnitude of potential and actual landscape and visual effects of the Project, a consistent 7-point rating scale has been used. The rating scale is symmetrical around 'moderate' and is based on the recommended NZILA Best Practice Guide. The following descriptions are provided which consider both NZILA and Waka Kotahi guidance documents.

7-point rating scale

- Effects that are **very low** are barely discernible. Mitigation is generally not required and in planning terms they are negligible;
- Effects that are **low** are discernible but where they do exist, they are likely too small to generate adverse effects either on their own or cumulatively. Additional mitigation is not required and in planning terms the landscape effects are considered to be less than minor;
- Effects that are **moderate-low** are discernible and where they do exist, they have the potential to generate adverse effects either on their own or cumulatively. Additional mitigation may be required and in planning terms the landscape effects are considered to be minor;
- Effects that are **moderate** are discernible, without being significant on their own. There is the potential for cumulative effects to be more significant, but they can generally be mitigated to an appropriate level. In landscape and visual terms, moderate effects may be acceptable provided an appropriate design/ mitigation response has been adopted. In planning terms moderate landscape effects are more than minor;
- Effects that are **moderate-high** are discernible and have the potential to be significant on their own. There is the potential for cumulative effects to be more significant however there is potential for additional mitigation measures to reduce effects to a lower degree. In planning terms moderate-high landscape effects are more than minor;
- Effects that are **high** are significant on their own and are likely to increase in a cumulative sense. In general, a high degree of effect may represent an unacceptable outcome in landscape and/or visual terms however, there may be potential for additional mitigation measures to reduce effects to a lower degree although these measures will need to be substantial. In planning terms, high effects would be more than minor and considered 'significant' in landscape and visual terms; and
- Effects that are **very high** are significant and in relation to landscape effects, additional mitigation is unlikely to reduce the degree of effect to any discernible degree. In planning terms, very high effects are more than minor and likely to be unacceptable in landscape and visual terms.

4.2 Methodology Breakdown

The methodology that forms the basis for the assessment is set out below:

- Identification of relevant statutory provisions and non-statutory guidance relating to landscape.
- Analysis and description of existing landscape elements, features and character of the existing 'Baseline Landscape'.

- Analysis and description of the landscape elements, features and character of the 'Future Receiving Landscape'.
- Analysis and description of perceptual, sensory and associative qualities of the Project Area and the identification of the viewing audience and visual catchment.
- Summary of landscape values, including inputs from other specialists such as ecology, arboriculture and heritage.
- Evaluation of the sensitivity of the landscape to landscape change arising from transport infrastructure upgrades.
- Analysis and description of the Project including construction methodology and timeline.
- Identification of the principle elements of the Project (effects generators) likely to result in landscape, natural character and visual effects.
- Identification of temporary (construction) vs permanent (operational) effects of the Project.
- Identification of general and targeted mitigation measures to respond to and reduce the magnitude of likely effects.
- Assessment of effects (adverse, neutral and/or positive) on the bio-physical aspects of the landscape resource, landscape character, natural character and visual amenity, taking account of the proposed mitigation measures.
- Summary of the overall landscape and visual effects of the Project and a determination of the significance of landscape effects.

4.3 Landscape Analysis

The landscape analysis that forms the basis for the assessment is derived from the following data collection and field work:

- Online data collection of aerial maps and AUP:OP/GIS overlays (including, but not limited to: SEA's, ONL's, ONF's, ONC, HNC and Land Cover Data Base, zones and catchments and hydrology);
- Desktop analysis of roading corridors, urban areas / future urban areas utilising Google Street View;
- Escorted specialist team visits to the Project Area; and
- Independent site visits to the Project Area to undertake on-site landscape and visual assessment and to undertake indicative public viewpoint photography.

4.4 Landscape Values

In the absence of any scheduled high value landscape areas (ONL, ONF, HNC and ONC) at a national, regional or district level within or adjacent to the Project Area, a summary is provided of local

values. Local values generally consider three broad categories including: geographic, perceptual and associative values.[8]

4.5 Landscape Sensitivity

The interface between the land and water (riparian, wetland and coastal margins) is particularly sensitive to landscape change and under Part 2 of the RMA (section 6(a)), these areas of the landscape should be protected from inappropriate subdivision, use and development.

Other landscape character building attributes may also be sensitive to the effects of landscape change such as topographical and landform features, vegetation (notable trees or patterns of contiguous land cover) and views afforded to notable landmarks and/or landscape features located either within the local landscape of the Project, or further afield within the contextual landscape.

4.6 Landscape Effects

Landscape effects derive from changes in the physical landscape, which may give rise to changes in its character and how this is experienced over time. This may in turn affect the perceived value ascribed to the landscape.

Landscape effects in this assessment relate to the following landscape attributes:

- Biophysical - Abiotic: Geophysical processes (Landform) and drainage patterns and processes.
- Biophysical – Biotic: Vegetation type (native / endemic and exotic vegetation) and vegetation cover and patterns (quality of vegetation and evident relationship to landform, climate, mature historic land use and ecological factors).
- Human attributes: Land uses / activities / buildings and structures and recreational areas.

Landscape and visual effects are assessed in two parts as outlined below; firstly, through the construction period where the bio-physical and human attributes the Project Area are required to be modified to implement the Project. Landscape and visual effects during the construction phase are generally considered to be temporary and dynamic in nature and may temporarily be heightened by the intervention of heavy machinery and the use of construction service areas. In the second part (operational phase), the overall significance and value of landscape and visual change is explored and ultimately the Project's impact on landscape character, natural character and visual amenity is assessed.

Temporary Effects (Construction Effects): Describes the anticipated impacts on the bio-physical elements and features of the landscape resource (landform, vegetation and hydrology) resulting from the construction of the Project. It also includes how these aspects translate into visual amenity effects for both public and private viewing audiences.

Permanent Effects (Operational Effects): Describes the completed works (including integrated landscape mitigation measures), the significance of physical landscape change and ultimately the

[8] Landscape Guideline: Appendix 1: NZTA Landscape and Visual Assessment Guidelines

resulting effects on landscape character, natural character and visual amenity for both public and private viewing audiences.

4.6.1 Natural Character Effects

Section 6(a) of the RMA requires the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers[9] and their margins, and the protection of them from inappropriate subdivision, use, and development. The natural character assessment for this Project applies to the existing wetlands and waterbodies associated with Trig Stream, outside of the coastal environment.

Assessing existing natural character is primarily concerned with the degree to which natural processes, natural patterns and natural elements have undergone human modification. Ecological survey and assessment for the Project Area generally underpin the landscape evaluation of existing natural character values.

4.7 Visual Effects

Visual effects relate to the changes that arise in the composition of available views as a result of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity. Visual effects are considered for both temporary (construction effects) and permanent effects (operational effects).

Potential effects considered in this assessment relate to the following visual amenity attributes:

- Visual quality and composition (legibility, coherence, setting, scenic quality)
- Visibility (extent of visibility to and from the Project Area)
- Views (viewing audience and views afforded to and from the Project Area)

The nature and magnitude of the visual effect can be influenced by a number of factors such as:

- The extent to which the Project Area is visible;
- Legibility and whether there are intervening elements in the landscape that restrict views towards the road corridor;
- Whether or not aspects of the Project appear 'at odds' with existing landscape character and composition;
- Distance between the viewer and the Project Area;
- The nature of the viewing audience, numbers and extent of the visual catchment.

4.7.1 Viewpoint Locations

For the purposes of this assessment, the visual effects of the Project have been assessed from 20 representative public vantage points and private boundary locations along the western perimeter of Trig

[9] A 'river' is defined in the RMA as a continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse.

Road and either side of Hobsonville Road. Refer to Appendix 3: Landscape Plans and Images: Map 08.

All viewpoint locations were visited, photographed and assessed in variable-fine weather conditions between November 2019 and January 2020. The viewpoints have been photographed at standing eye level, in portrait view with a digital SLR camera with a 50mm (and 30mm) lens.

4.8 Change Management

Change management is the process of identifying ways and opportunities to ensure and enable sustainable landscape management within the existing and future landscape[10]. The Project has been through the SGA MCA route selection process during which landscape and visual effects were tested and any significant effects avoided or 'designed-out' of the Project in line with specialist landscape input at the time. On that basis, the landscape mitigation measures proposed below in Section 7 deal with the localised effects likely to result from the construction and operation of the Project.

Design refinements through the detailed design phase can further minimise potential landscape and visual effects. These opportunities are also outlined below in Section 7 of this report.

4.9 Limitations

All site assessments have been undertaken from public land and supported through desktop GIS mapping and aerial photograph information.

There are several crossovers with related specialities and this assessment relies on assessment findings from archaeology, ecology, stormwater and urban design. This report references the latest data available at the time of issue.

4.10 Project Assumptions

The findings of this landscape and visual assessment are underpinned by the following project assumptions: For the FUZ areas, it is likely that construction of the Project will occur ahead of, or in parallel to, the urbanisation of these areas. Therefore, the starting assumption is that the upgraded corridor will be constructed in the existing (or baseline) landscape and operate in an emerging urban environment. The Whenuapai 3 Precinct Plan is used to inform the general future urban environment in which the corridor will operate.

[10] Sustainable Landscape Management recognises and protects the distinctive, representative or typical attributes that define landscape character and values, through the process of integrated assessment, planning and design to meet the needs of both present and future generations. NZILA Best Practice Note, 10.1.

5 Receiving Environment

Chapter Summary

The Project is located between West Harbour and Whenuapai, just south of the Upper Harbour Motorway. The Project Area comprises a 1.8km long and 20m wide section of the existing Trig Road / Hobsonville Road corridor as well as adjacent land generally extending 40m either side of the existing corridor as illustrated in Appendix 3: Landscape Plans and Images: Maps 01 and 02.

Overall, the baseline landscape is characterised as follows:

- The land adjacent to the Project is largely rural in character, particularly along the eastern perimeter and northern extent of Trig Road where there are lifestyle blocks, agricultural activities and a grouping of plant nurseries. Along the south-western perimeter there is a greater presence of residential development and further towards Hobsonville Road, this is mixed with a range of commercial and retail development to form a residential neighbourhood character.
- Existing landscape elements and features within the Project Area and adjacent land exhibit a notable degree of modification from rural land use and residential activities. The overall vegetative framework consists largely of exotic shelterbelt and garden plantings and existing hydrological features are unfenced within the pastoral landscape of the FUZ.
- Further afield, the local setting, as a whole, can be described as a transitional landscape that exhibits an eclectic range of rural, residential and commercial activities located in close proximity of each other and this is clearly driven by the development and urban growth that is occurring within the greater contextual landscape.

The landscape analysis that follows describes the Project Area and the local landscape forming the contextual setting of the Project.

5.1 Approach to Receiving Environment

A key objective of the Supporting Growth Programme is to protect land now to ensure that the transport networks required to support growth areas in the future, around Auckland, can be provided in an efficient and co-ordinated manner. This Project supports the development of housing in the immediate vicinity of Trig Road and has funding to be constructed in the near future.

In the context of an RMA assessment process, considering the environment as it exists today will not be a true reflection of the real-world environment in which the transport corridor will operate. Accordingly, when considering the environment within which the effects of the construction and operation of the transport corridor are likely to occur, this assessment considers both the existing environment and the likely future environment for the Project Area.

The following outlines the key elements of the planning context for the Project:

- The existing corridor for Trig Road is approximately 20m wide and zoned ‘Road’ under the AUP:OP.
- The proposed designation will be wider than the existing corridor to provide for the construction and operation of a 24m wide transport corridor cross section, and additional space for construction activities and mitigation.
- Proposed Plan Change 5 (**PPC5**) to the AUP:OP was notified in September 2017 with the intent of re-zoning the Whenuapai Stage 1 area around Trig Road to Residential - Mixed Housing Urban Zone and Residential - Terrace Housing and Apartment Building Zone.

PPC5 zoning provides the future urban context in which the corridor is likely to operate. Table 4 sets out the direct likely future receiving environment of the Project based on PPC5 zoning provisions. This

rezoning signals a high probability of land use change over time from the currently mostly rural character of the area. This likely future receiving environment has been used to inform the assessment.

Table 3: Whenuapai – Trig Road Corridor Upgrade Receiving Environment

Whenuapai – Trig Road Corridor Upgrade receiving environment	
Residential – Mixed Housing Urban Zone	• 'Reasonably high-intensity zone enabling greater intensity of development than previously provided for'. • Development 'typically up to three storeys in a variety of sizes and forms including detached dwellings, terraced housing and low-rise apartments'.
Residential – Terraced Housing and Apartment Building Zone	• 'A high-intensity zone…providing for urban residential living in the form of terraced housing and apartments…with the greatest density, height and scale of development of all the residential zones'. • Buildings enabled up to five, six or seven storeys. • 'Predominantly located around metropolitan, town and local centre zones and the public transport network', also providing for a range of non-residential activities within an 'urban residential character'.

5.2 Baseline Landscape

5.2.1 Landform and Hydrology

The Project Area is elevated within the local setting with Hobsonville Road occupying a primary east-west trending ridge system and Trig Road traversing a secondary north-south trending ridge from the upper Trig / Hobsonville Road intersection down towards the lowlands surrounding Brigham Creek Road. Residential neighbourhoods to the south of Hobsonville Road occupy moderate-sloped terrain with a south-eastern aspect overlooking Henderson Creek and Waitemata Harbour further beyond. The spatial arrangement of these neighbourhoods is further defined by the upper tributaries of Waipareira and Manutewhau Streams.

The surrounding landform of Trig Road is undulating with higher terrain along the western perimeter of Trig Road. The land to the west (beyond the Project Area) is defined by the hydrological patterns associated with Totara Creek that drain north into Brigham Creek. Along the eastern perimeter of Trig Road, the landform is similarly defined by the hydrological patterns associated with Trig Stream in the north and Waiarohia Stream to the south, as identified through the AUP:OP GIS database. The land falls away steeply beyond the roadside at the upper two catchments of Trig Stream. Existing landform and hydrological patterns are illustrated in Appendix 3: Landscape Plans and Images: Map 02.

According to the specialist ecological report which has been prepared for the Project, an ephemeral stream located at the headwaters of the Waiarohia Stream intersects the Project Area at the northern end of the alignment. The stream catchment has been heavily modified and is assessed as exhibiting negligible ecological value. With regards to Trig Stream, the report describes the two tributaries as being consistent with wetland environments rather than streams and states that "*two degraded pasture wetlands were identified within the Project Area and were assessed to be of Moderate ecological value on the basis of their existing functionality and because wetlands are a threatened*

ecosystem type within the Auckland region".[11] The spatial extent, vegetation types and condition of the wetlands is described in section 6.2.1.2 of the ecological report. Figure 2 below depicts the location of wetland 1 (**W1**) and wetland 2 (**W2**).

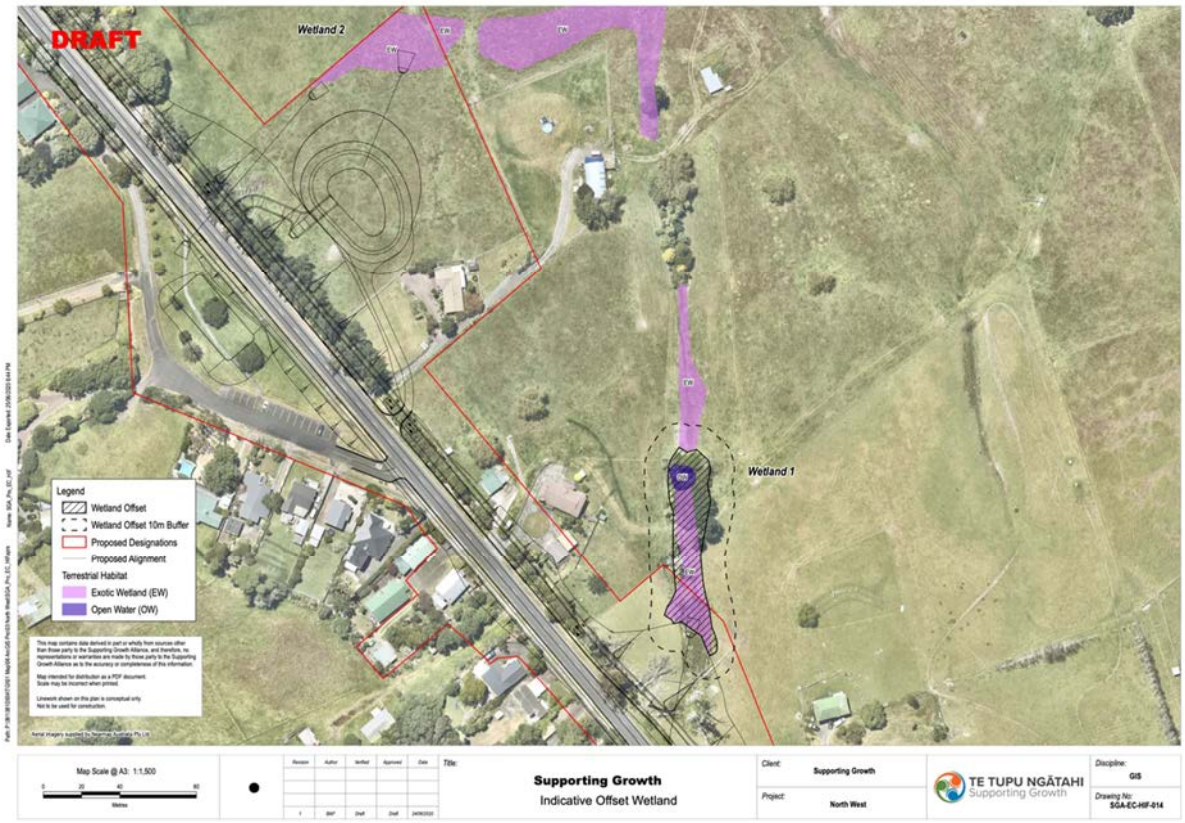


Figure 2: Location of W1 and W2 and proposed ecological offset planting

Overall, the natural hydrological features within the Project Area and adjacent land have been notably modified as a consequence of the rural land use, including un-fenced stock access to riparian margins and directly through lower-order systems, stream culverting, plus the creation of irrigation and ornamental on-line ponds[12].

[11] NW HIF Trig Road Final Draft Ecology Impact Assessment Rev 5, June 2020.

[12] Plan Change 5 Whenuapai 3 Precinct Stormwater Management Plan 2017.

Figure 3: View north from 12 Trig Road into W1

Figure 4: View south-east from 38 Trig Road into W2 and location of proposed dry pond

5.2.2 Land Cover

The vegetative framework of the Project Area is generally dominated by grazed exotic grassland, private domestic gardens (including some native and exotic specimen trees), native and exotic trees within the road reserve and shelterbelt planting (mainly *Pinus radiata)*.

Trees within the road reserve comprise a mix of mature and semi-mature native and exotic shrubs and trees. It is understood through initial arboricultural investigations of the Project Area, that many of the larger trees along Trig Road are coming to the end of their safe and useful life expectancy, with several trees in decline. No significant or high-value trees were identified during early arboricultural investigations. However, it is noted that a mature pūriri (*Vitex lucens*) is situated within the private property of 4 Trig Road.

Indigenous terrestrial habitat is very limited throughout the Project Area, which according to the specialist ecological report would historically have comprised forest species such as: pūriri (*Vitex lucens*), tōtara (*Podocarpus totara*), mataī (*Prumnopitys taxifolia*), kahikatea (*Dacrycarpus dacrydioides*) and tītoki (*Alectryon excelsus* subsp. *excelsus*), kōwhai (*Sophora* sp.) and taraire (*Beilschmiedia tarairi*).[13]

Extensive indigenous revegetation plantings are present to the north of the Project Area along the cut and fill slopes of SH16 and SH18. These relatively recent plantings intersect with sections of Totara Creek and Pikau Stream to the northwest and Trig and Waiarohia Stream to the east and contribute to the biodiversity of the local landscape.

Figure 5: View north-west from 20 Trig Road illustrating typical vegetation cover

5.2.3 Land Use

Land use within and proximate to the Project Area is dominated by agricultural activities and rural lifestyle living, with residential and some commercial activity concentrated along the southern and northwest perimeter of Hobsonville Road and the southwest perimeter of Trig Road.

Hobsonville Road demarcates the existing transition between residential land use to the south and rural activities to the north, with Trig Road attracting a continuation of residential (single detached housing development) along the south-western section.

A mix of commercial, retail and residential development exists along the Project extent of Hobsonville Road and at the Luckens Road intersection. This includes local services to support the residential catchment such as a vet clinic, early learning centre, church, dental clinic, construction companies, cattery, real-estate companies and Te Piringatahi Marae. Hobsonville Kindergarten is located adjacent to Trig Road Reserve (described below). SH16 separates the Project Area from intensive commercial development at Westgate.

Several open space areas exist within the local setting of the Project Area including Hilda Griffin Reserve, which is accessible from Hobsonville Road and connects to Midgley Park to the south through Louise Place. Another unnamed open space area is located to the north of the Project Area

[13] NW HIF Trig Road Final Draft Ecology Impact Assessment Rev 05 (section 6.1.1.1).

within the road reserve between Trig Road and Ryans Road. The land is elevated and located opposite an area of land at 34A Ryans Road zoned Open Space – Informal Recreation. For the purposes of this assessment, the unnamed reserve is referred to as Trig Road Reserve.

A Watercare pump station and WIFI antennae are co-located together at the corner of Trig and Hobsonville Road. It appears that native and exotic vegetation has been planted along the road boundary to provide visual screening for those features.

5.2.4 Historical and Cultural Associations

A specialist archaeological assessment has been undertaken for the Project Area and local landscape. The report outlines in section 7 that, "*The Project Area is located inland some distance from the coast, where most Maori archaeological sites have been recorded. The nearest archaeological sites relating to Maori settlement are over 1.5km to the west along the coast and c.1km to the south along the Manutewhau inlet and stream. Evidence of early European occupation at Whenuapai is relatively sparse and associated with a few key settler families, and no sites of this period are recorded in the near vicinity of the Project Area*"[14].

5.2.5 Future Receiving Landscape

The Trig Road Project runs adjacent to land that is currently zoned FUZ and 'Residential – Mixed Housing Urban' under the AUP:OP. The adjacent land is proposed to be rezoned to Residential – Mixed Housing Urban Zone and Residential – Terrace Housing and Apartment Building Zone under PPC5. On that basis, there is a general focus on assessing the potential landscape and visual amenity effects associated with the construction and operation of the transport corridor on the Future Receiving Landscape (**FRL**).

Notwithstanding the above, there are some complexities in the planning context and Project timeline that signal the need to also address the potential landscape and visual amenity effects of the arterial upgrade on the Baseline Landscape. The reasons are as follows:

- PPC5 is still progressing through the plan change process and there is currently no timing on a Council decision; at this stage it is understood the proposed zoning has no legal effect;
- Funding is available now for the Project and construction is anticipated to occur in the short-medium term. This means that construction and operation of the arterial upgrade is likely to occur inside the context of the existing Baseline Landscape. This is anticipated to bring about heightened visual amenity effects in the short term, particularly for existing properties located along the western perimeter of Trig Road who currently experience a largely rural outlook to the northeast over the FUZ land.

[14] NW HIF NoR Whenuapai Trig Road Archaeological Assessment, July 2020.

On the basis of the above, there are two subtly different scenarios to consider as part of this landscape and visual effects assessment:

- The Project is undertaken ahead of urban development occurring in the FUZ land, with construction commencing in the short term. On that basis, the changes to the AUP zones are seen as a mitigating factor over time, since urban development is anticipated by the policy framework, (i.e. an urban road within a transitional rural to urban environment).
- Urban development in the FUZ land and the Project occur concurrently. On that basis, urban development both existing and occurring on adjacent land are seen as a mitigating factor during the construction of the Project (i.e. an urban road upgrade within an existing or developing urban environment).

The following sections outline the analysis of PPC5 and non-statutory guidance documents pertaining to the future development of land within and adjacent to the Project Area. The analysis of the future receiving landscape is an important step in understanding whether the proposed features of the Project will integrate with the future development (specifically aspects relating to landscape character and amenity), as set out in the following guidance literature.

5.2.6 Proposed Plan Change 5

PPC5 was notified in September 2017 to rezone the Whenuapai Stage 1 area, which includes the Project Area. The Plan Change, along with the underlying FUZ, signals a high probability of land use change over time in and around the Project and provides the future urban context in which the upgraded Trig Road corridor will operate.

Existing open space areas are not expected to change from a land use perspective and the open space – informal recreation zone at 34A Trig Road will remain in place.

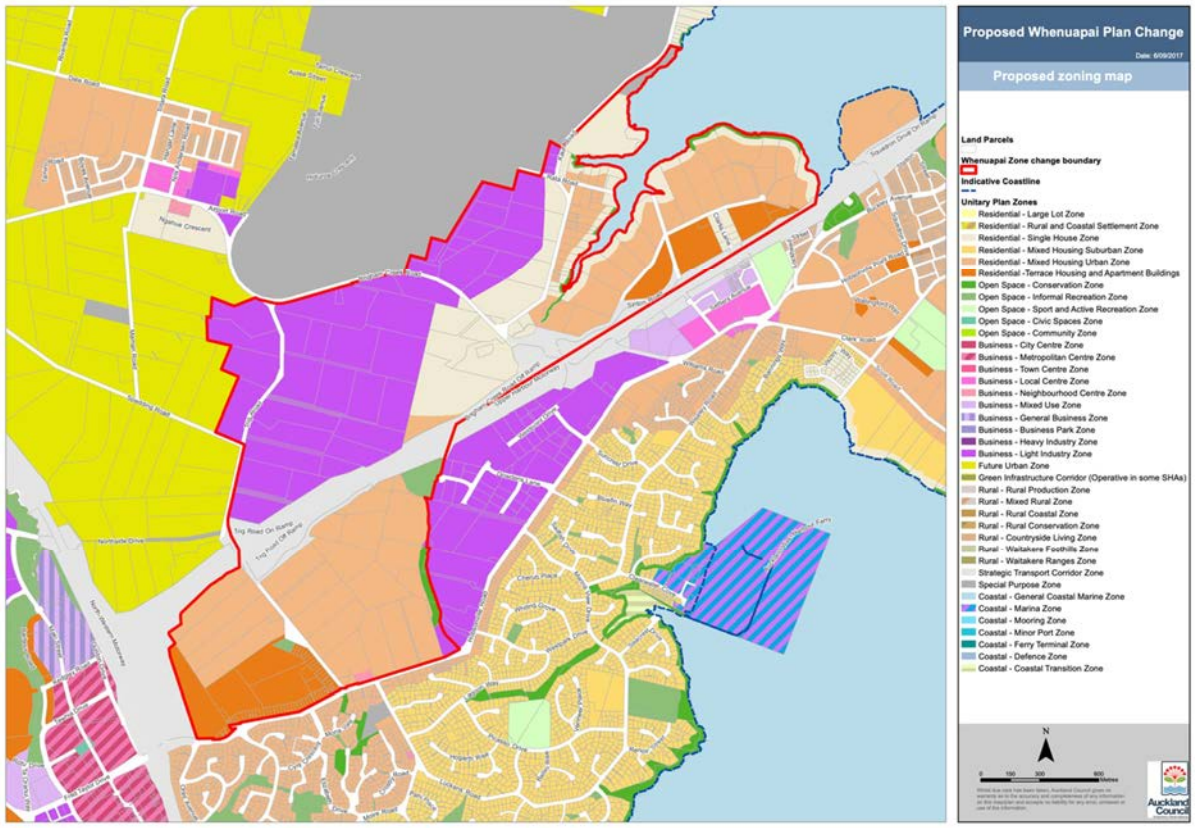


Figure 6: Proposed Whenuapai Plan Change Zones

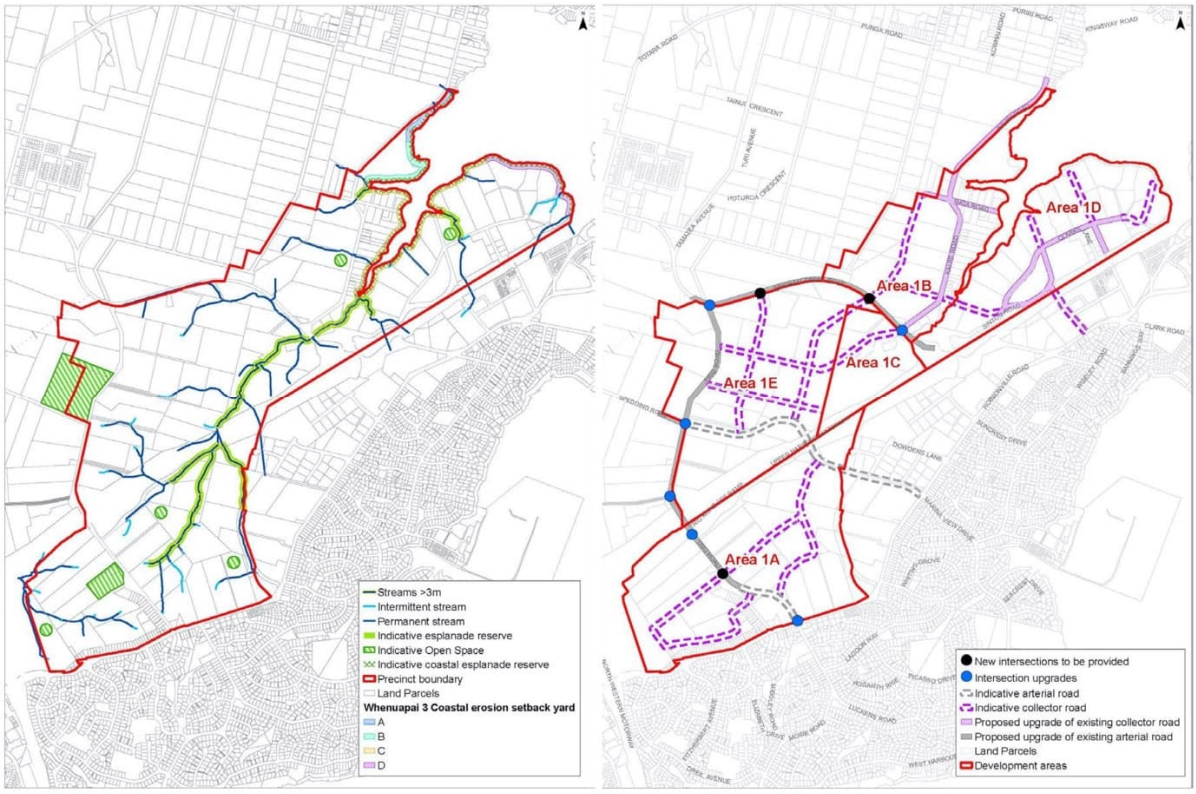


Figure 7: Whenuapai 3 Precinct Plans 1 (left) and 2 (right)

The Whenuapai 3 Precinct Plans illustrate an indicative development structure and landscape framework that includes:

- Open space nodes, esplanade reserves and coastal esplanade reserves;
- The permanent and intermittent stream network, including streams wider than three metres;
- Indicative new roads and intersections (including a modified version of the Trig Road corridor);
- Proposed upgrades to existing roads and intersections; and
- Development areas for transport infrastructure.

With regards to the future landscape framework of land adjacent to the Project Area, PPC5 indicates an interconnected pattern of public open space, esplanade reserves and walking and cycling connections. Esplanade corridors follow existing hydrological patterns of the landscape which are assumed to be enhanced through future subdivision and development, in accordance with policies E.3.3 (section E3 Lakes, rivers, streams and wetlands) of the AUP:OP. PPC5 will also give effect to the Whenuapai Stormwater Management Plan (**SMP**) recommendations and the North-West Wildlink[15] through riparian planting[16].

The Whenuapai SMP outlines stormwater management requirements as they relate to the W3P sub-catchment in which the Project is situated. It promotes best practice sustainable urban development and offers helpful guidance around how existing watercourses are likely to be managed through development.

The report states - "*While urbanisation of W3P has the potential to give rise to, or exacerbate, the adverse effects identified above, the change in land use also offers significant opportunities to enhance the currently degraded environments through appropriately designed and managed subdivision and development. The AUP (OP) recognises the opportunity that greenfield development planning presents to identify and implement enhancement opportunities, in addition to minimising new adverse effects. As discussed below, objectives and policies of the plan, particularly in E1, seek an integrated stormwater management approach and the progressive reduction in existing adverse effects on/enhancement of degraded freshwater and coastal systems*"[17].

On the basis of the above, general assumptions can be made about the likely future landscape character of the local landscape surrounding the Project Area. This is important as it enables a general evaluation of the likely sensitivity of that landscape to the effects of the Project. It also provides the opportunity to link the proposed mitigation measures of the Project in with the landscape values that have been identified in the PPC5 Precinct plans. This is likely to achieve greater coherence and visual cohesion between the Project Area and adjacent land.

[15] The North-West Wildlink is a Forest and Bird initiative that provides a wildlife corridor from the Waitakere Ranges to the Hauraki Gulf.

[16] Proposed Plan Change 5, Whenuapai, September 2017. 1616.1 Precinct Description. 1616.2. Objectives. 1616.3. Policies.

[17] Plan Change 5 Whenuapai 3 Precinct Stormwater Management Plan 2017.

The assumptions for the FRL include:

- Considerable shift from rural character to mixed residential.
- Trig Stream (now assessed as wetlands in the upper catchment) and its main tributaries are likely to be enhanced through revegetation strategies and become an esplanade reserve.
- The landform immediately surrounding Trig Stream and its tributaries is unlikely to change.
- For landform within the balance areas of the site, zoned Residential – Mixed Housing Urban Zone and Residential – Terrace Housing and Apartment Buildings, assume a high degree of physical change through earthworks and platforms for local roads and housing.
- Small increase in neighbourhood based commercial activities along Hobsonville Road between Trig Road and Luckens Road.
- Indicative collector roads (as indicated on Precinct Plan 2) are proposed to generally follow existing contours which will maintain overarching landform structure.
- Existing shelter belt planting likely to be removed.
- Trig Road Reserve likely to remain an important open space node and is located proximate to a large open space area indicated on Precinct Plan 1.
- New intersection indicated at Trig Road and indicative collector road intersections.
- Potential for cycle and pedestrian linkages to wider landscape.

5.2.7 Viewing Context

The key landscape characteristics of the viewing context are outlined below:

- The Project Area occupies an elevated ridgeline system that is reasonably prominent within the local viewing catchment.
- Existing views into the road corridor from private dwellings along the southern and northwest perimeter of Hobsonville Road are direct and in close range with private boundary fences and planting providing a 'visual buffer' between the road corridor and private space. Future development (if it does occur) within this Mixed Housing Urban Zone is expected to maintain existing proximity to the road corridor.
- Land adjacent to the east of Trig Road slopes away from the road corridor and enjoys a northerly aspect. There are few existing dwellings on this side of the Project Area and it's likely that future development will take advantage of the north facing slopes and generally orientate buildings away from the elevated Trig Road corridor.
- Conversely, along the western perimeter of Trig Road, where views from existing dwellings are direct and in close range; future development within the FUZ land is expected to maintain proximity to the road corridor and therefore direct views towards it.
- In general, residents of existing dwellings are likely to experience the visual effects of landscape change during the construction and finishing phases of the Project as well as long term visual change within the operational phase of the Project. The latter taking place within the context of wider changes occurring in the landscape as indicated by PPC5.

5.2.8 Landscape Values

There are no regionally or nationally significant landscapes (ONLs, ONFs or ONCs) within or proximate to the proposed designation boundary.

Some of the elevated sections of Hobsonville and Trig Road afford unimpeded views to the northeast over the undulating landform with a northerly aspect. This landscape pattern and visual composition contributes to the general pleasantness of views afforded from the existing road corridor. Elevated views or viewshafts from Trig Road are likely to remain through the urban development of adjacent land because of the elevated position of Trig Road.

Existing hydrological patterns associated with Rawiri, Trig and Waiaroho Streams also contribute to the local landscape values of the Project Area and local setting. They represent natural character forming features that with adequate landscape management (as indicated by PPC5 to the AUP:OP), are likely to endure land development and deliver landscape amenity and natural character values within the future urban landscape. These values are identified (in part) in the PPC5 Precinct Plan 1.

There are a number of reserves within the Project Area that not only provide opportunities for active and passive recreation, but also provide alternative pedestrian and cycle connectivity away from the roading network. These include Midgley Park to the south – connected to Te Piringatahi Marae, Fitzherbert Reserve further to the south and Trig Road Reserve located opposite Hobsonville Kindergarten. Trig Road Reserve is proximate to future proposed large open space node as indicated on Precinct Plan 1.

5.2.9 Landscape Sensitivity

The existing Hobsonville and Trig Road corridors are generally considered to have low sensitivity to the type and extent of landscape and visual change proposed through the Project. This is primarily based on the combination of the following factors:

- The Project utilises existing infrastructure and there is no significant change in land use;
- Existing land cover is of low botanical value (refer ecological report);
- The existing wetlands within and adjacent to the Project Area have been notably modified by rural land use and exhibit low natural character;
- The AUP:OP indicates future urban development adjacent to the Project Area and on that basis, there is no guidance for maintaining the existing remaining rural character values of the Project Area.

The level of sensitivity for some existing private landowners along the western perimeter of Trig Road and on both sides of Hobsonville Road is considered to be heightened due to their proximity to and/or position within the Project Area.

6 Assessment of Landscape and Visual Effects

Chapter Summary

This section identifies the principle elements of the Project that have the potential to impact on landscape as a physical resource and ultimately change the landscape character, natural character and visual amenity of the Project Area and local landscape.

Landscape and visual effects are assessed in two parts as outlined below; firstly through the construction period where the bio-physical and human attributes of the Project Area are required to be modified in order to implement the Project. Landscape and visual effects during the construction phase are generally considered to be temporary and dynamic in nature and may temporarily be heightened by the intervention of heavy machinery and the use of construction service areas. In the second part (operational phase), the significance and value of landscape and visual change is explored and ultimately the Project's impact on landscape character, natural character and visual amenity is assessed.

Temporary Effects (Construction Effects): Describes the anticipated impacts on the bio-physical elements and features of the landscape resource (landform, vegetation and hydrology) resulting from the construction of the Project. It also includes how these aspects translate into visual amenity effects for both public and private viewing audiences.

Permanent Effects (Operational Effects): Describes the completed works (including integrated landscape mitigation measures), the significance of physical landscape change and ultimately the resulting effects on landscape character, natural character and visual amenity for both public and private viewing audiences.

6.1 Assessment of Construction Effects

6.1.1 Demolition and Earthworks

Temporary adverse landscape effects will result from the earthworks required to implement the principle elements of the Project, which will include:

- Re-profiling of the existing road surface and adjacent land within the Project Area to accommodate corridor widening and transport features, resulting in cut and fill slopes of varying scales;
- Clearance and/or disturbance of broad areas of existing road-side vegetation within the Project Area;
- Implementation of new stormwater features; and
- Modification of the W1 environment.

The proposed cut and fill slopes range in scale within the Project Area. Very small to moderate scale cut and fill slopes are proposed along Luckens Road and Hobsonville Road and are able to be integrated into the adjacent modified road corridor. The larger, more expansive fill slopes are proposed along the eastern perimeter of Trig Road into an open pastoral landscape, therefore the scale of these fill slopes is able to be integrated into the receiving landform with care taken to form a natural slope profile (refer to section 6.2).

One of the larger fill slopes along Trig Road (CH 160) is proposed to cover part of the existing W1. An upgraded culvert is proposed beneath the fill slope with an outlet into the remaining wetland environment. Approximately 0.10ha of ecological offset restoration planting is proposed within the remaining areas of W1 as shown on Figure 2, above. From a landscape perspective, it is recommended that localised mitigation planting is undertaken at the culvert outlet (within the

proposed designation boundary) to ameliorate physical landscape effects and to integrate the new culvert wingwalls into the proposed wetland restoration planting.

Stormwater features are proposed within the Project Area and include replacement of existing stormwater culverts into the edge of W2 and new features including a rain garden and attenuation pond (CH 1560), a bioretention rain garden and dry pond (CH 320 – 440) and several stepped bioretention raingardens located within the berm of the Trig Road corridor that feed into the dry pond. The bioretention ponds and dry pond will require earthworks to re-shape the land to achieve optimal depths and edge profiles, while the stepped bioretention rain gardens will be formed as part of the hard works within the road corridor.

As mentioned above, existing culverts are proposed to be replaced with outlets into the southern extent of existing W2. This will result in a like for like situation, within a heavily modified environment that is also in the general vicinity of a proposed collector road (Precinct Plan 2). Given that this area of land is subject to future external design detail, landscape mitigation is not recommended on these culvert wingwalls at this point in time.

In all cases, the stormwater features are proposed within open pastoral or grassed areas, within land that is already modified by rural land use or the existing road corridor. On that basis, the physical landscape effects required to implement the stormwater features is considered to be low.

Private residential and commercial properties adjacent to the road corridor (either partially or fully designated) will be impacted by the Project in the following ways:

- Surface level changes between private property boundaries and the upgraded road corridor, requiring existing driveways and private accessways to be regraded;
- Encroachment into private yard areas and the removal of private garden plantings, mature trees, ancillary buildings and boundary fences;
- Construction of noise mitigation walls and retaining walls;
- Demolition of existing dwellings and ancillary buildings (required properties 72C Hobsonville Road and 19 Trig Road).

For partially affected properties, where existing dwellings are assumed to remain, it is recommended that boundary fences and garden plantings (removed through the Project works) be reinstated on completion of the works affecting the property. Noise mitigation walls and/or retaining walls (if proposed) are recommended to integrate with private boundary fencing reinstatement (i.e. to avoid double layering of noise walls and boundary fences). It is also recommended that retaining walls and/or noise walls incorporate any reinstatement planting required to replace vegetation lost through the Project works (if practicable).

For affected private properties, where existing dwellings are assumed to be removed, it is recommended that, after completion of the works affecting the property, the remnant land be grassed and maintained within the road corridor to mitigate adverse visual amenity effects potentially arising from residual land.

Overall, the physical landscape effects resulting from earthworks within the Project Area is assessed as **low,** with the proposed mitigation measures included in the Project works.

Physical landscape effects resulting from earthworks on private properties is assessed as **low-moderate,** with the proposed mitigation measures included in the Project works.

6.1.1.1 Construction Work Areas

The Project will require site facilities and services to support the construction of the upgraded corridor. Two indicative construction laydown areas are proposed within the designation boundary. These areas are illustrated in Appendix 3: Landscape Plans and Maps: 03-07 and are proposed to be reinstated at the completion of the Project works.

The first laydown area is proposed on private land at 80 Hobsonville Road. The site consists of a grazed paddock and no native vegetation. This will provide an area of approximately 1,500m2, providing space for site offices, parking and manoeuvring, stockpiling and equipment storage.

A second facility is proposed at the northern end of the Project at 19 Trig Road. The construction area is proposed to be divided into two areas (1000m2 each), separated by the ephemeral stream (stream 1 as per the ecological assessment), which bisects the site. The stream is highly modified and surrounded by pastoral grass. The construction area will provide space for site offices, parking and manoeuvring, stockpiling and equipment storage.

The proposed designation boundary includes the areas required to construct the Project, providing space for manoeuvring, setup and temporary storage of construction plant and to establish construction management measures. Larger construction buffer areas are proposed around wetlands and stream crossings to allow for construction works to be undertaken around sensitive natural features within the Project Area.

Overall, the physical landscape effects resulting from establishment and use of the construction work areas within the Project Area is assessed as **low,** with the proposed mitigation measures included in the Project works.

6.1.1.2 Vegetation Clearance

Broad areas of street-side vegetation and private garden plantings are required to be removed as a result of the proposed earthworks. As outlined in Appendix 1: Detailed Assessment of Project Works, exotic grassland, private garden plantings, hedgerows, shelterbelts (mainly *Pinus radiata)* and native and exotic trees make up the majority of vegetation to be removed.

Existing private garden plantings, although consisting mostly of exotic species, are considered to contribute to the residential street character and provide residential amenity and privacy for residents fronting the road corridor. On that basis, it is proposed to reinstate private garden plantings where there has been disturbance or removal through the Project works (refer to section 6.1.1 above).

It is also proposed to reinstate the existing screen planting for the Watercare pump station site along the southern and western boundary (CH 60), within the residual land following the realignment of Trig Road.

It is recommended (for consideration through detailed design) that the mature Puriri (*Vitex lucens*) tree, located at 4 Trig Road be retained and accommodated if practicable through the refined design of the footpath and cycleway through this section of the Project.

New street tree plantings along the entire length of the proposed alignment will mitigate for the loss of individual or small groupings of existing native trees and shrubs, as outlined in Appendix 1: Detailed Assessment of Project Works. This is also expected to reduce the impact of the scale of landscape change associated with the clearance of existing shelterbelt and hedgerow planting.

Overall, the physical landscape effects resulting from vegetation clearance within the Project Area are assessed as **low,** with the proposed mitigation measures included in the Project works.

6.1.2 Effects on Visual Amenity

The total construction phase of the Project is anticipated to last 16-18 months and the Project works are indicatively proposed in 3 stages. On that basis, visual effects will occur progressively through the road corridor through zones 1 to 3.

The consideration of visual effects through the construction phase acknowledges the full range of activities required to implement the upgraded road corridor. This includes site enabling works (site establishment, demolition and vegetation clearance), bulk earthworks and surface formation, bridge reconfiguration and also the 'finishing works' period where it is anticipated that street trees, lighting, footpath/cycleway details and line marking will be implemented, alongside any other urban design and landscape features of the Project.

It is anticipated that construction activities required to implement the Project will be generally consistent in nature and scale to road works and infrastructure activities commonly anticipated by transient viewing audiences within a main arterial corridor. Another important consideration is that landscape change by way of vegetation removal and land modification forms part of the expected backdrop of the rural environment, particularly one that is expected to transition, over time, into an urban neighbourhood.

Notwithstanding the above, some vantage points within the Project Area are likely to witness heightened adverse visual effects through the construction phase. These areas are outlined below:

- Private properties where physical landscape effects will occur along roadside boundaries.
- CH 1140 – 1260 (southern side of Hobsonville Road) where existing dwellings are to be removed.
- CH 1260 – 1320 (Trig / Hobsonville Road intersection) where existing dwellings are to be removed.
- CH 1660 (80 Hobsonville Road) where a laydown area is proposed.
- CH 100 – 180 at the location of W1 and the large fill batter.
- CH 320 – 460 at the location of the proposed bioretention rain garden and dry pond.
- CH 580 – 680 (19 Trig Road) where the construction area is proposed.

The nature and significance of the potential adverse visual effects during the construction phase is considered to be moderated through the Project Area because of the following aspects:

- Road works and construction activities can generally be expected to occur within arterial roads;

- The Trig Road carriageway is already a dominant element within the visual composition of Project Area;
- The existing road corridor landscape has already been modified by previous works required to shape the existing road corridor.
- The construction phase is expected to last no longer than 18 months and is proposed to be implemented in 3 stages. Therefore, adverse visual effects can be seen to be temporary in nature.

Representative viewpoint images are provided in Appendix 3. Landscape Plans and Images. The supporting commentary (Appendix 2. Public Viewpoint Assessment) outlines the existing visual composition for each location as well as the landscape change that is anticipated to occur that might translate into adverse visual effects during the construction period.

Overall, adverse visual effects for the transient public viewing audience are likely to be **moderate-low** through the construction phase**,** taking into account those areas listed above where adverse effects are likely to be heightened during the temporary construction period.

Adverse visual effects during the construction phase are likely to be heightened for the private viewing audience directly adjacent to the road corridor on the basis of more frequent and prolonged engagement with the construction activities of the Project. On that basis, visual effects are likely to be **moderate** during the construction phase for private viewing audiences. As above, this corresponds with the presence of heavy machinery and the visible disturbance of both the road corridor and individual private interface with the road.

6.2 Operational Effects

6.2.1 Effects on Landscape Character

The principle elements of the Project will permanently alter the character of the Project Area. While the existing roading corridor along Hobsonville Road is residential, the existing corridor of Trig Road is distinctively rural in character owing to the limited streetscape features, unstructured hedgerow and shelterbelt planting and the existing rural land use adjacent on both sides of the corridor (with the exception of the southwestern extent). At the completion of the Project, the upgraded corridor will resemble that of an urban arterial on account of the additional vehicle lanes, active modes of transport, reduced speed limit, structured street tree plantings, integrated stormwater management and an increased visual amenity within the road corridor itself.

The Project is anticipated to enter its operational phase within the context of increased urbanisation within adjacent FUZ land either side of Trig Road. As outlined earlier, PPC5 indicates an interconnected pattern of public open space, esplanade reserves and walking and cycling connections through an urban neighbourhood consisting mainly of Residential – Mixed Housing Urban Zone and some Residential – Terrace Housing and Apartment Building Zone to the southwest of Trig Road and the northwest of Hobsonville Road. A Neighbourhood Centre Zone is proposed to the east of the Trig / Hobsonville Road intersection. On that basis, the magnitude and nature of change to existing landscape character within the Project Area is considered to accord with that which will occur throughout the localised landscape.

In assessing the landscape character effects of a roading Project within a future urban environment, there is an overlap with urban design considerations. This is expressed through the consideration of

urban amenity, neighbourhood character and sense of place. Integration of stormwater features and associated fill slopes is an important factor in maintaining neighbourhood character and a sense of landscape cohesion within the permanent works.

All cut and fill slopes are recommended to be shaped to a natural slope to integrate with the surrounding landform, as outlined in Section 7.1.1. These areas are to be reinstated with grass, with the exception of specific areas within the Project where it is proposed (for mitigation purposes) to reinstate private garden plantings and native vegetation that has been cleared through the Project works. Refer to Appendix 3: Landscape Plans and Images: Maps 03-07 for further detail.

For the larger fill slopes (that are to be retained as part of the road corridor) above W1 and the proposed dry pond (CH 100-180 and CH 320-430 respectively), it is recommended that they be planted in low maintenance native shrubs. Native planting will assist with integrating these residual fill slopes into the ecological wetland planting and the proposed dry pond so that such features read as cohesive landscape elements and contribute positively to the visual amenity of the road reserve. It is noted that a future collector road is indicated to align to the northern extent of the proposed dry pond; therefore, native planting within the fill slope should not extend north of CH430, as stated above.

Two bioretention raingardens and one dry pond are proposed within the Project Area along with a series of raingardens (approximately 20m long) located within the berm of the new Trig Road corridor. Stormwater wetlands form part of the 'landscape aesthetic'. Constructed wetlands with shallow and vegetated edges will integrate as a perceived natural feature more so than deep ponds that are required to be fenced. On that basis, it is recommended that the stormwater features be planted with appropriate (low maintenance native species) and integrated into the surrounding urban landscape context, so that they provide a hydrological and ecological function and are safe places to visit. Given the future urban location and scale of the proposed features, it is important that they enhance the landscape and visual amenity of the local landscape. Planting proposed at the culvert headwalls within W1 will assist with integrating this feature into the landscape.

The land surrounding the bioretention rain garden and dry pond at CH 380 is likely to form an important part of the future open space network spanning across the Project Area from east to west between the FUZ land. PPC5 indicates an informal recreational zone adjacent to the proposed bioretention rain garden at 34A Trig Road. It also indicates a large open space area directly north and an esplanade reserve associated with W2 (Trig Stream) on Precinct Plan 1. Precinct Plan 2 indicates a collector road travelling east to west across the corridor at approx. CH 500.

On the basis of the above, it is suggested (as a future detailed design consideration) that the fill slopes (CH 320-430), culvert and stormwater features be designed as a cohesive landscape feature to be coordinated with the local road design (if practicable). An integrated design for this area of the Project is likely to enhance landscape amenity and natural character values within the Project Area over time.

The overall scale of vegetation clearance proposed to implement the Project is notable and is likely to contribute the greatest shift in the existing character of the landscape. As outlined in Appendix 1. Detailed Assessment of Project Works, exotic shelter belt plantings, hedgerows and private gardens make up the majority of vegetation to be removed alongside stand alone, or small groupings (2-3) of young and mature native trees. Existing shelterbelt and hedgerow plantings associated with rural land use have been established through ecological assessment to be of low botanical value. New street tree

plantings along the length of the Trig and Hobsonville corridors, along with indigenous planting within the stormwater features will assist with moderating the shift from rural to urban landscape character.

Overall, adverse landscape character effects are assessed as **low,** with the proposed mitigation measures included in the Project works.

6.2.2 Effects on Natural Character

The natural attributes of the wetlands are discussed in the ecological assessment at section 6.2.1.2 and are summarised as being moderately to largely modified with some residual function including erosion control and water purification. The wetlands are not currently fenced within their rural setting and stock are afforded access through the wetland environments. The landform is natural at the edges of the feature and expressive of a wetland environment however typical indigenous wetland plant species are absent and notable weed infestations are present.

Ecological impact management for the partial loss of habitat within W1 is proposed by the Project ecologists and this will involve enhancement planting of the remainder of W1. The proposed ecological mitigation is anticipated to improve natural character values within the Project Area over time.

Overall, the existing natural character value of W1 is assessed as low and the effects of the Project on that value are assessed as **very low** taking account of the positive impacts associated with the offset planting.

6.2.3 Effects on Visual Amenity

Once the Project is completed, transient and private viewing audiences will continue to engage with a similar visual environment to which currently exists, within the backdrop of an increasingly urban local context. Improved journey experience for users in vehicles and active modes of transport will be evident.

Visual effects of the Project are anticipated to move from very low to positive (beneficial) over time as the proposed mitigation measures mature and start to impact positively on the user experience of the road corridor.

Nevertheless, low residual adverse visual effects are anticipated for private properties that have experienced a material change to the visual composition of the private / streetscape interface and where the upgraded road corridor might appear as a more dominant feature in views overlooking Hobsonville and Trig Road. Residual adverse effects are anticipated to reduce over an extended period of time.

Overall, adverse visual effects within the Project Area are likely to be **very low** for transient viewers through the operational phase of the Project. For the private viewing audience, the visual effects are likely to be **low** reducing to **very low** over an extended period of time.

6.3 Summary of Landscape and Visual Effects

This landscape, natural character and visual assessment finds that the proposed features and scale of the Project are able to be integrated into the existing landscape, with landscape mitigation measures

forming part of the Project. Natural character and amenity values are likely to be enhanced (over time) as a result of the Project.

FUZ development areas on adjacent land will over time substantially change the scale and character of the adjacent landscape as experienced from within the road and absorb the landscape and visual changes proposed within the Project Area.

As outlined earlier under the baseline landscape analysis, there are no regionally or nationally significant landscapes (ONLs, ONFs or ONCs) within or proximate to the Project Area and localised effects on the sensitive features of the landscape are able to be managed through the proposed mitigation measures.

7 Mitigation

Chapter Summary

A number of landscape mitigation measures are proposed alongside the Project works to assist with integrating the Project into the landscape. The proposed landscape mitigation measures underpin the overall magnitude of landscape character, natural character and visual effects that have been assessed for the Project.

Further suggestions are provided for consideration during detailed design. These recommendations do not contribute to the assessment of effects, however if included within the Urban Design and Landscape Management Plan (**UDLMP**) and ultimately implemented through the Project they are likely to enhance the landscape, natural character and visual amenity outcomes of the Project.

7.1 Landscape Mitigation Measures

The matters outlined below address the temporary construction and permanent operational landscape and visual effects of the Project. An UDLMP is recommended as a condition on the designation including the matters outlined below.

a. All cut and fill slopes to be shaped to a natural profile to integrate into the surrounding natural landform. Avoid benching and geometric angles. Reinstate with grass, except areas identified on the landscape mitigation plan where it is proposed (for mitigation purposes) to reinstate private garden plantings and native vegetation that has been cleared through the Project works. Refer to Bridging the Gap: NZTA Urban Design Guidelines (2013), Section 4.14 Earthworks.

b. The larger fill slopes (that are to be retained as part of the road corridor) above W1 and the proposed dry pond (CH 100-180 and CH 320-430 respectively) to be planted in low maintenance native shrubs. Native planting will assist with integrating these residual fill slopes into the ecological wetland planting (W1) and the proposed dry pond so that such features read as cohesive landscape elements and contribute positively to the visual amenity of road reserve.

c. Implement localised native planting at the culvert outlet into W1 to ameliorate physical landscape effects and to integrate the new culvert wingwalls into the ecological wetland offset planting (W1).

d. Reinstate private fences and garden plantings (with the exception of required properties 72C Hobsonville Road and 19 Trig Road) for existing, remaining dwellings affected by Project works along Hobsonville Road and Trig Road.

e. Design retaining walls and noise mitigation walls to integrate with private boundary fencing (i.e. avoid double layering of noise walls and boundary fences). Incorporate existing and reinstatement planting into retaining walls and noise walls. Do this in a way that minimises visual amenity effects on residents while integrating with the layout and design of outdoor living spaces. Consider contribution of design to the streetscape character. Refer to Bridging the Gap: NZTA Urban Design Guidelines (2013), Section 4.13 Retaining Walls and Section 4.15 Noise Barriers.

f. For private properties required by the NoR, where private dwellings and ancillary buildings are assumed to be removed, it is proposed that land retained be grassed and maintained within the road corridor.

g. Remove residual fill and gravel from construction laydown areas and reinstate with grass following the completion of Project works.

h. Reinstate the existing screen planting for the Watercare pump station site along the southern and western boundary (CH 60), within the residual land following the realignment of Trig Road.

i. Implement street tree plantings within the proposed berms of Hobsonville Road and Trig Road.

j. Configure the bioretention rain gardens and dry pond to a natural appearance, conforming to landform and future urban context. Optimise the natural appearance with shallow planted edges (native riparian species) for long term sustainability, maintenance, hydrological and ecological function. Refer to Bridging the Gap: Waka Kotahi Urban Design Guidelines (2013), Section 4.17 Stormwater Management Devices.

Refer to the Appendix 3. Landscape Plans and Images: Mitigation Plans 03-07, which illustrate the general location of the mitigation measures.

7.2 Future Detailed Design Considerations

There is significant opportunity to enhance the landscape character, natural character and visual amenity of the Project Area. The following design opportunities are suggested to be considered at the detailed design phase and implemented through the UDLMP (if practicable) alongside the mitigation measures outlined above in section 7.1.

a. It is suggested that the extent and gradient of the proposed fill slope (CH 160) be refined during detailed design to reduce the level of encroachment into the existing W1 environment.

b. It is suggested that the mature Puriri tree (Vitex lucens) located at 4 Trig Road be retained and accommodated if practicable, through the refined design of the footpath and cycleway through this section of the Project. This mature native specimen tree is likely to contribute positively to the landscape character and visual amenity of the road reserve.

c. It is suggested that the fill slopes (CH 320-430), culvert and stormwater features be designed as a cohesive landscape feature to be coordinated with the local road design (if practicable).

d. It is suggested that proposed street trees species match with original forest types (known to be successful within urban applications), identified through the ecological assessment.

Appendix 1. Detailed Assessment of Project Works

Table 4: Proposed Works and Resulting Landscape Change

Proposed Works	Existing Landcover	Private Property / Open Space	Landscape Response
Luckens Road **Chainage 120 – 20** Corridor improvements to include central traffic island and connection with upgraded Hobsonville Road intersection. Very small scale fill slopes along Luckens Road / Trig Road intersection.	Grass berm / garden plantings on private property boundaries. Mature exotic and some native trees in front of 10 and 23 Luckens Road where noise walls are proposed. Not proposed to be removed. Mature native tree in road reserve in front of 1 Luckens Road. Project works within dripline.	Small scale encroachment of northern boundary of 115 Hobsonville Road. Noise walls proposed along private boundaries of 1, 1B, 2, 16, 10, 115 Luckens Road.	Integrate very small scale earthworks into natural landform. Reinstate with grass. Reinstate amenity planting along the northwest perimeter of the carpark at 115 Hobsonville Road / retain Pohutukawa tree if practicable. Design 1.8m high noise walls to integrate with private property boundary fencing (avoid double layering of noise wall and property fence). Incorporate existing and replacement planting into noise wall. Retain existing large trees if practicable. Retain mature native tree in road reserve in front of 1 Luckens Road if practicable.
Hobsonville Road (southern side) **Chainage 1500 – 1550** Small scale fill slopes	Grass berm / garden plantings on private property boundaries.		Design 1.8m high noise wall to integrate with private property boundary fencing (avoid double layering of noise wall and property fence). Incorporate existing and replacement planting into noise wall.
Hobsonville Road (northern side) **Chainage 1700 – 1320** Corridor widening to include additional vehicle lanes / Hobsonville - Luckens Road signalised intersection / vehicle stacking / walking/cycling lanes (both sides). Small - moderate scale fill slopes	Grass berm / hedgerows / shelterbelt planting. Native and exotic trees and garden plantings associated with 78 Hobsonville Road to be removed. Puriri tree (*Vitex lucens)* located at 4 Trig Road. Mature specimen – to be retained if practicable.	80 Hobsonville Road - encroachment of southern boundary. Removal of boundary fence and regrading of driveway. 78 Hobsonville Road - encroachment of southern boundary. Removal of boundary fence and regrading of driveway. Demolition of ancillary building and	Integrate small to moderate scale earthworks into natural landform. Reinstate with grass. Reinstate boundary fence (if required) and native planting along boundary of 78 Hobsonville Road (chainage 1500-1530) Plant proposed rain garden and attenuation pond with native species.

Proposed rain garden and attenuation pond (chainage 1560-1580)		removal of native and exotic boundary plantings. 1 Trig Road – encroachment of southern boundary / demolition of barn and removal of shelterbelt planting. Watercare pump station (74-76 Hobsonville Road) – encroachment of southern boundary. Removal of boundary fence and regrading of driveway. Removal of some existing boundary (screen) planting.	Reinstate boundary fence and provide replacement screen planting for Watercare along southern and western boundary (chainage 60) and within residual land left over from realignment of Trig Road (chainage 1320).
Hobsonville Road (southern side) **Chainage 1470 - 1320** Small scale fill slopes	Grass berm / hedgerows / exotic / native shrubs. Mature Pohutukawa tree on Road reserve in front of 97 Hobsonville Road to be removed.	1/93 / 97 / 99 Hobsonville Road - encroachment of northern property boundaries / removal of garden plantings and regrading of driveways. 101 / 107 / 109 / 1/111 / 105 / 103 / 95 regrading of driveways along Hobsonville Road. Noise walls in front of 93 and 99 Hobsonville Road.	Design 1.8m high noise walls to integrate with private property boundary fencing (avoid double layering of noise wall and property fence). Incorporate existing (if practicable) and replacement planting into noise wall. Reinstate boundary fences (if required) and garden plantings for 1/93 / 97 and 99 Hobsonville Road.
Hobsonville Road (southern side) **Chainage 1320 – 1270** Corridor widening to accommodate additional vehicle lanes / Hobsonville / Trig Road signalised intersection / vehicle stacking /walking/cycling lanes (both sides).	Grass berm / mature exotic trees on road reserve potential removal.	Hilda Griffin Reserve – encroachment into northern boundary of reserve.	Integrate small scale earthworks into natural landform. Reinstate with grass.
Hobsonville Road (southern side) **Chainage 1270 – 1140** Corridor widening to accommodate additional vehicle lanes / Hobsonville / Trig Road signalised intersection / vehicle stacking /walking/cycling lanes (both sides). Moderate scale fill slopes.	Grass berm / garden plantings / native and exotic trees on private property. 3 x Pohutukawa Trees on road reserve to be removed.	77 /79 / 81 / 83 / 85 / 87 / 89 Hobsonville Road. Encroachment into northern boundaries requiring removal of fencing, garden plantings and driveway regrading.	Integrate moderate scale earthworks into adjacent landform. Reinstate with grass.

Hobsonville Road (northern side) **Chainage 1140 – 1260** Corridor widening to accommodate additional vehicle lanes and stacking / walking and cycling lanes (both sides). Small scale cut slopes.	Grass berm / garden plantings / exotic and native trees on boundary line and road reserve to be removed.	60 / 62 / 64 / 66 / 68 / 70 / 72 Hobsonville Road - encroachment of southern property boundaries / removal of fences, garden plantings and regrading of driveways. Noise wall proposed 62, 64, 66 and 72 Hobsonville Road.	Integrate small scale cut slopes into adjacent landform. Reinstate with grass (if practicable). Reinstatement of private boundary fences and garden plantings for 60 / 62 / 64 / 66 / 68 / 70 / 72 Hobsonville Road. Design 1.8m high noise walls to integrate with private property boundary fencing (avoid double layering of noise wall and property fence). Incorporate existing (if practicable) and replacement planting into noise wall.
Hobsonville Road (northern side) **Chainage 1260 – 1300** Corridor widening to accommodate additional vehicle lanes / Hobsonville - Trig Road signalised intersection / vehicle stacking / walking and cycling lanes (both sides). Very small scale fill slopes.	Mature Tairere tree / native hedgerow / cabbage trees / mature pohutukawa tree within private garden at 2 Trig Road to be removed.	72C Hobsonville Road and 2 Trig Road. Existing dwelling and commercial property to be removed. Properties required.	Integrate very small scale fill slopes into adjacent landform. Reinstate with grass and maintain within the road corridor.
Trig Road (western side) **Chainage 60 – 280** Corridor widening to accommodate additional vehicle lanes / stacking and signalised intersection at Trig/Hobsonville Road. Walking and cycling lanes (both sides). Small to moderate scale fill slopes.	Shrubs and exotic trees in private gardens to be removed.	6, 8, 12, 14, 16, 18, 20, 22, 24, 26 and 28 Trig Road - encroachment of northwest property boundaries / removal of fences, garden plantings and regrading of driveways. Noise walls proposed at 20 / 26 Trig Road.	Integrate small to moderate fill slopes into adjacent landform. Reinstate with grass or replacement of private garden plantings (if practicable). Reinstatement of private boundary fences (if practicable). Design 1.8m high noise walls to integrate with private property boundary fencing (avoid double layering of noise wall and property fence). Incorporate existing (if practicable) and replacement planting into noise wall.

Trig Road (eastern side) **Chainage 60 – 280** Corridor widening to accommodate additional vehicle lanes / stacking and signalised intersection at Trig/Hobsonville Road. Walking and cycling lanes (both sides). Small to large scale fill slopes to support corridor widening. Fill slope into W1 environment and construction of culvert (chainage 120-180).	Exotic trees and shelter belt planting / exotic and native hedgerows to be removed along private boundary. Reduction of extent of W1 habitat (currently dominated by exotic species, weeds and *pinus radiata*).	3 Trig Road - encroachment of western property boundary / ancillary building / removal of fence, garden plantings and regrading of driveways. Retaining wall in front of 7 Trig Road (chainage 270). Sheds to be removed from south western corner of property.	Reduce extent of fill slope into W1 through detailed design (if practicable). Extent of W1 loss (bio-physical landscape / Natural character effects and ecological effects) mitigated through ecological offset planting of W2. Propose native planting at the culvert outlet (within the designation) to ameliorate localised landscape effects and to integrate the proposed culvert outlet into the future riparian planting of the Trig Stream watercourse, as indicated by PPC5 Precinct Plan 1 and the Chapter E3 of the AUP:OP. Recommend localised planting of the fill slope (approx CH 120 – 160) over top of the proposed culvert to reduce maintenance issues and to improve landscape amenity outcomes for the Project.
Trig Road (both sides) **Chainage 280-570** Small to large cut and fill slopes associated with the bioretention rain garden in road reserve of Trig Road / proposed culvert inlet and outlet / earthworks along corridor and proposed dry pond and culvert.	Grass / exotic trees to be removed within road reserve of Trig Road W2 environment	Trig Road Reserve zoned Road in AUP:OP / PPC5 Retaining wall and noise wall proposed in front of 40 and 15 Trig Road. Dry pond proposed at 9 Trig Road.	PPC5 indicates an informal recreational zone adjacent to the proposed bioretention rain garden at 34A Trig Road. It also indicates a large open space area directly north and an esplanade reserve associated with W2 (Trig Stream) on Precinct Plan 1. Precinct Plan 2 indicates a collector road traveling in an east/west direction across the Corridor at approx. CH 500. On that basis, assume a high degree of landscape amenity value through this section of the Project. Design proposed earthworks, culvert and stormwater elements cohesively alongside the ecological restoration component to be a feature

			within the future urban environment and enhance landscape amenity and natural character values within the Project Area. Design proposed retaining and noise mitigation walls to integrate with private property boundary fencing (avoid double layering of noise wall and property fence). Incorporate existing (if practicable) and replacement planting into retaining / noise wall. Consider contribution of design to the streetscape character.
Trig Road (both sides) **Chainage 570 – 800** Small scale cut and fill slopes to support road widening. Culvert proposed at chainage 640.	Grass / exotic shelterbelt planting and hedgerows. Increased vegetation within the road reserve through this section.	19 Trig Road – dwelling to be removed. Property required. 42 / 46 / 52 Trig Road - encroachment of eastern private property boundaries / removal of fence, garden plantings and regrading of driveways.	Integrate small scale cut and fill slopes into adjacent landform. Reinstate with grass.

Appendix 2. Public Viewpoint Assessment

Viewpoints 01 – 04 – Luckens Road / Hobsonville Intersection

Refer to Appendix 3: Landscape Plans and Images: Maps 06 and 07

These viewpoints represent the visual experience for motorists, cyclists, pedestrians and people accessing several local business and residential properties. This audience is largely mobile (i.e. vehicles travelling at 50km/h) with the location representing a short portion of their journey. Given the nature of the audience the proposed changes will be 'close up' and highly legible, especially for those that use the route regularly.

Viewpoints 01 – 04 illustrate the existing visual amenity of the northern section of Luckens Road and the Luckens / Hobsonville Road intersection. Luckens Road is currently single lane in both directions and lined on both sides by residential dwellings, grass berms and the occasional street tree. Luckens Road is proposed to be widened as it approaches the intersection with Hobsonville Road to provide two northbound turning lanes providing separated east and west movements onto Hobsonville Road.

From VP01 the most notable visual change will be the increased width of the corridor to provide for the additional northbound lane and the subsequent loss of the existing grass verge. The row of pine trees in the background will also be removed.

From VP02, the most notable visual change will be the removal of the foreground row of pine trees located along the northern edge of the Luckens/Hobsonville intersection. The removal of these trees will open up and expand views of the FUZ land to the north and potentially accentuate the perceived elevation of the intersection in relation to the FUZ land bordering Trig Road.

VP03 illustrates the view for motorists, cyclists and pedestrians traveling west along Hobsonville Road. The most notable visual change will result from the proposed corridor widening and its encroachment into the existing footpath in front of the Barfoot and Thompson carpark at No. 115 Hobsonville Road. Likewise, with VP02, the removal of the pine trees will result in a more open and expansive view towards FUZ land, which will urbanise over time.

The overall visual impact of the changes described above includes a shift in the balance between hardstand and 'green space' with the loss of existing grass verge and established trees meaning that the widened carriageway will dominate the view. Visual effects will be moderated due to the carriageway already being a dominant element, the presence of directly adjacent buildings, the dynamic/ moving nature and short duration of the visual experience.

Viewpoints 05 – 09 – Hobsonville / Trig Road Intersection

Refer to Appendix 3: Landscape Plans and Images: Maps 08 and 10

Viewpoint 05 illustrates the existing visual amenity of the Hobsonville and Trig Road intersection. The reserve at 91 Hobsonville Road is visible in the background next to the row of 4 exotic trees that will be removed to make way for the proposed retaining wall in front of 89 – 77 Hobsonville Road. The intersection widening will be visible from this location as it encroaches into the properties at 72 and 72C Hobsonville Road and 2 Trig Road, requiring those existing dwellings to be removed and replaced by road corridor, footpath and cycleway.

Changes to the existing vegetation patterns will be visible and as a result of the removal of some vegetation along the existing road corridor and within private properties and as a result of new street tree plantings within the proposed berms of the arterial upgrade.

The visual change resulting from the proposed driveway regrades, associated retaining walls and the features included in the upgraded intersection, will be evident at viewpoint 07, 08 and 09, resulting in a distinct visual character shift of the streetscape. Likewise, with VP05, the vegetation patterns will shift and the proposed street tree plantings within the arterial upgrade berms will result in a more urban residential street character.

The overall visual impact of the changes described above includes a shift in the balance between hardstand and 'green space' with the loss of existing grass verge and established trees meaning that the widened carriageway will dominate the view. While the loss of vegetation and grass cover will be noticeable, visual effects will be moderated due to the carriageway already being a dominant element, the presence of directly adjacent buildings, the dynamic/ moving nature and short duration of the visual experience.

Viewpoints 10 – 12 – Trig Road

Refer to Appendix 3: Landscape Plans and Images: Maps 10 and 11

The proposed fill slopes in front of 6-16 Trig Road will be visible from Viewpoints 06 and10. The existing boundary vegetation on these properties will be removed and the upgraded Trig Road will appear visibly wider and more open at this location and a more urban residential street character will result.

The new Ryans Road entry will be visible from the location of viewpoint 11, and the removal of the shelter belt planting to the right of the view will result in a shift in visual character for the viewing audience at this location. In the first instance, the change in visual composition will be obvious and open views out towards the dry pond planting area and the Trig Road Esplanade Reserve.

When considering the FRL, the arterial upgrade will be viewed in the context of increased residential development. On that basis, the proposed mitigation and enhancement planting proposed in this report is likely to assist with improving the visual amenity of views afforded from this location.

Viewpoint 12 is representative of the views afforded from the Trig Road reserve and future open space network anticipated by PPC5. Similarly, with Viewpoint 11, the visual amenity of the existing road will change from being distinctly rural to more open and residential in character, with views out over the FUZ land. The proposed mitigation planting and additional enhancement opportunities proposed in this assessment are important factors in maintaining the visual amenity from this important viewpoint and public space node.

Viewpoints 13 – 14 – Trig Road

Refer to Appendix 3: Landscape Plans and Images: Map 12

Viewpoints 13 and 14 illustrate the current view at approximate chainage 620. The arterial upgrade will visibly encroach into the existing grass verge and planting along the eastern perimeter of the road. A low (300mm) batter is proposed at this point. Large street trees will assist in reinstating the visual amenity afforded to this view by the existing large trees.

Similarly, with Viewpoint 12, the visual amenity of the existing road will change from being distinctly rural to more open and residential in character, with views opening out towards the FUZ land.

Viewpoints 15 – 20 - Trig Road

Refer to Appendix 3: Landscape Plans and Images: Maps 13 to 15

Viewpoints 15 and 16 illustrate the current view at approximate chainage 810. The existing visual amenity afforded at this location is expansive and generally influenced by the character of the Upper Harbour Highway. The proposed arterial upgrade is unlikely to result in notable changes to the existing visual amenity of this view.

Viewpoints 17 and 18 illustrate the current view at the Upper Harbour onramp. The existing visual amenity afforded at this location is expansive and generally influenced by the character of the Upper Harbour Highway. The proposed footpaths and cycleway will be visible features of the arterial upgrade upon the existing motorway crossing looking south. Overall, the proposed arterial upgrade is unlikely to result in notable changes to the existing visual amenity of this view.

Viewpoints 19 and 20 are located at 84 Trig Road, at the termination of the proposed arterial upgrade. At this point the road narrows to the existing width and there are very minimal changes to the visual amenity of this vantage point.

Appendix 3. Landscape Plans and Images

Supporting Growth

Trig Road Arterial Project

Assessment of Landscape and Visual Effects

Appendix 3

Landscape Plans and Images

Version 1.0

August 2020

TE TUPU NGĀTAHI Supporting Growth

NZ TRANSPORT AGENCY WAKA KOTAHI

LEGEND

	TRIG ROAD ARTERIAL PROJECT AREA
01	WESTGATE SHOPPING CENTRE
02	WEST HARBOUR
03	HOBSONVILLE POINT / SCOTT POINT
04	WHENUAPAI

DATE	AUGUST 2020
SCALE	1:25,000 @ A3
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

PROJECT LOCATION AND LOCAL CONTEXT

01

LEGEND

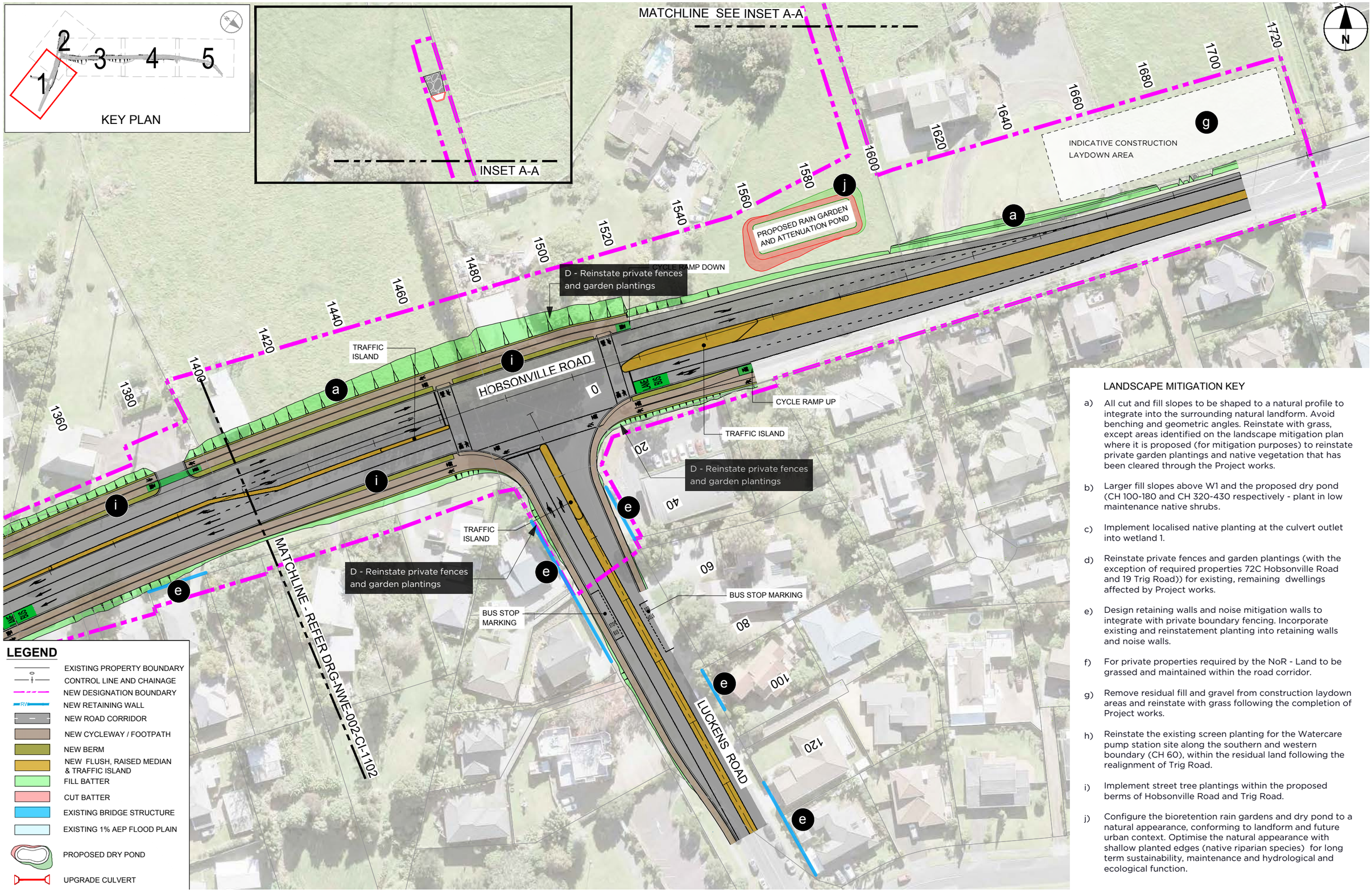
- TRIG ROAD ARTERIAL PROJECT AREA
- 01 RAWIRI STREAM
- 02 TRIG STREAM
- 03 WAIAROHIA STREAM
- 04 TOTARA CREEK
- 05 TRIG ROAD RESERVE
- 2m CONTOURS (AUP OIP GIS)

DATE	AUGUST 2020
SCALE	1:5,000 @ A3
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

BASELINE LANDSCAPE FEATURES

02



LEGEND

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE AND CHAINAGE
- NEW DESIGNATION BOUNDARY
- NEW RETAINING WALL
- NEW ROAD CORRIDOR
- NEW CYCLEWAY / FOOTPATH
- NEW BERM
- NEW FLUSH, RAISED MEDIAN & TRAFFIC ISLAND
- FILL BATTER
- CUT BATTER
- EXISTING BRIDGE STRUCTURE
- EXISTING 1% AEP FLOOD PLAIN
- PROPOSED DRY POND
- UPGRADE CULVERT

LANDSCAPE MITIGATION KEY

a) All cut and fill slopes to be shaped to a natural profile to integrate into the surrounding natural landform. Avoid benching and geometric angles. Reinstate with grass, except areas identified on the landscape mitigation plan where it is proposed (for mitigation purposes) to reinstate private garden plantings and native vegetation that has been cleared through the Project works.

b) Larger fill slopes above W1 and the proposed dry pond (CH 100-180 and CH 320-430 respectively - plant in low maintenance native shrubs.

c) Implement localised native planting at the culvert outlet into wetland 1.

d) Reinstate private fences and garden plantings (with the exception of required properties 72C Hobsonville Road and 19 Trig Road)) for existing, remaining dwellings affected by Project works.

e) Design retaining walls and noise mitigation walls to integrate with private boundary fencing. Incorporate existing and reinstatement planting into retaining walls and noise walls.

f) For private properties required by the NoR - Land to be grassed and maintained within the road corridor.

g) Remove residual fill and gravel from construction laydown areas and reinstate with grass following the completion of Project works.

h) Reinstate the existing screen planting for the Watercare pump station site along the southern and western boundary (CH 60), within the residual land following the realignment of Trig Road.

i) Implement street tree plantings within the proposed berms of Hobsonville Road and Trig Road.

j) Configure the bioretention rain gardens and dry pond to a natural appearance, conforming to landform and future urban context. Optimise the natural appearance with shallow planted edges (native riparian species) for long term sustainability, maintenance and hydrological and ecological function.

LEGEND - EXISTING FEATURES

- TRIG ROAD ARTERIAL PROJECT AREA
- 01 RAWIRI STREAM
- 02 WETLAND 1
- 03 WETLAND 2

● APPROXIMATE LOCATION OF MIITGATION MEASURES

DATE	AUGUST 2020
SCALE	1:1000 @ A3
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

LANDSCAPE MIITGATION MEASURES

03

LANDSCAPE MITIGATION KEY

a) All cut and fill slopes to be shaped to a natural profile to integrate into the surrounding natural landform. Avoid benching and geometric angles. Reinstate with grass, except areas identified on the landscape mitigation plan where it is proposed (for mitigation purposes) to reinstate private garden plantings and native vegetation that has been cleared through the Project works.

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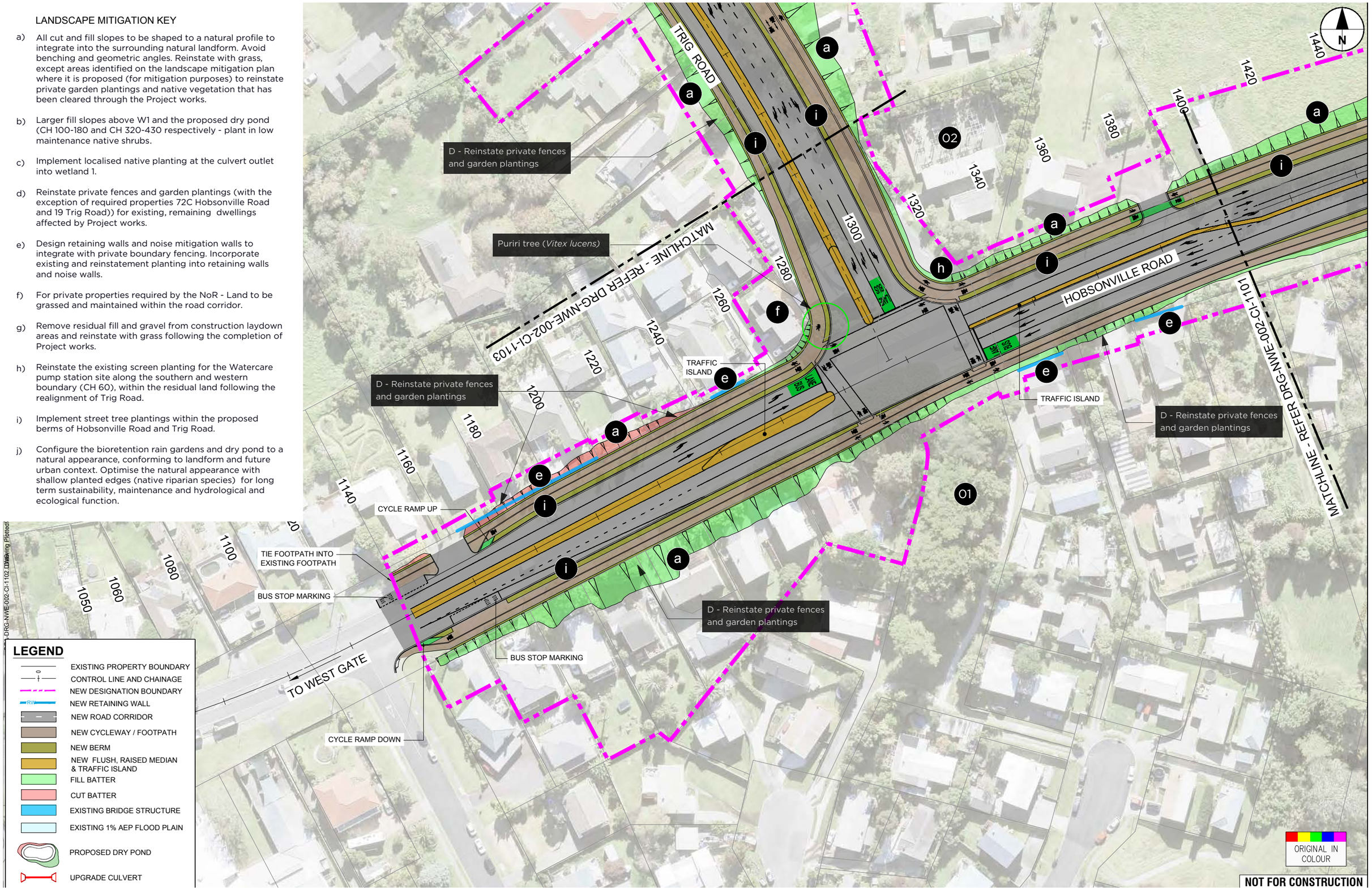

LEGEND - EXISTING FEATURES

- TRIG ROAD ARTERIAL PROJECT AREA
- 01 HILDA GRIFFIN RESERVE
- 02 WATERCARE PUMP STATION
- APPROXIMATE LOCATION OF MIITGATION MEASURES

DATE	AUGUST 2020
SCALE	1:1000 @ A3
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

LANDSCAPE MIITGATION MEASURES

04

LANDSCAPE MITIGATION KEY

a) All cut and fill slopes to be shaped to a natural profile to integrate into the surrounding natural landform. Avoid benching and geometric angles. Reinstate with grass, except areas identified on the landscape mitigation plan where it is proposed (for mitigation purposes) to reinstate private garden plantings and native vegetation that has been cleared through the Project works.

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i) Implement street tree plantings within the proposed berms of Hobsonville Road and Trig Road.

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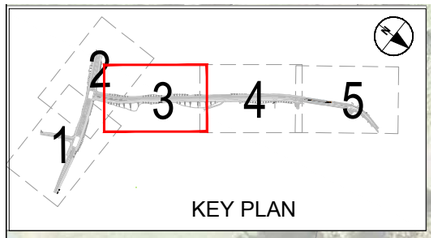
LEGEND

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE AND CHAINAGE
- NEW DESIGNATION BOUNDARY
- NEW RETAINING WALL
- NEW ROAD CORRIDOR
- NEW CYCLEWAY / FOOTPATH
- NEW BERM
- NEW FLUSH, RAISED MEDIAN & TRAFFIC ISLAND
- FILL BATTER
- CUT BATTER
- EXISTING BRIDGE STRUCTURE
- EXISTING 1% AEP FLOOD PLAIN
- PROPOSED DRY POND
- UPGRADE CULVERT



MATCHLINE - REFER DRG-NWE-002-CI-1102

MATCHLINE - REFER DRG-NWE-002-CI-1104

60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440

D - Reinstate private fences and garden plantings

NEW ACCESS TO CUL-DE-SAC

BIORETENTION RAIN GARDEN

TRIG ROAD

D - Reinstate private fences and garden plantings

WETLAND 1 ECOLOGICAL OFFSET PLANTING AREA (INDICATIVE ONLY)

TRIG ROAD DRY POND

01 02 03

ORIGINAL IN COLOUR

NOT FOR CONSTRUCTION

SGA-DRG-NWE-002-CI-1103.DWG Saving Plotted07 May 2020 7:58 AM

LEGEND - EXISTING FEATURES

- TRIG ROAD ARTERIAL PROJECT AREA
- 01 WETLAND 1
- 02 WETLAND 2
- 03 TRIG ROAD RESERVE
- APPROXIMATE LOCATION OF MIITGATION MEASURES

DATE	AUGUST 2020
SCALE	1:1000 @ A3
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

LANDSCAPE MIITGATION MEASURES

05

LANDSCAPE MITIGATION KEY

a) All cut and fill slopes to be shaped to a natural profile to integrate into the surrounding natural landform. Avoid benching and geometric angles. Reinstate with grass, except areas identified on the landscape mitigation plan where it is proposed (for mitigation purposes) to reinstate private garden plantings and native vegetation that has been cleared through the Project works.

b) Larger fill slopes above W1 and the proposed dry pond (CH 100-180 and CH 320-430 respectively - plant in low maintenance native shrubs.

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h) Reinstate the existing screen planting for the Watercare pump station site along the southern and western boundary (CH 60), within the residual land following the realignment of Trig Road.

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j) Configure the bioretention rain gardens and dry pond to a natural appearance, conforming to landform and future urban context. Optimise the natural appearance with shallow planted edges (native riparian species) for long term sustainability, maintenance and hydrological and ecological function.

LEGEND

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE AND CHAINAGE
- NEW DESIGNATION BOUNDARY
- NEW RETAINING WALL
- NEW ROAD CORRIDOR
- NEW CYCLEWAY / FOOTPATH
- NEW BERM
- NEW FLUSH, RAISED MEDIAN & TRAFFIC ISLAND
- FILL BATTER
- CUT BATTER
- EXISTING BRIDGE STRUCTURE
- EXISTING 1% AEP FLOOD PLAIN
- PROPOSED DRY POND
- UPGRADE CULVERT

KEY PLAN

MATCHLINE - REFER DRG-NWE-002-CI-1103

MATCHLINE - REFER DRG-NWE-002-CI-1105

420 440 460 480 500 520 540 560 580 600 620 640 660 680 700 720 740 760 780 800

D - Reinstate private fences and garden plantings

TRIG ROAD

INDICATIVE CONSTRUCTION LAYDOWN AREA

INDICATIVE CONSTRUCTION LAYDOWN AREA

TRAFFIC ISLAND

OFF RAMP

01

ORIGINAL IN COLOUR

NOT FOR CONSTRUCTION

SGA-DRG-NWE-002-CI-1104 Plotted: 07 May 2020 7:54 AM

LEGEND - EXISTING FEATURES

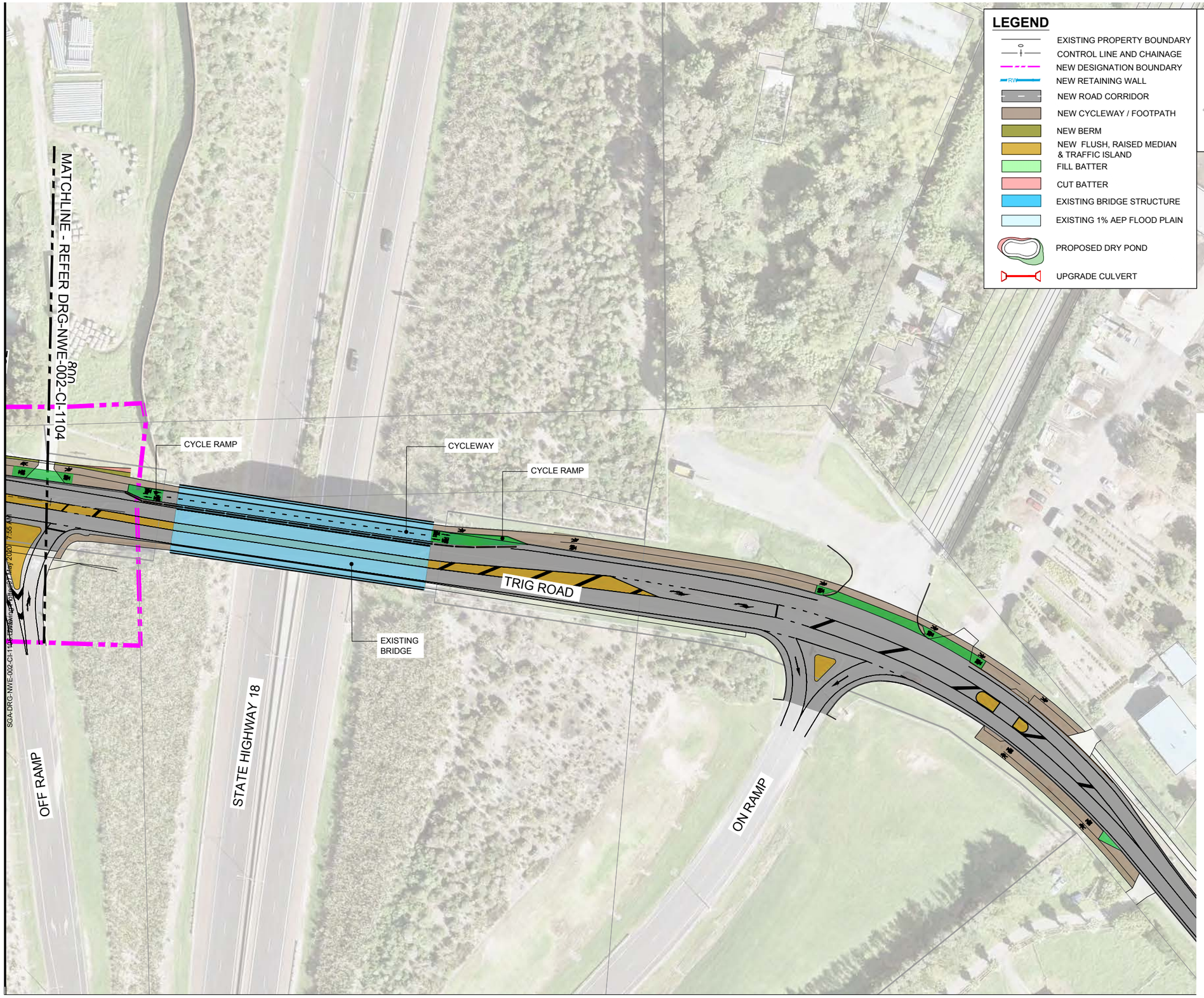
- TRIG ROAD ARTERIAL PROJECT AREA
- 01 WETLAND 2
- APPROXIMATE LOCATION OF MIITGATION MEASURES

DATE	AUGUST 2020
SCALE	1:1000 @ A3
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

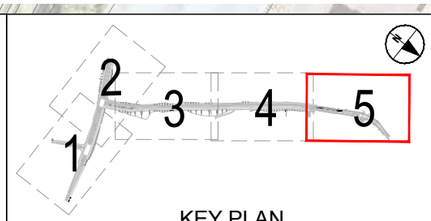
LANDSCAPE MIITGATION MEASURES

06



LEGEND

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE AND CHAINAGE
- NEW DESIGNATION BOUNDARY
- NEW RETAINING WALL
- NEW ROAD CORRIDOR
- NEW CYCLEWAY / FOOTPATH
- NEW BERM
- NEW FLUSH, RAISED MEDIAN & TRAFFIC ISLAND
- FILL BATTER
- CUT BATTER
- EXISTING BRIDGE STRUCTURE
- EXISTING 1% AEP FLOOD PLAIN
- PROPOSED DRY POND
- UPGRADE CULVERT



KEY PLAN

LANDSCAPE MITIGATION KEY

a) All cut and fill slopes to be shaped to a natural profile to integrate into the surrounding natural landform. Avoid benching and geometric angles. Reinstate with grass, except areas identified on the landscape mitigation plan where it is proposed (for mitigation purposes) to reinstate private garden plantings and native vegetation that has been cleared through the Project works.

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LEGEND - EXISTING FEATURES

- TRIG ROAD ARTERIAL PROJECT AREA
- 01 RAWIRI STREAM
- 02 WETLAND 1
- 03 WETLAND 2

APPROXIMATE LOCATION OF MIITGATION MEASURES

DATE	AUGUST 2020
SCALE	1:1000 @ A3
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

LANDSCAPE MIITGATION MEASURES

07

Representative Viewpoint Locations

VP01 - 6-8 Luckens Road
VP02 - 1 Luckens Road
VP03 - 117 Hobsonville Road
VP04 - 78 Hobsonville Road
VP05 - 1 Trig Road
VP06 - 2 Trig Road
VP07 - 2-4 Trig Road
VP08 - 89 Hobsonville Road
VP09 - 87A Hobsonville Road
VP10 / VP11 - Corner Ryan / Trig Road
VP12 - 36 Ryans Road
VP13 / VP14 - 42 Trig Road
VP15 / VP16 - 58 Trig Road
VP17 / VP18 - 64 Trig Road
VP19 / 20 - 84 Trig Road

Context

01	Hobsonville Road	05	West Harbour
02	Upper Harbour Highway SH18	06	Hobsonville
03	North-Western Motorway SH16	06	Whenuapai
04	Westgate Shopping Centre		

TRIG ROAD ARTERIAL PROJECT AREA

Representative Viewpoint Locations

DATE	AUGUST 2020
SCALE	1:10,000 @ A3
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

VIEWPOINT LOCATION PLAN

08

Proposed Hobsonville / Luckens Road intersection. Includes traffic lights and lan widening. Background pine trees to be removed.

Viewpoint Photograph 01. 6-8 Luckens Road, looking north-west towards Hobsonville Road intersection. 50mm focal length. Standing eye level.

Viewpoint Photograph 02. 1 Luckens Road, looking north-east into Hobsonville Road intersection and east down Hobsonville Road. 50mm focal length. Standing eye level.

DATE	AUGUST 2020
SCALE	N/A
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
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TRIG ROAD ARTERIAL PROJECT

VIEWPOINT PHOTOGRAPHS 01 AND 02

09

Proposed Hobsonville / Luckens Road intersection. Includes traffic lights and lane widening
Vegetation along roadside (right) to be removed.

Viewpoint Photograph 03. 117 Hobsonville Road. Looking south-west towards Hobsonville/Luckens Road intersection. 50mm focal length. Standing eye level.

Viewpoint Photograph 04. 78 Hobsonville Road. Looking south towards Hobsonville/Luckens Road intersection. 50mm focal length. Standing eye level.

DATE	AUGUST 2020
SCALE	N/A
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

VIEWPOINT PHOTOGRAPHS 03 AND 04

10

Row of trees to be removed.

Mature Puriri tree at 4 Trig Road.

Proposed Hobsonville / Trig Road intersection. Includes traffic lights and lane widening

Viewpoint Photograph 05. 1 Trig. Looking southwest towards Hobsonville/Trig Road intersection. 50mm focal length. Standing eye level.

Watercare - existing screen planting

Viewpoint Photograph 06. 2 Trig Road. Looking northwest down Trig Road. 50mm focal length. Standing eye level.

DATE	AUGUST 2020
SCALE	N/A
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

VIEWPOINT PHOTOGRAPHS 05 AND 06

11

Row of trees to be removed.

Lane widening / cycle and footpath

Viewpoint Photograph 07. 2-4 Trig Road. Looking west down Hobsonville Road. 50mm focal length. Standing eye level.

Cut slopes / driveway re-grading

Viewpoint Photograph 08. 89 Hobsonville Road. Looking southwest along Hobsonville Road. 50mm focal length. Standing eye level.

DATE	AUGUST 2020
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DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

595

TRIG ROAD ARTERIAL PROJECT

VIEWPOINT PHOTOGRAPHS 07 AND 08

12

Viewpoint Photograph 09. 87A Hobsonville Road. Looking northeast along Hobsonville Road. 50mm focal length. Standing eye level.

Viewpoint Photograph 10. Corner Ryans and Trig Road, looking southeast up Trig Road. 50mm focal length. Standing eye level.

DATE	AUGUST 2020
SCALE	N/A
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
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REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

VIEWPOINT PHOTOGRAPHS 09 AND 10

13

Viewpoint Photograph 11. Corner Ryans and Trig Road, looking northwest down Trig Road. 50mm focal length. Standing eye level.

Viewpoint Photograph 12. 36 Ryans Road, looking northeast towards Trig Road. FUZ land in the background behind pine trees. 50mm focal length. Standing eye level.

DATE	AUGUST 2020
SCALE	N/A
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DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

VIEWPOINT PHOTOGRAPHS 11 AND 12

Viewpoint Photograph 13. 42 Trig Road, looking northwest. 50mm focal length. Standing eye level.

Viewpoint Photograph 14. 42 Trig Road, looking southeast. 50mm focal length. Standing eye level.

DATE	AUGUST 2020
SCALE	N/A
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

VIEWPOINT PHOTOGRAPHS 13 AND 14

15

Viewpoint Photograph 15. 58 Trig Road, looking northwest. 50mm focal length. Standing eye level.

Viewpoint Photograph 16. 58 Trig Road, looking southeast. 50mm focal length. Standing eye level.

DATE	AUGUST 2020
SCALE	N/A
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
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REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

VIEWPOINT PHOTOGRAPHS 15 AND 16

16

Viewpoint Photograph 17. 64 Trig Road, looking north. 50mm focal length. Standing eye level.

Viewpoint Photograph 18. 64 Trig Road, looking south. 50mm focal length. Standing eye level.

600

DATE	AUGUST 2020
SCALE	N/A
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
DRAWN BY	K. HOLYOAKE
REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

VIEWPOINT PHOTOGRAPHS 17 AND 18

17

Viewpoint Photograph 19. 84 Trig Road, looking north. 50mm focal length. Standing eye level.

Viewpoint Photograph 20. 84 Trig Road, looking south. 50mm focal length. Standing eye level.

DATE	AUGUST 2020
SCALE	N/A
PROJECT ID	NORTH-WEST HIF NOR AND CONSENTING
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REVISION	FINAL R6

TRIG ROAD ARTERIAL PROJECT

VIEWPOINT PHOTOGRAPHS 19 AND 20