



Airport to Botany Rapid Transit / 20Connect

Joint Consenting Strategy

Waka Kotahi NZ Transport Agency and NZ Transport Agency

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Glossary of abbreviations

Abbreviation	Term
20Connect	SH20/SH20A/SH20B improvement works
A2B	Airport to Botany
AC	Auckland Council
AUP(OP)	Auckland Unitary Plan (Operative in Part)
AIAL	Auckland International Airport Limited
AMETI	Auckland Manukau Eastern Transport Initiative
AT	Auckland Transport
CMA	Coastal Marine Area
CPTED	Crime Prevention Through Environmental Design
NDC	Network Discharge Consent
NOR	Notice of Requirement
RCA	Road Controlling Authority
RMA	Resource Management Act 1991
RTN	Rapid Transit Network
RTC	Rapid Transit Corridor
SH(#)	State Highway (number)
SSBC	Single-Stage Business Case
SUP	Shared Use Path
SWG	Southwest Gateway Programme
Waka Kotahi	Waka Kotahi NZ Transport Agency
TTMP	Temporary Traffic Management Plan

1 Executive Summary

This is a joint Consenting Strategy that supports separate single stage business cases (SSBC) for the Airport to Botany Rapid Transit (A2B) and 20Connect projects. Both projects form part of the Southwest Gateway Programme (SWGP).

Southwest Gateway Programme

The SWGP through the combination of key transport projects, seeks to provide improved transport connections to Auckland Airport from South and East Auckland, by delivering:

- A2B – Bus Rapid Transit connecting Botany Town centre to Auckland Airport via State Highway 20B, Puhinui Road, Manukau City and Te Irirangi Drive.
- State Highway Improvements (20Connect) – widening of SH20 & SH20A corridors
- Auckland Airport Precinct Improvements – Transport corridor improvements to accommodate A2B including reviewing capacity of the Pūkaki Creek Bridge

This work will result in better public transport, walking and cycling facilities, improved safety, improved reliability and efficiency of freight and vehicles. Benefits involve improved access to jobs, education and social opportunities, supporting economic prosperity and provide health, cultural and environmental benefits.

The four Programme Partners for the SWGP are Te Ākitai Waiohū, Waka Kotahi NZ Transport Agency (Waka Kotahi), Auckland Transport (AT) and Auckland International Airport (AIAL) (collectively referred to as ‘the Programme Partners’). This consenting strategy covers the Waka Kotahi and AT elements of the SWGP.

The SWGP is to be sequentially delivered over the next 20 years (staged over five project horizons). The consenting strategy (summarised in **Figure 1**) aligns with the proposed delivery programme and is split between **Part 1 – A2B & Part 2 – 20 Connect**.



Figure 1: Parts of the Consent Strategy



Part One: Airport to Botany Rapid Transit, between Botany Town Centre and Auckland Airport Precinct

For this section of A2B, the recommended planning pathway is:

- To authorise via Notice of Requirement (NoR) with AT as the Requiring Authority and associated regional plan resource consents;
- Lodge as a single, integrated application consisting of NoR packages that reflect staged service delivery while enabling management of procedural risk (i.e. appropriately distributing network benefits and adverse effects etc);
- Lodged in parallel with:
 - AIAL's Precinct Improvements resource consent application(s); and
 - Alteration to the Waka Kotahi designations to accommodate the widened SH20B state highway corridor and the overlap of the SH20B and SH20 designations for SH20B to SH20 ramp; and
- Via the 'traditional approach' RMA application process determined by the territorial authority (Auckland Council). With an option to utilise Direct Referral to the Environment Court if deemed appropriate and opportunities to hold a joint hearing with all programme partners applications.

Other Approvals and Significant Stakeholder Engagement:

- An Archaeological Authority could be sought on a precautionary basis because of proximity to scheduled items like Cambria Cottage at 252 Puhinui Road which may be pre-1900.
- Impacts on private property –
 - Property acquisition – A2B involves substantial property impact (including 129 full and 272 partial land acquisitions); and
 - Third party consents will need to be altered and/or obtained.
- Potential s177 RMA approvals from other requiring authorities including the Ministry of Education, Minister for Tertiary Education, Skills and Employment for AUT, Transpower, AIAL and Wiri Oil Services Limited.

Key Planning and Environment Risks and Opportunities:

- Opportunity for programme partners and Mana Whenua to mitigate the cultural effects associated with the impact of the A2B corridor particularly on Pūkaki Creek and within the wider Puhinui Precinct;
- Funding – the project is currently unfunded. Advancing NoR(s) involving property take without at least funding for some property acquisition for route protection is both a PWA process and an RMA financial responsibility risk; and
- Third party assets – Transpower pylon on Te Irirangi Drive that will need relocation (and associated asset owner / Transpower statutory approvals).
- Puhinui Precinct - the 'Puhinui Heritage Gateway', which includes the State Highway 20B Designation, allows for a 40m yard setback on the southern side and northern side of the designation for future transport requirements. This is both an opportunity and a risk because:
 - o If a NoR is not lodged by 1 January 2023 for a future transport corridor, the yard adjoining State Highway 20B shall be reduced to 10 metres allowing development within the proposed A2B corridor potentially increasing the complexity and cost of property acquisition.
 - o The yard can be challenged through the resource consent process increasing the case for urgency for route protection.
- Partnership – An opportunity to achieve integration with the Airport Precinct and demonstrate a 'one-network' to the statutory decision-makers (via integrated engagement, authorisation and delivery).

Part Two: 20Connect (including SH20 and SH20A, excluding SH20B)

The recommended planning pathway is:

- Without a short or mid-term need to deliver the 20Connect, authorising the project with such significant property acquisition and environmental (including cultural) impacts is high risk, and likely contentious given the challenges justifying property acquisition in the immediate or near term. Authorisation (irrespective of the planning tool and process) in the near term is not recommended;
- Unless the project delivery horizon is significantly accelerated (to a short or mid-term), the RMA framework (tools and processes to authorise the project) may have fundamentally changed by the time these aspects of 20Connect progress to pre-implementation (potentially second or third decade); and
- If a decision was made to advance the project in the near term the recommended pathway is an integrated NoR and regional plan application processed by the 'traditional approach' RMA application process determined by the territorial authority (Auckland Council).

Other Approvals:

- Archaeological Authority – an authority would be necessary given the relationship to Ngā Kapua Kohuora / Crater Hill on SH20.

Significant Stakeholder Engagement

- Impacts on private property;
- Property acquisition – including full and partial acquisition (including residential property and landscaping, vehicle access, car-parking and loading / servicing of commercial property);
- Third-party consents will need to be altered and/or obtained; and
- Potential s177 RMA approvals from other requiring authorities.

Key Planning and Environment Risks and Opportunities:

- Opportunity for programme partners and Mana Whenua to mitigate the cultural effects associated with the impact of the proposed 20Connect improvements particularly on Ngā Kapua Kohuora / Crater Hill and Tararata Creek;
- Potentially significant effects relating to the CMA, impacts on social infrastructure (such as parks, schools and reserves) and heritage;
- Potential to cause adverse effects on natural character due to the proximity of several identified landscapes and features, including Tararata Creek and Ngā Kapua Kohuora / Crater Hill. Ngā Kapua Kohuora is subject to an Outstanding Natural Feature Overlay and is currently impacted by the design;
- Changes to the focal point Regionally Significant Viewshaft M4 toward Mangere Mountain due to the south facing ramp from SH20A to SH20;
- Significant Ecological Area (SEA_M2) along parts of the coastal areas of SH20. The Project requires the crossing of and/or interaction with the CMA at the northern extent of the Project, near Mangere Bridge and Tararata Creek;
- Archaeology – there is significant potential for archaeological material within the project area (the portion of SH20 between Puhinui Road and Massey Road runs through the extent of Ngā Kapua Kohuora / Crater Hill); and
- There is risk of further development of the residential and commercial land adjacent to the state highway corridor in the period between 2020 and project delivery (second or third decade).



2 Introduction

2.1 Overview and Structure of the Consenting Strategy

The Southwest Gateway Programme is an overarching collection of transport projects being progressed by investment partners comprising Te Ākitai Waiohū, Waka Kotahi NZ Transport Agency (the Waka Kotahi), Auckland Transport (AT) and Auckland International Airport (AIAL) (collectively referred to as 'the Programme Partners').

The purpose of the programme is to create a well-connected, efficient transport system that provides choice and reliability for how people and freight travel through southwest and southeast Auckland, including to, and from, the Auckland Airport. Two of the cornerstone projects of the programme are:

- Airport to Botany (A2B) - the AT component comprising high frequency public transport provision between Botany and the Airport; and
- 20Connect - the Waka Kotahi component comprising the State Highway (SH) network in the south west of Auckland (SH20, SH20A and SH20B).

The Consenting Strategy is a key component of the joint single stage business case ('SSBC') which integrates both the A2B and 20Connect projects. The strategy takes a 'chapters approach' to be able to reflect both the differentiation and inter-relationship of the two projects predominantly state highway and public transport improvements.

The Consenting Strategy is made up of two parts (Figure 2) illustrating each Project's extent, the forecasted delivery timeframes and recommended consenting pathways.

PART ONE – A2B from Botany Town Centre to the Airport via Puhinui Road Interchange with SH20 / SH20B

PART TWO – 20Connect (SH20 and SH20A)

The key components of each Part of this Consenting Strategy are identified as:

- An overview of the scope, location and objectives of the Project as it has evolved through the business case process;
- Outcomes of the Preliminary Environmental Assessments (PEAs) based on the current state of the design (including development of the Environmental Social Responsibility (ESR) screen as relevant to 20Connect only);
- Identification of the dependencies between the consenting pathway, the design development, property acquisition and engagement strategy;
- Identification of the suite and scope of the RMA approvals and other statutory approvals required;
- A recommended approvals pathway for the Project; and
- Identification of design issues and technical reporting required to support applications for RMA approvals.



Figure 2: Parts of the Consent Strategy

2.2 Overview of the Southwest Gateway Programme

Population and employment growth in future urban areas, particularly in the south around Drury, Pukekohe, Paerata and Takanini¹, will lead to increased demand on the network in the future. In addition, current services do not meet people's needs, limiting access, choice and the uptake of public transport.

In November 2017, work was completed on a Programme Business Case (PBC) which outlined a high-level programme for improving access to the Auckland Airport – the Southwest Gateway was the outcome of the PBC.

The Southwest Gateway is a programme of three key transport projects:

- 20Connect (widening SH20 and SH20A);
- Airport to Botany Rapid Transit (Bus Rapid Transit corridor); and
- Auckland Airport Precinct Improvements.

The SWGP (Figure 3), through these combined projects, seeks to provide a well-connected, efficient transport system with better public transport and walking and cycling facilities, improved safety, reliability and efficiency of freight and vehicles. This will improve access to jobs, education and social opportunities, support economic prosperity and provide health, cultural and environmental benefits.

¹ The Future Urban Zone (FUZ) in the AUP has been extended south to provide further development in areas, including Pukekohe, Drury, Paerata and Takanini. The FUZ is applied to greenfield land that has been identified as suitable for urbanisation. The FUZ is a transitional zone and will remain in place until a structure plan and concurrent plan change re-zones the land to the appropriate urban zone (e.g. residential or business). Land may be used for a range of general rural activities but cannot be used for urban activities until the site is re-zoned for urban purposes.

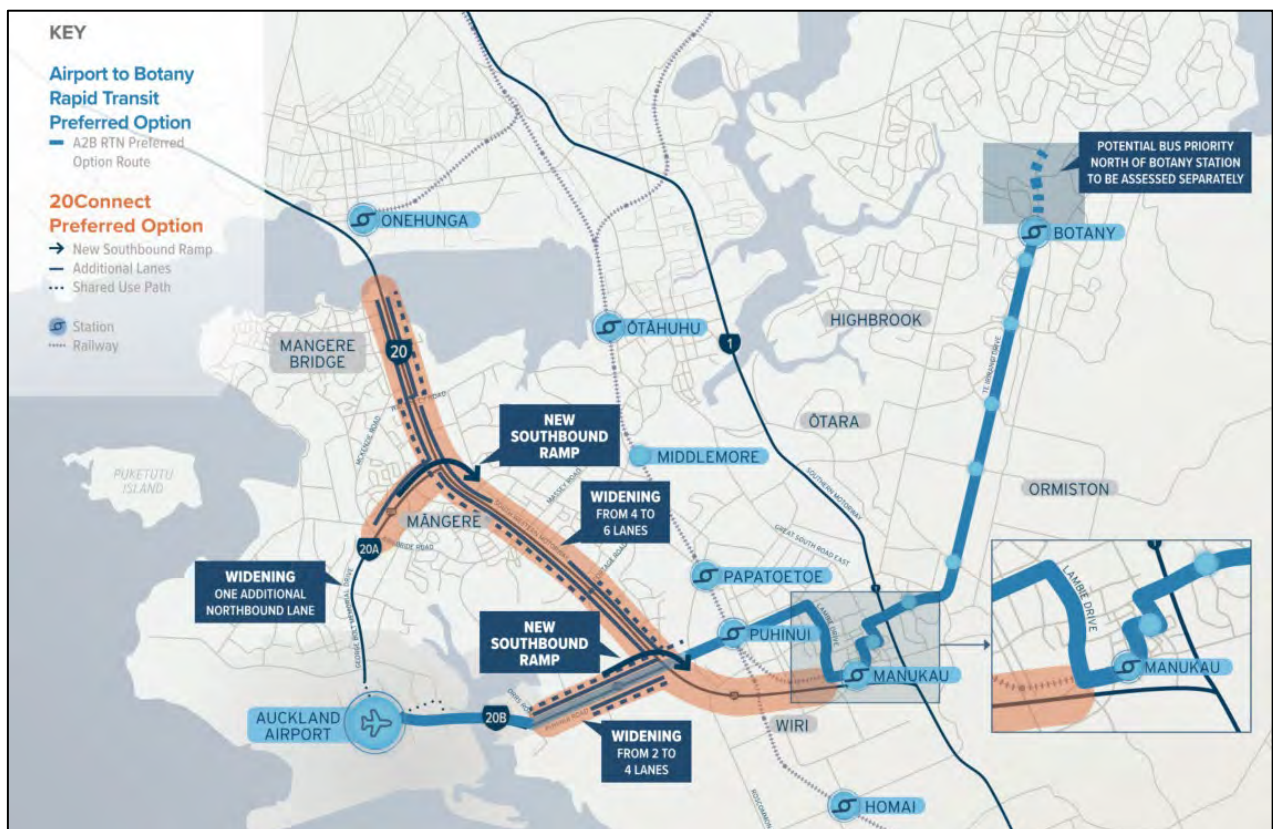


Figure 3: Key Deliverable Components of the Southwest Gateway Programme

2.3 Purpose of the Consenting Strategy

The purpose of the Consenting Strategy is to outline the Resource Management Act 1991 (RMA) approvals and other necessary approvals (which may be required under different legislation) for the A2B and 20Connect projects as part of the SWGP.

This Consenting Strategy considers the available pathways to achieve the approvals associated with each of the Parts with the aim of providing a recommended approach for obtaining the required approvals for the construction, operation and maintenance of the Projects.

The Consenting Strategy has been prepared having regard to the supporting specialist technical assessments undertaken to date, and in the case of the 20Connect project, the ESR screen. It also considers the existing planning framework, including existing designations and the provisions of the Auckland Unitary Plan – Operative in Part 16 November 2016 (AUP).

It is recognised that this Consenting Strategy is a living document that has been developed at the SSBC phase and it should be revisited, reviewed and updated (as required) by the Programme Partners once the Projects, or elements of the Projects progress to the pre-implementation phase (i.e. property acquisition and RMA consenting).

AIAL is developing a Consenting Strategy for the A2B element within the Airport Precinct and will sit alongside this Consenting Strategy.

A Stakeholder Engagement and Communications Plan, Māori Engagement and Property Acquisition Strategies have also been developed for the Projects. These strategies are referred to in the Consenting Strategy where appropriate as there is an acknowledged relationship between these documents.

2.4 Project Horizons

The Southwestern Gateway programme consists of five delivery horizons detailed below. A breakdown of the individual elements for each Part of this strategy and how they align with the delivery horizons is provided at **Appendix A**.

2.4.1 Horizon 1 - Short Term Airport Access Improvement Programme

This horizon is mostly consented (bus priority between Puhinui Station and Manukau Station to be consented) and elements are under construction and will be delivered by early 2021 (see Figure 4). AT will deliver the upgrade of the Puhinui Station, bus priority lanes, new and upgraded intersections along Puhinui Road and Lambie Drive. Waka Kotahi will deliver SH20B short-term improvements² (as approved by the Minor Alteration to Designation 6717 SH20B (approved 27 August 2019)).

The SH20B road corridor will be wider (accommodating two new priority traffic lanes primarily for bus usage (one lane in each direction)); comprise a Shared Use Path (SUP) along its length; the SH20B / Memorial Gardens intersection will be signalised; the intersection with Campana Road will be signalised and have a fourth arm added and there will be a new SUP bridge extending over Waokauri Creek.

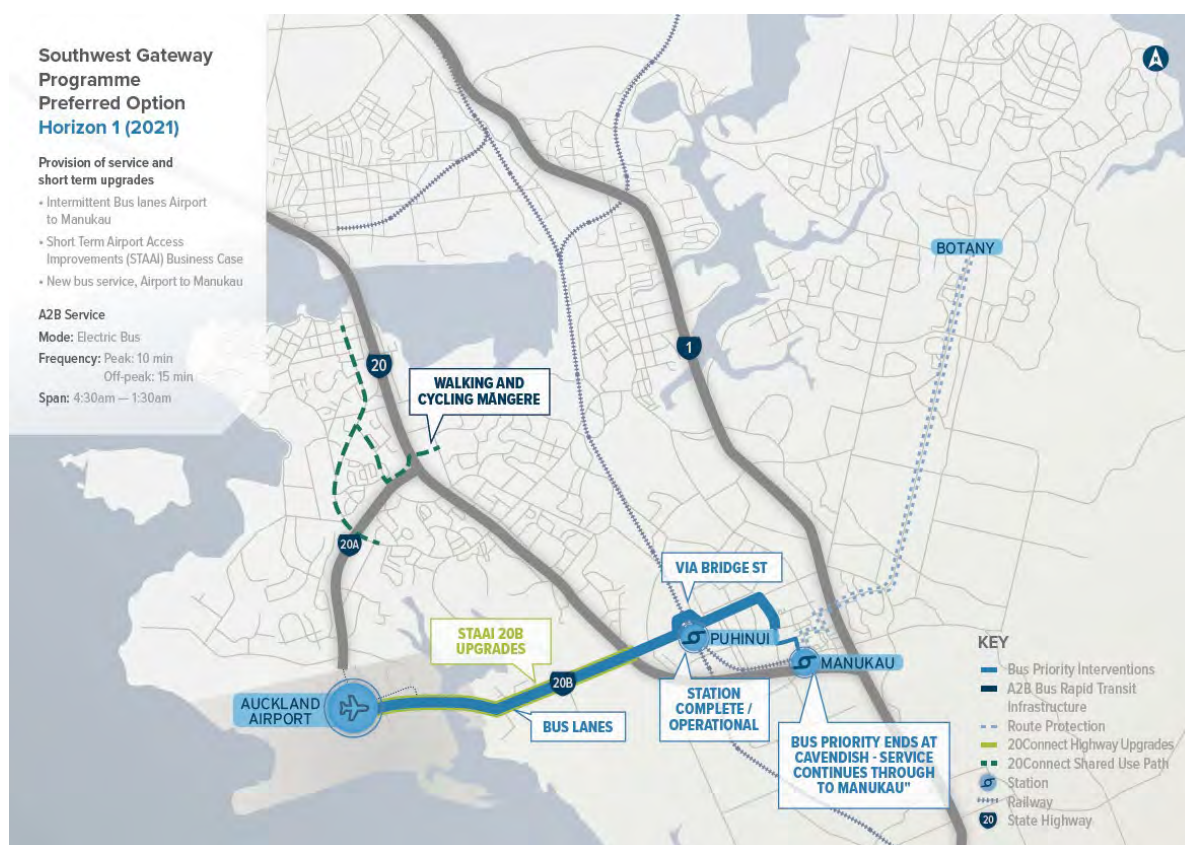


Figure 4: Horizon 1 Short Term Airport Access Improvement Programme

2.4.2 Horizon 2 - Medium Term Airport Access Improvement Programme

The improvements proposed as part of Horizon 2 are identified in Figure 5. AT are to deliver by 2025 bus priority improvements with interim bus stations between Botany and Manukau. Botany Station is to be

² These works will proceed in accordance with the Minor Alteration to Designation 6717 SH20B (approved 27 August 2019), and the consents approved 26 November 2019 (BUN60341597 (NZTA) - LUC60341682 (s9 land use consent), CST60341598 (s12 coastal permit), LUS60341681 (s13 streamworks consent), WAT60341680 (s14 water permit), DIS60341871 (s15 stormwater permit), DIS60341599 (s15 contaminants permit); and BUN60341644 (AIAL) LUC60341646 (s9 land use consent), LUS60343635 (s13 streamworks consent), DIS60341645 (s15 stormwater permit).

constructed as a part of the Auckland Manukau Eastern Transport Initiative (AMETI) Eastern Busway Alliance (EBA). This horizon includes a section of RTN in central Manukau (Ronwood Avenue and Davies Avenue)

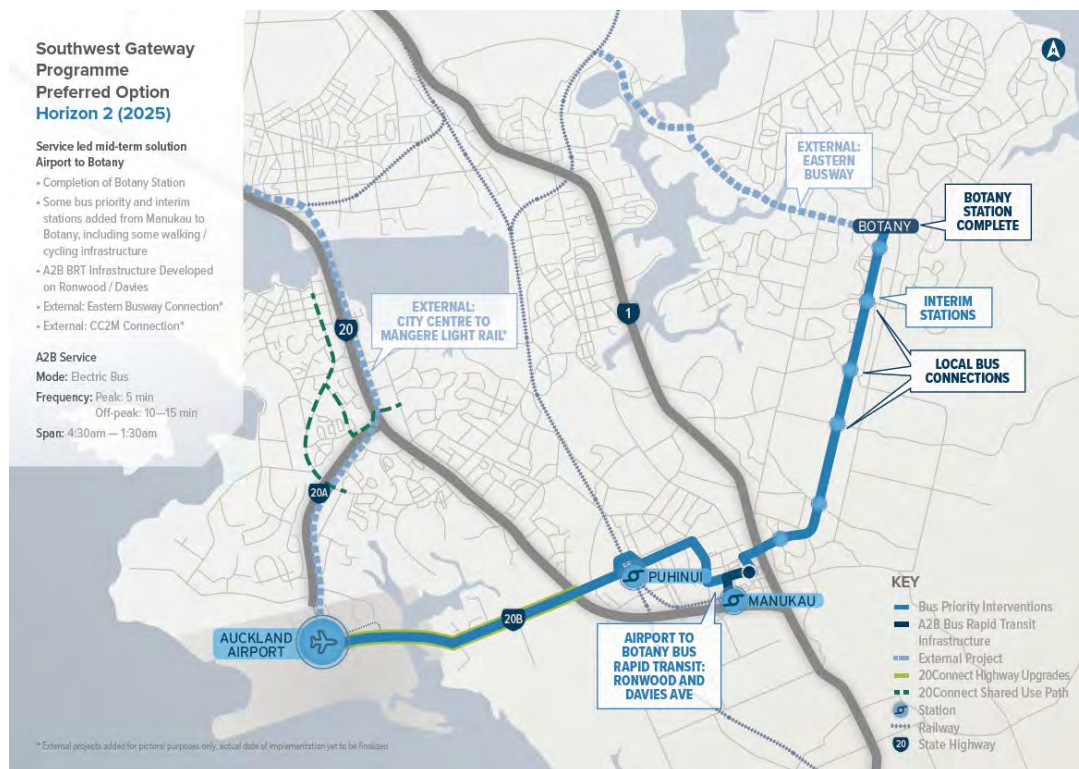


Figure 5: Horizon 2 Medium Term Airport Access Improvement Programme

2.4.3 Horizons 3, 4 and 5 - Long Term Airport Access Improvement Programme

AT will complete the bus rapid transit network between Botany and the Auckland Airport Precinct between 2030 and 2035 (Figures 6, 7 and 8). This work includes a new southbound SH20B to SH20 ramp and A2B station improvements. This work is programmed to be completed in stages with the final stage (SH20 upgrades) to be constructed by 2040.

Southwest Gateway Programme Preferred Option Horizon 3 (2030)

Description

- 20Connect 20B upgrades
- Corridor developed further around Manukau
- New bridge across rail at Puhinui, diverted from Bridge Street

A2B Service

Mode: Electric Bus

Frequency: Peak: 5 min
Off-peak: 10–15 min

Span: 4:30am – 1:30am



Figure 6: Horizon 3 Long Term Airport Access Improvement Programme Extent

Southwest Gateway Programme Preferred Option Horizon 4 (2035)

Airport to Botany Preferred Option Implemented

- Final corridor around Puhinui, and between Manukau and Botany
- New stations to accommodate final corridor between Manukau and Botany, and station access improvements completed

A2B Service

Mode: Double Articulated E-Bus

Frequency: Peak: 3 min
Off-peak: 10–15 min

Span: 4:30am – 1:30am

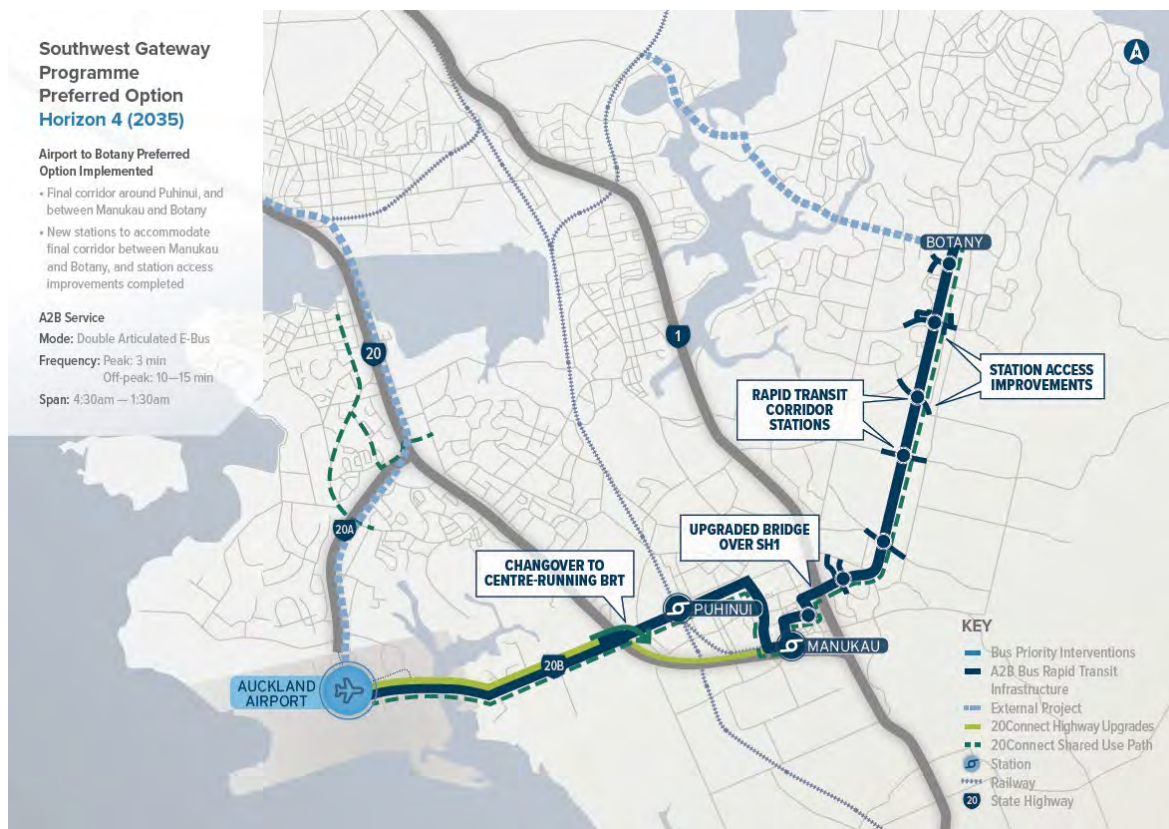


Figure 7: Horizon 4 Long Term Airport Access Improvement Programme Extent



Figure 8: Horizon 5 Long Term Airport Access Improvement Programme Extent

2.5 Common Assumptions

The following assumptions are common to all aspects of the SWGP, and are therefore not repeated in Parts One and Two of this document:

- The Programme Partners will work together and enter into a separate agreement which will set out the agreed service functionality both within and beyond the Airport environs and agree project delivery / contractor procurement / ongoing asset maintenance and cost share arrangements;
- The four Programme Partners are working together in relation to a review of the multi-modal capacity of the Pūkaki Creek Bridge.
- Timing of the project and associated approvals will be aligned where possible. For instance, the resource consents for the Auckland Airport precinct improvements will be sought by AIAL at the same time as the AT Notice of Requirement(s) (NoR) for the RTN and Waka Kotahi alterations to State Highway designations;
- Botany station will be delivered by the Eastern Busway Alliance;
- Work has already commenced on various aspects of the SWGP short term works.
- Where possible works will occur within the existing road corridors to avoid the need to designate and acquire land; and
- It will be beneficial to implement the project in stages, as detailed in the project horizons.

2.6 Requiring Authority Status

AT is a network utility operator and is deemed to be approved as a Requiring Authority pursuant to s167 of the RMA for the purposes set out in s47 of the Local Government (Auckland Council) Act 2009 (LGA). The functions of Auckland Transport are stated under s45 of the LGA and s47 details how AT is deemed to be approved as a requiring authority (attached as **Appendix G**).



Waka Kotahi also has Requiring Authority status as a network utility operator pursuant to s167 of the RMA. Waka Kotahi has the ability to designate for State Highway purposes and AT for local roads and public transport purposes. The relevant requiring authority will be the organisation that would have financial responsibility for the works.

The Waka Kotahi and AT will work together to deliver the SWGP particularly on sections with overlapping infrastructure. Therefore, within each section of the consent strategy, a recommendation is made on who the requiring authority should be on which section of the corridor.

2.6.1 The role of Auckland International Airport Limited

AIAL is a Requiring Authority under Section 167 of the RMA for the operation, maintenance, expansion and development of Auckland Airport. AIAL is also a Road Controlling Authority under the Land Transport Act 1988 and owns and maintains the majority of the roads within the Airport Precinct.

This Consenting Strategy only addresses the delivery of these improvements up to the AIAL designation³ boundary (near Orrs Road). While the SWGP covers an area that extends into land west of Orrs Road (within the Airport) and requires a number of interventions and access improvements to facilitate the success of SWGP (including reviewing capacity in relation to Pūkaki Creek Bridge, crossing the CMA).

This consent strategy assumes that the approvals required to authorise the upgrades for A2B (Part 1 of this Strategy) will be sought concurrently with those required by AIAL and the programme partners will endeavour to hold a joint hearing for the applications associated with A2B.

2.6.2 The role of Te Ākitai Waiohū

The programme area covers the Puhinui Precinct which is of high cultural value to Mana Whenua, in particular Te Ākitai Waiohū. To reflect the significance of the area to Te Ākitai Waiohū, the Southwest Gateway Programme is based on a strong strategic partnership between four Programme Partners: Te Ākitai Waiohū, AT, Waka Kotahi and Auckland Airport.

Te Ākitai Waiohū are the owners of Pūkaki and Waokauri Creeks (which includes areas of Māori Reservation). Those areas are highly significant to Te Ākitai Waiohū. Te Ākitai Waiohū also has a longstanding involvement in the area's development, including in the Puhinui Structure Plan and as a signatory party to the significant Eastern Access Agreement (1991), which agreed that the form of the Pūkaki Creek Bridge would remain as a two-lane bridge in perpetuity. Those matters are being worked through in a respectful manner and the spirit of partnership and collaboration between the four programme partners.

Te Ākitai Waiohū have a significant role in developing A2B's way forward in the route protection phase particularly in relation to:

- reviewing the multi modal capacity of Pūkaki Creek Bridge.
- inputting into the different assessments to inform the integrated NoR application.
- helping to further refine the components of the scheme (with a particular focus on the Puhinui precinct and the Pūkaki Creek).

2.7 Approval Types and Pathways Available

This section outlines the approval types assessed that are currently available under the RMA and the potential pathways for obtaining the necessary approvals for the A2B and 20Connect projects. They are referred to in each of the subsequent sections of this document.

³ Identified as Designation 1100 in the AUP.



2.7.1 Approval Types

The range of approval types considered are those currently available under the RMA and include Notice of Requirements (NoR), alterations to existing Designations, Outline Plan, Resource Consents and Plan Changes. Specific combinations considered in detail include:

- NoR only (without other statutory approvals)
- A single NoR and Regional Resource Consent package lodged as an integrated application;
- Multiple NoRs and Regional Resource Consents lodged as separate integrated (NoR and Regional Consent) packages (i.e. this may include a comprehensive NoR for the A2B RTN and / or 20Connect and separate NoRs for the interchanges or a staged NoRs based on the priority of various project components);
- Staged NoRs based on the priority of various Project components;
- A Resource Consent Package and Outline Plan (including potential alterations and/or minor alterations to existing NoRs);
- Resource Consents only; and
- Plan Change(s) (including the streamlined planning process).

NoR Considerations

The primary benefit of a designation is that it cannot be altered by any other party, unlike provisions of a plan. The outline plan process also allows for greater flexibility into the future than a granted resource consent, by allowing some of the details of the project or works to be left to a later stage. In addition, this approach maximises the requiring authority powers for route protection and gives long-term operational benefits.

The design of the Project should be of sufficient detail to justify the extent that the area is reasonably necessary for the NoR and to enable its environmental effects to be appropriately assessed.

There are components of the Project that may be aligned with other project work by AT which overlap within the Project area such as the Eastern Busway and is programmed to be alongside the project.

An additional consideration for a NoR is to obtain approval for a route protection only NoR (without other Statutory approvals). This is an approach that has been used where the public work isn't proposed in the short-midterm. This approach has been used to protect land for a public need in areas of high growth where critical infrastructure is required.

A number of property owners and/or occupiers would be affected by the Southwest Gateway Programme and likely subject to a NoR and/or alteration to an existing state highway designation. Accordingly, a robust alternatives assessment would need to be completed to meet the requirements of s171(1)(b)(i) of the RMA. This assessment would be based on the options assessment and technical reporting undertaken to date, which has been developed to support the long-list and short-list assessments and any further assessment work undertaken during the future pre-implementation phase.

Resource Consent Considerations

The resource consent process provides authorisation for certain activities or particular uses of natural and physical resources associated with the construction and operation of the Project. Designations will supersede the resource consent requirements under section 9(3) of the RMA, however, resource consent requirements will need to be assessed against any relevant national environmental standards and regional plan provisions.

The Project area is regulated by the AUP, which contains the planning provisions for development within the Auckland region. Where the project is located within the existing road corridor, the AUP largely enables the project from a land use perspective as roads (excluding state highways) are unzoned. However, there are a number of sections along the project route that require work to occur outside of the existing road corridor including corridor widening, associated works and these will not be in accordance with the AUP.



While a land use resource consent could be used as a route protection method to inform property acquisition, this is not considered as favourable as the NoR process, given it is not as transparent or certain for the public (i.e. not easily identifiable in the District Plan overlays), and expiry dates may not be long enough for the project duration which is anticipated to extend across multiple decades. Not as much control is retained, in comparison to a NoR where the Requiring Authority is the decision maker and has more control with conditions and prevents other works from occurring in the NoR/Designation.

An indicative summary of key AUP provisions is contained in **Appendix D**. The list of AUP provisions is not comprehensive and will need to be reviewed and updated as the detailed design develops.

Resource consents may also be required under the National Environmental Standards. Those standards of relevance to the Southwest Gateway Programme at the time of writing:

- National Environmental Standard for Assessing and Managing Contaminants in Soils to Protect Human Health 2011 ('NES: Soil');
- National Environmental Standard for Air Quality 2004; and
- National Environmental Standard for Electricity Transmission Activities 2009 ('NES: ETA').

Plan Change Considerations

The plan change process can be used to authorise a project. However, the Project Partners would only consider this process if an element of the project could not be considered through the AUP thus requiring a plan change.

Objective and Policy Considerations

The following provides a high-level summary of the relevant provisions in the following statutory policy statements and plans:

- New Zealand Coastal Policy Statement (NZCPS);
- National Policy Statement for Freshwater Management (NPSFM);
- National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES_{soil}); and
- Auckland Unitary Plan Operative in Part, 15 November 2016 (AUP).

These objectives and policies are assessed in more detail in **Appendix I**.

2.7.2 Approvals Pathway

There are four RMA approvals processing options available to AT for obtaining the necessary NoR and resource consents for A2B. These options are:

- Determination by the Consent Authority (Auckland Council);
- Determination by a Board of Inquiry through a proposal of national significance call-in process; and
- Direct referral to the Environment Court.

The pathways have been comprehensively assessed in Table 1 below. The pathway recommendations for A2B and 20Connect are detailed in the following sections.



Table 1: Advantages and disadvantages of the processing (pathways) options

Pathway / Process Option	Advantages	Disadvantages / Risks	Opportunities / mitigation
Determination by Consent Authority (Auckland Council)	In terms of the NoR the Requiring Authority is the decision-maker. Enables greater Auckland Council interaction in addressing key project risks and conditions. Maintains collaborative approach to refining key aspects of the design with partners, landowners, stakeholders, third parties and local community (and promote transparency and retain reputation). Statutory timeframes dictate the processing period for resource consents (but this is contingent on many factors) this excludes the NoR however. Approach will facilitate smoother project implementation with common understanding on meaning and intent of conditions. Some limited prospect of this process being quicker than the 'one stop shop' options (described below), provided the decision is not appealed to the Environment Court. Maintains the 'second-shot' appeal process at achieving outcomes if a negative decision or conditions (resource consent) are received. A perception of a 'friendlier' environment, that is more accommodating and considerate towards local communities	Decision can be appealed to the Environment Court, impacting programme timeframes (up to 18 months from lodgment) and delaying the project.	If appealed to the Environment Court, the hearing would be limited to the resolution of outstanding issues rather than rehearing all submitter issues making a more efficient process. Allows time prior to Council hearing to resolve submitters issues helping to ensure an efficient hearing process.
Proposal of National Significance	A fast process provides a clear pathway and associated timeframe certainty (a defined timeframe of nine months) for process and determination of a proposal following notification.	A decision will be made by the Board of Inquiry or Judge, rather than a recommendation. Should this route be adopted, the matter could instead be referred to the Environment Court, and consequently,	The opportunity to develop a comprehensive application that encompasses all approvals.



Board of Inquiry decisions can only be appealed to the High Court on points of law.

it would not provide the certainty and timeliness for decision-making (i.e. there is no nine-month processing timeframe).

Projects before a Board of Inquiry should have a certain level of design detail, which means all required approvals are usually submitted together (e.g. NoR and associated regional consents for the full Project scope/extent).

Management of risks would be required given these processes are more challenging for laypeople to be involved with. It typically requires a higher level of expertise and financial investment to be involved in them than the standard Council process and this has the potential to damage relationships with stakeholders and mana whenua.

Direct referral to the Environment Court

Streamline decision-making for large scale and/or complex applications which are likely to be appealed following a Council hearing and decision.

Provides time and cost savings to both the applicant and submitters who would otherwise lodge applications with the relevant consent authority.

Appeals to the High Court may only be sought on points of law which would be beneficial for any contentious issues that are unlikely to be resolved.

All submissions would need to be dealt with through the Environment Court, rather than the process being limited to the resolution of outstanding issues only.

Can be an efficient process if Council support direct referral. However, no decision certainty is provided when a decision would be made by the Court rather than a recommendation.

Lesser opportunity to negotiate with submitters and the decision maker in comparison to that typically experienced through the Council process.

The Environment Court process is more challenging, resource and time intensive for laypeople to be involved with. It typically requires a higher level of expertise and financial investment to be involved in and this has the potential to damage relationships with stakeholders and Mana Whenua.

A comprehensive engagement strategy could assist in reducing concerns / submissions from the general public and directly affected parties



3 PART ONE - Airport to Botany Rapid Transit

3.1 Project Summary

3.1.1 Context

This combined section of the Consent Strategy encompasses aspects of both the 20Connect and A2B Projects. It includes the area from Botany to the Puhinui Interchange with SH20 and the SH20B corridor, the continuation of the A2B from Puhinui Road to the Airport and the associated necessary state highway improvements.

A2B will consist of the following elements (summarised in Appendix A):

- A dedicated Rapid Transit Corridor from Auckland International Airport to Botany via:
 - Te Irirangi Drive (entire length)
 - Great South Road (between Te Irirangi Drive and Ronwood Ave intersections)
 - Ronwood Ave (From Great South Road to Davies Ave intersections)
 - Davies Ave (entire length)
 - Manukau Station Road (from Lambie Drive to Davies Ave intersection)
 - Lambie Drive (From Manukau Station Road intersection to Puhinui Road)
 - Puhinui Road (from Lambie Drive to SH20 / SH20B interchange)
 - State Highway 20B (Centre-running and Alongside corridor)
- The A2B cross section will incorporate improved walking and cycling facilities along each side of the corridor.
- Rapid transit overbridge at Puhinui Station over the rail corridor, stations between Manukau Train / Bus station and Botany Town Centre, and an upgraded bridge over SH1 to accommodate the wider road corridor.
- The widening of SH20B Corridor for a 4-lane expressway, the A2B RTN, and walking/cycling facilities.
- A2B RTN on Puhinui Road, east of the Puhinui Interchange would be primarily located in the central median (except where it travels along Davies Avenue). Through the Puhinui Interchange onto SH20B the RTN remains centre running until the intersection with Memorial Gardens where it is able to move to the southern edge;
- An upgraded Puhinui motorway interchange, including a new southbound ramp from SH20B to SH20 to remove those southbound movements from the Puhinui Interchange in order to accommodate the RTN through the interchange;
- In addition to the elements identified above, the early deliverables from Horizon 1 (detailed in Section 2.3) support the development of the A2B RTN but are not discussed further in this strategy.

The SH20B section of the project corridor is highly sensitive. It is an area of cultural importance to Te Ākitai Waiohū with identified archaeological sites, freshwater watercourses and intersects with the CMA (that have been surveyed during options assessment phase as extending as further south of the Waokauri Creek Bridge than as depicted in AUP maps). The corridor also contains extents of Significant Ecological Area – Marine and Sites of Significance to Mana Whenua.

West of Orrs Road (the western boundary of this section) AIAL is the road controlling authority. The crossing over Pūkaki Creek (and the CMA) is subject to the Eastern Access Agreement and has Māori reservation status. This is a crucial project element (delivered by AIAL) – the timing of which is critical to the delivery of A2B to successfully access Auckland Airport.

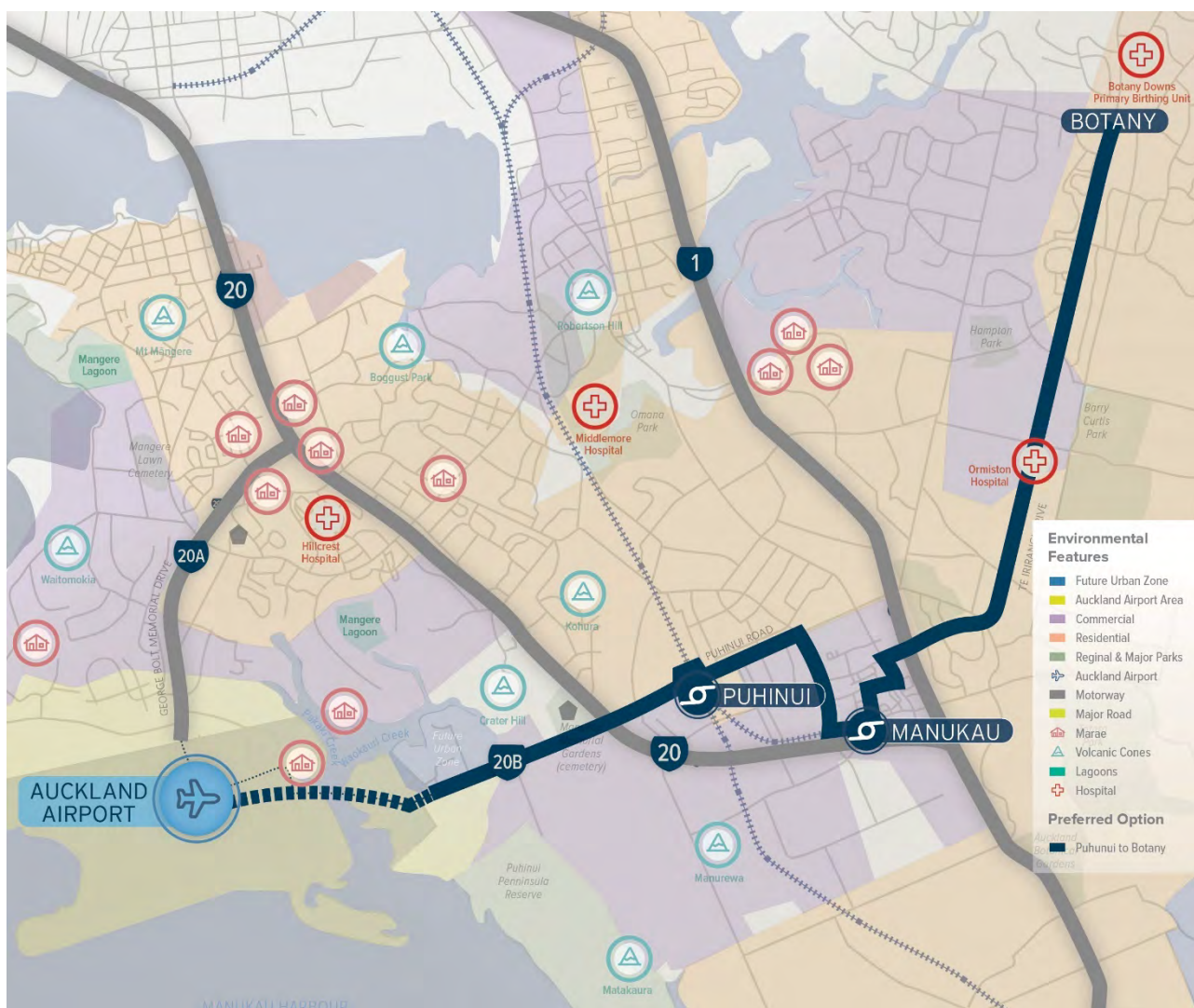


Figure 9: A2B Preferred Route and Key Surrounding Environmental Features

3.1.2 Location

The surrounding existing environment comprises a mix of typically older low-density suburban areas, the Manukau metropolitan town centre, the highly commercial Botany Town Centre, other local town centres and several concentrated employment areas, notably through industrial and commercial activities. SH20B is surrounded to the north and south by pasture land, horticulture activities and scattered residences.

3.1.3 Project Investment Objectives

The A2B investment objectives⁴:

- **Investment objective 1:** More equitable access and travel choices to jobs, learning, cultural and social activities in the south and east of Auckland
- **Investment objective 2:** Reliable and resilient transport system in south and east Auckland that is easy to use
- **Investment objective 3:** Transport network that enables the efficient movement of goods and people
- **Investment objective 4:** Urban regeneration and improved built environment

⁴ A2B Investment Objectives and KPIs as linked to GPS priorities taken from Figure 4-21 in the Airport to Botany SSBC – Part A: Strategic Case Report (Revision A – dated 31 January 2020).

- 
- **Investment objective 5:** Minimal impact of the transport system on the environment and Taonga
 - **Investment objective 6:** Safe and secure transport facilities in south and east Auckland

The Investment Objectives above will be further refined with future phases, so they are relevant for RMA purposes.

3.1.4 Mana Whenua

Engagement with Iwi has been undertaken for the SWGP via the AT Southern Table hui during the development of the SSBC. To date several hui, a site visit and Long and Shortlist workshops (involving Mana Whenua) have been held. Ongoing engagement with the Southern Table hui continues with Mana Whenua being a key partner in the delivery of A2B.

The Southern Table hui require ongoing engagement through the detailed design, particularly in relation to incorporation of cultural identity in to the network, potential effects on taonga such as stormwater in waterways and restoration the mauri⁵ of the area. Iwi have an elevated status as Treaty of Waitangi partners and as such it is important that iwi and hapū with Mana Whenua status over the area are meaningfully engaged with.

A CVA by Ngaati Whanaunga has also been undertaken for the Puhinui Station improvement works (part of the SWG Short term works).

The project is likely to impact cultural values given the range of known and anticipated cultural, spiritual and historical values and identified environmental effects, a strong partnership with Mana Whenua, in accordance with the principles of Te Tiriti o Waitangi is critical.

To record and manage project partnership expectations, a Māori Engagement strategy has been drafted and will be updated for the next phase of the project.

3.1.5 Property Considerations

A breakdown of the properties potentially impacted by A2B is provided in the A2B Property Acquisition Strategy. Overall A2B will seek to avoid the acquisition of private property, however a substantial number of privately and publicly owned properties will need to be acquired

3.1.6 Engagement and Consultation

As the consenting strategy evolves, a communications plan will need to be developed. Consultation and stakeholder engagement to date has been with Programme partners, key stakeholders, local communities and the public.

Programme Partners

Te Ākitai Waiohū, Waka Kotahi and AIAL are key to making decisions for the project and as well as holding information relevant to decisions.

A high level of engagement with Programme Partners will be important during the development of the detailed design, obtaining necessary RMA approvals and property acquisition. Early buy-in of the consenting strategy and associated staging of A2B is important to the delivery of the project.

Information Holders

Ongoing engagement with information holders would likely be required during development of the detailed design, obtaining necessary RMA and other statutory approvals. A relevant information holder includes the

⁵ A2B Problem Statement 3: 'the current transport system does not recognise cultural identity and taonga diminishing the mauri of the area'



Heritage New Zealand (Historic Places Trust – Pouhere Taonga), regarding Archaeological Authorities required under the Heritage New Zealand Pouhere Taonga Act 2014 ('HNZPTA').

Affected Property Owners/Occupiers

The Project would affect property owners and occupiers in selected locations requiring partial or full acquisition for the construction and operation of the Project. To date, property owners and occupiers have not been engaged with. Temporary land requirements are unknown at the time of writing.

Face to face meetings to discuss the proposed improvements would be required to inform property owners and occupiers of the Project and the potential impacts.

Utility and Network Operators

On-going consultation with the following utility and network operators⁶ will be necessary:

- KiwiRail (Main North Trunk Line);
- Watercare (watermain, wastewater);
- Spark New Zealand Limited (Southern Cross Chorus Fibre Optic);
- Chorus Limited (Chorus Fibre Optics);
- New Zealand Refining Company Ltd (Wiri to Auckland Airport jet fuel line)
- Transpower New Zealand (National Grid);
- Vector Limited (electricity, gas, communication, street lights); and
- Vodafone New Zealand (communication).

Engagement with these utility and network operators will be critical to Project delivery.

Local Community and General Public

Community and stakeholder engagement for the Southwest Gateway programme has been divided into two stages the first from November 2017 to December 2018 and the second from January to December 2019. This two-staged approach has allowed the project teams to consider the feedback, along with a range of technical assessments, to evaluate options and rapid transit route.

Key stakeholders of the project (not mentioned above) include:

- Auckland Council
- KiwiRail
- Transdev
- Bus operators
- Local Boards
- Panuku
- Ministry of Education
- Kāinga Ora – Homes and Communities (formerly Housing NZ)
- Freight and road user groups
- Union

⁶ In relation to the early deliverable A2B STAAI and Puhinui Interchange projects, engagement has been undertaken with these network utility operators (except Spark who does not have utilities within the project area).

- 
- Advocacy and interest groups (i.e. National Road Carriers, Bike Auckland and Howick and Pakuranga Grey Power).
 - Community stakeholders
 - Business associations
 - Network utility operators
 - Emergency services
 - Directly affected property owners, lessees and tenants

Feedback to date

Overall, partners, key stakeholders and the community have been supportive of improvements within the SWGP study area. They recognise the need for the SSBCs and the inter-relationship with other transport infrastructure in south and east Auckland.

Key points of feedback in relation to the A2B preferred option include support for a rapid transit corridor that has priority at intersections over general traffic, the desire to provide separate, safe cycling facilities and the desire for services that are customer centric, cost effective, fast and reliable. In addition, there is strong support for walking and cycling improvements proposed along SH20B.

3.2 Key Planning and Environment Considerations

Section 3.2.1 summarises the Southwest Gateway Preliminary Environmental Assessments ('PEAs') findings relevant to the A2B corridor.

PEAs have been completed for the preferred option for those discipline areas known to be of particular risk to the Southwest Gateway programme or require specific mitigation. Other discipline areas have been addressed in Section 3.2.2 below.

The PEAs identify the key potential adverse environmental effects (particularly significant effects) and opportunities for mitigation measures. An overview of the environmental mitigation opportunities is provided within this Consenting Strategy.

3.2.1 Preliminary Environmental Assessments

Overview

Preliminary advice regarding potential environmental effects and mitigation opportunities was obtained as part of the options assessment stage. The PEAs follow on from the high-level technical notes provided for the MCA assessments (long list, short list and optioneering) and coalesce earlier advice in relation to the preferred design. The PEAs will guide further technical assessment prepared at pre-implementation.

PEAs have been produced in relation to landscape, visual and urban design, noise and vibration, archaeology and heritage, arboriculture and ecology and are attached at **Appendix E**.

Assumptions regarding the Project Scope applied to the PEAs are as follows:

- **Interfacing Projects:** Interfacing projects include the Auckland Airport Precinct Improvements (AAPI), Eastern Busway, and City Centre to Mangere (CC2M) Light Rail. These interfacing projects should be referred to but not explicitly assessed as part of the scope of the Southwest Gateway projects.
- **Construction Method:** The construction method of A2B and the timeframes for the work have not yet been determined. Generic construction methods should be assumed to be applied.
- **Botany Town Centre:** Assessment to be completed as a part of the Eastern Busway project.

- **The Project extent** - defined as being between Botany, including the Puhinui Interchange (intersection of SH20 and SH20B), and along SH20B to Orrs Road.
- **Existing Environment** - the SH20B short term improvement works have been given effect to and therefore form part of the existing environment.
- **Dimensions** - as relevant the assessments consider the proposed height (of proposed grade separations and ramp connections), width (of various components) and bulk (such as bridge replacements) and state the assumptions made.

A summary of PEAs can be found within **Appendix I**.

A SWG Corridor Strategy was drafted to support the long-term A2B SSBC with the purpose to:

- Assist with future stakeholder engagement in order to help 'tell the whole story' through presenting the context of the corridor;
- Identify urban, environment and transport projects with potential collective benefit of broader third-party project investment in the corridor environments;
- Identify constraints and opportunities, both high-level and site-specific, within the corridor to inform future planning and design work.

3.2.2 Planning and Environment Summary

Based on the PEAs undertaken, and the MCAs for the long list and short list options assessment, a range of positive and adverse effects are likely to be experienced from the construction and operation of the Project.

The key consenting risks identified in the PEAs are prioritised below:

- Property acquisition of both private and public properties;
- Construction effects associated with delivering a project within a constrained urban environment and a sensitive semi-rural environment;
- Third party consents including on landscaping, carparking and business delivery arrangements;
- The removal of large mature trees within the road corridor with limited opportunity for mitigation planting;
- Landscape and visual impact of removing a large number of street trees and reduced amenity due to loss of vegetation along the road corridor;
- Loss of riparian vegetation and negative impacts to the aquatic environment through sedimentation and fuel contaminants;
- Limited opportunities within the highly built up urban environment to provide stormwater treatment and management devices;
- Potential for increased flooding risk where there is limited space to provide any peak flow attenuation;
- Potential adverse ecological effects, within the Significant Marine Ecological Area (Waokauri Creek Bridge)⁷ as a result of construction on estuarine habitats and a loss of vegetation within 20m of mean high-water springs; and
- There is the potential for the project to have adverse effects on archaeology if not managed appropriately.

From the information available no fatal flaws or major consenting risk have been identified through the PEA assessment and this information will inform the following project stages.

The recommended mitigation, including further assessments, are listed in the PEAs in Appendix E. Mitigation including additional landscaping and planting can be explored at the detailed design stage. It is assumed that

⁷ Waokauri Creek Bridge, SH20B – north of the bridge mangrove and saltmarsh dominated habitat, within a SEA Marine 2 (SEA-M2-27a),



mitigation of effects associated with acquisition of residential properties will be incorporated within any property acquisition agreement.

3.2.3 A2B Opportunities

1. Partnership

Deepening existing relationships between programme partners and Mana Whenua, mitigating the cultural impact of A2B through delivery of a shared vision for the area.

2. Review of the capacity of the Pūkaki Creek bridge

The four programme partners are working together in relation to the review of the multi modal capacity of the Pūkaki Creek bridge

3. Design

Development of an A2B design framework that integrates:

- Cultural narratives incorporation of cultural design themes similar to what is currently being applied to the Puhinui Station upgrade project, which is an early deliverable of the A2B project.
- Te Aranga Cultural Landscape Principles or other Māori design principles as agreed with Mana Whenua
- Landscape, urban design and ecological considerations, including:
 - o Where possible, retention and incorporation of existing trees along the A2B corridor
 - o Where possible, the natural and cultural landscape including native plant species, or flora and fauna with a specific connection to the area to be preserved in the design and long-term maintenance of the project
- Archaeological and heritage outcomes including:
 - o Acknowledgement of sites and places of significance to Mana Whenua;
 - o Appropriate iwi monitoring and accidental discovery protocols to be agreed with Mana Whenua
 - o Stormwater design seeking an integrated approach to the management and treatment of stormwater along the A2B alignment.

4. Walking and Cycling

Improved walking and cycling around the A2B stations to improve multi-modal connectivity and access for residents / commuters.

5. Local and Central Government Collaboration

Alignment with proposed (and existing) Kāinga Ora and Panuku developments along the A2B corridor. Identifying opportunities for:

- Collective public engagement
- Improved connectivity between developments and A2B stations
- Sharing infrastructure e.g. stormwater facilities
- Sharing design narratives.

6. High Quality Transport Corridor

Delivering a high quality and legible transport corridor that is easy for regular users and visitors to navigate. Removes traffic from local roads (particularly Heavy vehicles) by better connecting SH20A to SH20 with a southbound ramp.

7. Coordinated Stakeholder Engagement

Opportunities for coordinated stakeholder engagement with are identified and implemented by A2B project partners (e.g. network utility operators including Watercare)

8. Successful mode shift

Successful modal shift would remove an increasing number of fossil fuel vehicles from the road in favour of electric public transport and improving the reliability of journeys to and from the Airport and surrounds.

Please note: this not a complete list of recorded opportunities and will be updated / revised as the project is progressed.

3.3 Required Approvals and Analysis of Approval Methods

This section sets out the likely approvals required for this section of A2B. It considers:

- RMA approvals – including the AUP and relevant national environmental standards; and
- Other statutory approvals under the Marine and Coastal Area (Takutai Moana) Act 2011, HNZPTA 2014 and Reserves Act 1977.

This list of statutory approvals should be reviewed and confirmed based on further information and detailed design during the pre-implementation phase.

3.3.1 Resource Consent Considerations

Existing Designations

Several designations apply to the land within or directly adjacent to the Project Area. A summary of the existing transport designations is provided in Table 2 below. If impacted, A2B will need to obtain approval to undertake works without other requiring authorities designations. A full list of all designations applicable to the A2B and 20Connect is provided at **Appendix B**.

Table 2. Existing Transport Designations within the A2B Project Area

Requiring Authority	Designation	Location	Purpose	Relevance
KiwiRail Holdings Limited	6302 North Island Main Trunk Railway	North Island Main Trunk Railway Line from Buckland to Britomart Station, Auckland Central	To develop, operate and maintain railways, railway lines, railway infrastructure, and railway premises as defined in the Railways Act 2005.	A2B will cross the Designation 6302 at Puhinui Station.
Waka Kotahi NZ Transport Agency	6708 South Western Motorway (State Highway 20)	State Highway 20 from (1) east of Great South Road, Manukau City Centre to Cavendish Drive interchange, Wiri and from (2) Massey Road to Walmsley Road, Mangere	South Western Motorway (State Highway 20).	When the RTN transitions from Lambie Drive to Manukau Station Road it will interact with Designation 6708.
Auckland Transport	1817 Public Car Park – Davies Avenue	2 Davies Avenue, Manukau	Public off-street parking, including ongoing maintenance, repairs and like for like replacement works to the existing parking facility and minor operational improvements to the same.	Works will occur adjacent to the public car park.
Auckland Transport	1822 Public Car Park – Davies Avenue	8 Davies Avenue, Manukau	Public off-street parking, including ongoing maintenance, repairs and like for like replacement works to the existing parking facility and minor operational improvements to the same	Works will occur adjacent to the public car park.

Requiring Authority	Designation	Location	Purpose	Relevance
Auckland Transport	1814 Car Park - Osterley Way (AMI)	9 Osterlery Way, Manukau Central	Public off-street parking, including ongoing maintenance, repairs and like for like replacement works to the existing parking facility and minor operational improvements to the same	
Waka Kotahi NZ Transport Agency	6714 State Highway 1 – Manukau City Centre to Takanini	State Highway 1 from north of Highbrook Drive, Otara to south of Great South Road, Takanini	Southern Motorway (State Highway 1)	Works on Te Irirangi Drive will interact with the Waka Kotahi Designation.
Waka Kotahi NZ Transport Agency	6717 State Highway 20B	State Highway 20B	State Highway 20B: State Highway 20 to Auckland International Airport	Works on SH20B will interact with the Transport Agency Designation and will require alteration to accommodate road widening
Waka Kotahi NZ	6709 State Highway 20	State Highway 20 between Massey Road on-ramp and Puhinui Road 20B on and off ramps.	State Highway 20: To undertake maintenance, operation, use and improvement to the State Highway network	Works on SH20B will interact with the Waka Kotahi Designation and will potentially require alteration to address the overlap in relation to the new SH20B to SH20 ramp structure.
Transpower New Zealand Ltd	8516 Brownhill Road to Pakuranga	143 Brownhill Road, Whitford to 109 Golfand Drive, Howick	Electricity transmission: the construction, operation and maintenance of a double circuit underground 220kV cable	Works on Te Irirangi Drive will interact with the Transpower Designation
Transpower New Zealand Ltd	8517 Brownhill Road to Otahuhu	143 Brownhill Road, Whitford to 26-28 Kaitawa Street, Otara	Electricity transmission: the construction, operation and maintenance of a double-circuit underground 220kV cable	Works on Te Irirangi Drive will interact with the Transpower Designation

Other designations held by other requiring authorities in the Project area which are located directly adjacent to, or overlap the Transport related designations identified above include⁸:

- Airspace Restriction Designation (1102) – applicable to the whole project area;
- AUT Manukau Campus (6102) at 640 Great South Road by the Minister for Tertiary Education, Skills and Employment;
- Gas Transmission Pipeline (9104) Mill Road (Waikato District Council boundary), Pukekohe to 65 Highbrook Drive, East Tamaki by First Gas; Puhinui School (4980) at 116 Puhinui Road, Papatoetoe by Minister of Education, Educational purposes – primary school (years 0-8) and may include early childhood education (preschool);

⁸ Designations as at 31 October 2019 in the AUP.

- Wiri Electricity Substation (8533) at 656 Great South Road, Manukau by Transpower New Zealand Ltd for Electricity Transmission (located on the eastern side of Great South Road);
- Wiri to Auckland International Airport Jet Fuel Pipeline (9700) by Wiri Oil Services Ltd;
- Petroleum Pipeline – Urban Section (6501) along Campana Road by New Zealand Refining Company Ltd;
- Southwestern Interceptor Line (9529) along and adjacent Puhinui Road and the properties along Orrs Road by Watercare Services Ltd; and
- Manukau Memorial Gardens (cemetery) (607) by Auckland Council (north of SH20B).

Auckland Unitary Plan, Zones, Controls and Other Designations The Project area is regulated by the AUP, which contains the planning provisions for development within the Auckland region.

Zones and Precincts

The zoning within the Project area is displayed in **Appendix C**.

The Project area from Botany to Puhinui interchange is predominantly within the road corridor which is unzoned. The surrounding land is a mixture of zones including residential, business, open space, strategic transport corridor zone (i.e. State Highway 1) and Special Purpose. This reflects the generally brownfield urban environment that this section of the A2B RTN will traverse.

The Manukau City Centre is predominantly zoned Metropolitan Centre, is flanked by General Business, Light Industry and Mixed-Use Zone. The Manukau velodrome is zoned open space (sport and active recreation zone).

To the north of SH20B, between Orrs Road and to the west of Waokauri Creek is an area of land zoned Future Urban. The Future Urban Zone is a transitional zone applied to greenfield land identified as suitable for future urbanisation. Anticipated land use activity is generally rural with urban activities not enabled until the site is rezoned for urban purposes.

The Memorial Gardens are largely zoned Special Purpose Cemetery with the western portion of the Memorial Gardens zoned Business Light Industry. Pūkaki Creek and the inlet are zoned Coastal – General Coastal Marine Area (CMA). There is also a small strip of Open Space – Informal Recreation Zone located directly west of Waokauri Creek.

This section of the A2B will traverse or is adjacent to several precincts. A high-level summary of each precinct is provided below:

- **Manukau Precinct** - Manukau Square is a focus of activity in the Manukau Metropolitan Centre and contributes to a high standard of amenity in the area. This precinct seeks to protect the admission of sunlight to Manukau Square during the daytime hours when it will be commonly used and will maintain both the amenity of this square and its function as a community focal point. To achieve this, development controls are placed on sites in close proximity to Manukau Square to ensure adequate sunlight for seated areas in the square.
- **Manukau 2 Precinct** – Located at 640 Great South Road, the Manukau 2 Precinct is occupied by AUT. The purpose of the precinct is to enable the development and operation of a range of activities to cater for the diverse requirements of the student population, employees and visitors. Community use of the facilities is also provided for, as well as businesses, offices, research and laboratory facilities.
- **Flat Bush Precinct** – The Flat Bush precinct (located to the east of Te Irirangi Drive near Ormiston Road) covers a total area of 1730ha of land. It is divided into sub precincts and areas largely focused on residential activity (each with its own distinct character and residential density), although there are sub-precincts focused on conservation and stormwater management.

- **Puhinui Precinct⁹** - The primary purpose of the Puhinui Precinct is to enable a transition from rural to urban development, while recognising the cultural, spiritual and historical values and relationships that Mana Whenua have with the land and sea in Puhinui as part of the Māori cultural landscape. The Puhinui Precinct also recognises the relationship which exists between Māori cultural landscape values and the management of natural and physical resources. Within the Precinct, Puhinui Road (State Highway 20B) is not only an important transport corridor, it is also recognised for its importance as a cultural heritage gateway. The 'Puhinui Heritage Gateway', which includes the State Highway 20B designation, allows for a 40m building set back on the southern side of the designation, and 40m set back on the northern side of the designation for future transport requirements.
- **Mana Whenua Management Precinct** - The purpose of the Mana Whenua Management Precinct (MWMP) is to formally recognise and provide for the special relationship Mana Whenua have with specifically recognised parts of the CMA and seeks to avoid discharges that could adversely affect water quality and the spiritual and cultural values of the Pūkaki and Waokauri Creeks. The MWMP is linked to the Maori Reservation over sections of Pūkaki and Waokauri Creeks.

Overlays and Controls

The Project area is subject to or adjacent to the following overlays and controls within the AUP (refer to **Appendix C** for more detail of the key overlays and controls relevant to this section of the RTN):

- **High Use Stream Management Overlay** - Applicable to the A2B project area west of Great South Road and SH20/SH20B interchange
- **High-Use Aquifer Management Area Overlay** - Applicable to project area west of the Southern Motorway (SH1)
- **National Grid Corridor Overlay (National Grid Yard Uncompromised)** - Located to the immediate east of the Southern Motorway (SH1) (A2B RTN will cross this overlay)
 - The Overlay cuts across Te Irirangi Drive north of the intersection with Belinda Avenue
- **National Grid Corridor Overlay (National Grid Substation Corridor)**
 - The National Grid Substation Corridor runs along Te Irirangi Drive from the intersection with Great South Road and just east of Diorella Drive. It also travels along Great South Road in the vicinity of the project area.
- **National Grid Corridor Overlay (National Grid Yard Compromised)** - The overlay cuts across Te Irirangi Drive north of the intersection with Boundary Road
- **Aircraft Noise Overlay** – Applicable to the A2B project area south of Ormiston Road
- **Notable Tree Overlay** – 250 Puhinui Road and Puhinui Road Reserve (near Vision Place)
- **Historic Heritage Overlay Extent of Place** - Cambria House (250 Puhinui Road)
- **Stormwater Management Area Control – Flow 2 (SMF 2)** - Applicable to the A2B project area between Puhinui Railway Station and Great South Road (including Manukau town centre)
- **Stormwater Management Area Control - Flow 1 (SMAF 1)** – Applicable to the entire section of SH20B
- **Buildings Frontage Control - General Commercial Frontage**
 - Manukau Town Centre
 - Botany Town Centre
- **Macroinvertebrate Community Index Area** – entire project area

⁹The Puhinui Precinct is divided into sub-precincts. Sub-precincts A and B are relevant to this Project for the proposed work west of Prices Road. Sub-precinct A adjoins the coastal environment and is proposed to be used for open space and passive recreation. Sub-precinct B notes that this land could be used for an airport remote parking area as well as a small range of aeronautical and airport support activities.

- **Significant Ecological Area Overlay** – Marine 2 (Waokauri Creek, Pūkaki Creek and Inlet)
- **Arterial Road** – Puhinui Road (SH20B);
- **Coastal Inundation 1 per cent Annual Exceedance Probability (AEP) Plus 1m control** - Pūkaki Creek and Waokauri Creek; and
- **Emergency Management Area Control** – Infrastructure (the New Zealand Refining Company Ltd (NZRCL) Petroleum Pipeline and the Wiri Oils Services Ltd (WOSL) Wiri to Auckland International Airport Jet Fuel Pipeline south of the Campana Road and Puhinui Road intersection).

Resource Consent Requirements

District Plan Requirements

The key District Plan requirements relevant to A2B are summarised below:

- Public transport facilities¹⁰ under the AUP are restricted discretionary activities in all zones (E27.4:A12);
- The construction, operation, use, maintenance and repair of road network activities¹¹ associated with the establishment of the A2B RTN will all be permitted where they are located within the local public road network operated by AT (Rule E26: A67). Road network activities include (but are not limited to) new pedestrian and cycling facilities, road safety devices, new traffic signs, traffic control devices, stormwater management devices and noise attenuation walls; and
- In addition, off-road pedestrian and cycling facilities are permitted in all zones (E27.4:A10).

In addition:

- The construction, maintenance, upgrade and use of cycleways and walkways associated with the proposed SUP facilities in the Strategic Transport Corridor zone are a permitted activity (Rule H22: A1);
- The removal of the notable tree at 250 Puhinui Road and Puhinui Road Reserve (near Vision Place) would require consent as a discretionary activity (E26.4.3.1:A89);
- The removal of trees within the road corridor, many of which are greater than 4m in height (i.e. along Te Irirangi Drive for A2B) will require consent as a restricted discretionary activity (E26.4.3.1:A92);
- Noise and Vibration associated with the works may exceed that permitted for the relevant zones (E25.4.1: A2);
- The proposed works are anticipated to be consistent with the Puhinui Precinct objectives and policy and meet transport standards (I432.6.1). Consequently A2B would be a permitted activity (I432.4:A51). There are no provisions in the Mana Whenua Management Precinct (I419) of relevance to this project, given they relate to prohibiting direct discharge wastewater only;
- Earthworks are likely to require consent as a restricted discretionary activity (E26.5.3.2:A103 and E26.5.3.2:A106), or discretionary activity (relating to the Significant Ecological Area overlay - Marine 2 (Waokauri Creek, Pūkaki Creek and Inlet – E26.6.3.1: A118); and
- The Project may require works to occur within a Historic Heritage Overlay which may not comply with the permitted activity standards in E26.8.5.1. (i.e. at Cambria House - 250 Puhinui Road (A2B – Part 1).

¹⁰ A public transport facility is defined in the AUP as a *facility for the transfer of passengers on/off and between public transport services* and includes areas for bus parking; passenger waiting areas; shelters; ticketing and other passenger facilities, including end-of-trip facilities; information kiosks; transport related signs; bus layovers and drive rest facilities; offices supporting the operation, maintenance and security of the facilities; devices and facilities to enable the movement, circulation and security of pedestrians; accessory food and beverages and other accessory retail.

¹¹ Road network activities include (but are not limited to) new pedestrian and cycling facilities, road safety devices, new traffic signs, traffic control devices, stormwater management devices and noise attenuation walls.



Regional Plan Requirements

As set out Section 2.5.1 of the Consent Strategy, this section of the RTN will need to be designed to comply with Auckland Council's recently obtained Stormwater NDC (DIS60069613), or a separate stormwater consent will be required (E8.4.1:A5, E10.4.1:A6 and E10.4.1:A7). Development of new or redevelopment of existing impervious areas greater than 5,000m² for a road, operated by a road controlling authority within Stormwater management area control – Flow 1 or Stormwater management area control – Flow 2 will need to comply with Standard E10.6.1 and Standard E10.6.4.2 (E10.4.1 A7).

In addition, a broad range of regional plan resource consents are anticipated to be required to authorise A2B, including in relation to:

- activities in, on under or over the bed of rivers, streams and wetlands (E3:A1);
- extensions to existing (E3.4.1: A26) and new culverts (E3.4.1: A33) that are greater than 30m in length;
- new stormwater outfalls (E3.4.1:A44);
- any reclamation or drainage, including filling over a piped stream (E3: A49);
- any diversion of streams to accommodate for the proposed stormwater management (E7:A13);
- dewatering to accommodate the proposed works (E7.4.1: A13, E7.4.1:A20 and E7.4.1: A26);
- permits relating to the construction, occupation and use of the CMA (A124 / A133: F2), including alteration or removal of existing vegetation (E26.3.3.1 (A77); and
- any air discharge permits relating to dust generated by earthworks and construction (E14.4.1:A83).

There will also be relevant regional policy framework considerations from the Mana Whenua Management Precinct (I419)¹². At this stage based on the limited information held to date, consent is anticipated to be required for a discretionary activity.

National Environmental Standards

National Environmental Standard for Assessing and Managing Contaminants in Soils to Protect Human Health 2011

The NES: Soil applies to land where HAIL activities have been identified.

A contaminated land investigation has been undertaken for the A2B RTN area from Botany to the Puhinui interchange, but a Preliminary Site Investigation (PSI) is yet to be undertaken. Given the anticipated presence of contamination along the proposed route it is anticipated that a detailed site investigation ('DSI') will be required to establish contamination conditions within parts of the Project area.

In relation to the SH20B corridor area, a PSI has been undertaken for the short-term improvement works. The PSI concluded that a number of HAIL activities are likely to have occurred within or adjacent to the Project corridor. Consequently, various forms of contaminants are expected along the proposed route and a Detailed Site Investigation (DSI) will be required to establish contamination conditions.

Provided this is produced and submitted as part of the NES application, resource consent is anticipated to be required as a restricted discretionary activity subject to Regulation 10 of the NES: Soil.

National Environmental Standard for Electricity Transmission Activities 2009

The NES: ETA contains regulations relating to the operation, maintenance, upgrade, relocation or removal of existing transmission lines and permits or controls these activities. The route intersects and travels along sections of the National Grid Corridor Overlay in the AUP. In addition, a pylon and an aboveground Transpower line located on the Te Irirangi Drive (adjacent to 35 Dissmeyer Drive, Clover Park) will be required to be

¹² There are no Regional Plan rules in this precinct relevant to combined SH20B corridor works (they relate to wastewater discharges).



relocated. Works required in relation to these will need to be undertaken in conjunction with Transpower New Zealand Limited and resource consents under the NES: ETA will need to be obtained as necessary.

3.3.2 Notice of Requirement Considerations and Other Approvals

Requiring Authority

It is considered that the proposed A2B RTN falls within the purpose of AT as a Requiring Authority.

The primary benefit of a Requiring Authority seeking a designation is that it cannot be altered by any other party, unlike provisions of a Plan. The outline plan process also allows for greater flexibility and for details to be provided at a later stage, compared to a granted land use resource consent. In addition, this approach maximises the requiring authority powers for route protection and gives long-term operational benefits. The design of the Project should be of sufficient detail to justify the extent that the area is reasonably necessary for the NoR and to enable its environmental effects to be appropriately assessed.

An additional consideration for a NoR is to obtain approval for a route protection only (without other Statutory approvals). A benefit of this approach is that it provides some certainty to landowners, however delays the detail and further consents to a later date. Given the A2B route is mostly brownfield, fully developed (with the notable exception of land alongside SH20B) and the proposed construction timeframe isn't long term (i.e. >10 years) it won't deliver significant benefit considering this process will increase costs/time associated with the need for further regulatory processes. It also requires a certain level of detail to pass the s171(1)(c) RMA 'reasonably necessary' test, which further supports applying for the appropriate statutory approvals at the same time given the detail will be available to seek other necessary approvals.

3.3.3 Other Approvals

Archaeological Authority

An Archaeological Authority is recommended for this project given known archaeological sites are within the Project area.

In addition, construction and earthworks may uncover previously unrecorded sites which has the potential to be considered a minor adverse impact. Further investigation into potential effects on Cambria Cottage (CHI 22166) and R11/1973 is recommended. As an approach to manage unforeseen risk, the requirements of HNZPTA should be reviewed in relation to the detailed design during the pre-implementation phase to consider and confirm the need to seek an authority.

Marine and Coastal Area (Takutai Moana) Act 2011 (MACA)

Engagement is required under the Marine and Coastal Area (Takutai Moana) Act 2011.

In April 2017, applications under the Marine and Coastal Area (Takutai Moana) Act 2011 for Customary Marine Titles (CMT) and Protected Customary Rights (PCR) closed. CMT recognises the relationship of an iwi, hapū or whanau with a part of the common marine and coastal area and confers a number of rights, including permission rights in some instances and affected party status. PCRs recognise a particular activity, use or practice which has been exercised since 1840 – for example collecting hāngi stones or launching waka. The majority of applications are still being processed¹⁵. To date the applicant groups approaching the Crown for direct engagement on PCR or CMT rights in the Manukau Harbour include:

- Ngāti Te Ata - application for CMT and PCR
- Te Whakakitenga o Waikato Incorporated (Waikato Tainui) - application for CMT and PCR

¹⁵ 20 Connect Investment Objectives as listed in Table 3-2 in the 20 Connect SSBC- Part A- Strategic Case

- Ngāti Whanaunga - application for PCR
- Ngai Tai Ki Tamaki - application for CMT and PCR
- Te Kawerau a Maki – application for CMT and PCR
- Ngāti Tamaoho - application for CMT and PCR

Applicants for resource consent, permits or approvals in the common marine and coastal area are required to notify and seek the views of any group that has applied for recognition of CMT in the area¹⁴.

In addition, there are Mana Whenua groups that are recognised as holding customary rights to the Manukau Harbour. Significant customary sites identified by Mana Whenua include Horakō (Ihumatao buried fossilised Kauri Forest) and Karore Bank. Access to these sites is ensured by AIAL as they maintain public access under condition 17 of their Designation 1100.

Ongoing consideration will need to be given to whether particularly engagement is required under the Marine and Coastal Area (Takutai Moana) Act 2011 and in relation to other customary rights. It is also recognised that engagement needs to consider the potentially differing land-based and coastal interests held by Mana Whenua groups.

The interaction of MACA obligations and the Project is critical item to monitor and re-evaluate. There is an opportunity for coordinated / streamlined processes between programme partners to achieve the consultation obligations.

Reserves Act 1977

Reserves are located within and/or adjacent to the Project area and these will be detailed in the Property Acquisition Strategy being prepared by AT Property. This strategy will advise on the status of parks and reserves in the area (i.e. Hayman Park and Manukau Sports Bowl) and the implications of the Reserves Act 1977.

Third Party Consents

This section of the A2B is anticipated to generate a variety of third-party consent implications, particularly at locations where there will be substantial private property impacts and / or where site reconfigurations are required (i.e. commercial properties in / near the Manukau Town Centre).

3.3.4 Approval Methods Recommendation

Based on the assessment above, it is recommended AT and NZTA develop an integrated NoR (with regional consents including other approvals detailed above) to establish an A2B designation for the complete alignment including an alteration to the existing State Highway corridor.

3.4 Approvals Pathway

There are four RMA approvals processing options available to AT for obtaining the necessary NoR and resource consents for A2B. These options are:

- Determination by a Board of Inquiry through a proposal of national significance call-in process;
- Determination by the Environment Court through a proposal of national significance call-in process;
- Direct referral to the Environment Court; and
- Determination by the Consent Authority (Auckland Council).

As with the approval tools, the pathways have also been comprehensively assessed in Section 2.7.2

¹⁵ 20 Connect Investment Objectives as listed in Table 3-2 in the 20 Connect SSBC- Part A- Strategic Case



3.4.1 Assessment of Processing Pathway Options

The following section assesses the use of each available approval pathway for A2B:

Determination by a Board of Inquiry through a proposal of national significance call-in process;

- Determination by a Board of Inquiry or the Environment Court as Project of National Significance is not considered appropriate at the time of writing for A2B given the scale of the Project and likely low level of interest (at a national level). Furthermore, A2B would not necessarily meet the tests under section 142(3) of the RMA.
- A sufficient level of design would be required for all components before a Board of Inquiry or Environment Court which may not be developed at the time of lodgement. and
- A decision will be made by the Board of Inquiry or Judge, rather than a recommendation.

Direct referral to the Environment Court

Under the direct referral process, all submissions would need to be dealt with through the Environment Court, rather than the process being limited to the resolution of outstanding issues only. However, appeals to the High Court may only be sought on points of law which would be of benefit if there were any contentious issues that are unlikely to be resolved. At the time of writing, it is not considered that there will be any contentious issues that cannot otherwise be resolved;

There are significant number of private residential and commercial properties that have the potential to be impacted by this proposal - including full and partial property acquisition. This quantum of impacted property means that there is potential that a large number of submissions. The benefit in holding a Council hearing first is that it can help to define submitter issues;

Given the reduced ability for the public to be involved due to the complexity, resource intensive nature and time costs of the process this is not as favorable in terms of maintaining and/or enhancing relationships with stakeholders, private property owners and mana whenua; and

A decision will be made by the Judge, rather than a recommendation by a Consent Authority.

This pathway would be favourable if submitters issues were largely discrete matters that would unlikely be resolved through a Council hearing thereby making an Environment Court proceeding unavoidable.

Determination by the Consent Authority (Auckland Council)

In terms of the NoR the Requiring Authority is the decision-maker. Auckland Council recommends to the Requiring Authority whether the designation should be confirmed in the district plan (with or without modification and conditions) or withdrawn. The Requiring Authority decides whether to confirm or withdraw the notice (in other words, to accept or reject the council's recommendation in part or full). This provides a greater level of control over the outcome and conditions. Other advantages include:

- Enables greater Auckland Council interaction to addressing key project risks and conditions;
- Maintains collaborative approach to refining key aspects of the design with partners, landowners, stakeholders, third parties and local community (and retain transparency and reputation);
- Statutory timeframes dictate the processing period for resource consents (but this is contingent on many factors) this excludes the NoR however;
- Approach will facilitate smoother project implementation with common understanding on meaning and intent of conditions;
- Some limited prospect of this process being quicker than the 'one stop shop' options (described above), provided the decision is not appealed to the Environment Court;
- Maintains the 'second-shot' appeal process at achieving outcomes if a negative decision or conditions (resource consent) are received; and
- A perception of a 'friendlier' environment, that is more accommodating and considerate towards local communities.

3.4.2 Approval Pathway Recommendation

Based on the above, it is recommended that an integrated Notice of Requirement and the regional resource consent application is lodged with Auckland Council, in parallel with AIAL's Precinct Improvements resource consent application and the Waka Kotahi's alteration to designations to accommodate the widened SH20B state highway corridor to address the overlap of the SH20B and SH20 designations for SH20B to SH20 ramp structure. Although there is the potential of appeal of the decision to the Environment Court, this risk can be managed through early consultation and engagement and seeking relevant property agreements

3.5 Key Effects / Constraints / Risks

The following are identified as key constraints, risks and opportunities that will influence the approval process for A2B:

Table 3. Summary of Key Approval Constraints and Risks associated with A2B RTN

A2B Key Approval Constraints and Risks
Stormwater Treatment Area Limited West of Great South road the project area is located within the Stormwater Management Area Control (Flow 1) and there are limited opportunities within the highly built up urban environment to provide stormwater treatment and management devices for the additional hardstand surface areas
Tree Removal and Replacement Removal of large mature trees within the road corridor with limited opportunity for mitigation planting could become contentious (although engagement with mana whenua indicates support for removal of exotic trees along Te Irirangi Drive) – of note there is a notable tree near Vision Place
Property Acquisition There are multiple residential and commercial properties to be acquired for the Project. In total 129 full and 272 partial land acquisitions are required.
Public Interest The Botany to Puhinui interchange section of A2B traverses a highly built-up area (including two town centres and numerous destinations such as AUT) and has substantial property take / site access / on-street car-parking implications. As a result, there is likely to be significant public interest and there is potential to generate submissions and or appeals;
Funding A2B is currently unfunded for the consenting phase. Advancing NoR(s) involving property take without at least funding for property acquisition or route protection is a PWA process risk
Third party assets There is a power pylon on Te Irirangi Drive that will need relocation and associated asset owner / Transpower requiring authority approvals).
Engagement Engagement is important and a risk area for the A2B corridor with the many parties with interests. In addition, to date there has been limited engagement with the utilities that intersect with the project area that have the potential to be adversely impacted by the proposed works.
Designations The designations associated with Puhinui School (116 Puhinui Road), the Wiri Electricity Substation (656 Great South Road) and AUT Manukau Campus (640 Great South Road) pose a planning risk for any road



A2B Key Approval Constraints and Risks

corridor widening impacting these designated areas given approval from the Ministry of Education, Transpower New Zealand and the Ministry of Tertiary Skills and Employment, respectively would be required. This will add additional risk and time to the planning process.

Sensitive Environment

The SH20B section of the corridor is sensitive, it has identified:

- identified archaeological sites,
- freshwater watercourses intersecting the alignment
- extents of the Coastal Marine Area (that has been surveyed as extending as further south of the Waokauri Creek Bridge than as depicted in Auckland Unitary Plan maps)
- being covered by extents of Significant Ecological Area – Marine

Puhinui Precinct

The 'Puhinui Heritage Gateway', which includes the SH20B Designation, allows for a 40m yard setback on the southern side and northern side of the designation for future transport requirements. This is both an opportunity and a risk because if a NoR is not lodged by 1 January 2023 for a future transport corridor, the yard adjoining State Highway 20 shall be reduced to 10 metres.

The yard can be challenged through the statutory consenting process increasing the case for urgency for route protection, the most effective route protection for A2B would be lodgement of the NoR as soon as practically possible.

Connection to the Airport Precinct

It is critical to demonstrate holistic integration between SH20B and the connection to and across the Airport Precinct to the statutory decision-makers (working collectively in partnership with AIAL will assist here);

3.6 Summary

In summary, the recommended planning pathway for the A2B RTN from Botany to the Auckland Airport Precinct is:

- To authorise via NoR(s) with Auckland Transport as the Requiring Authority and associated regional plan resource consents;
- Lodge as a single, integrated application consisting of NoR packages that reflect staged service delivery while enabling management of procedural risk (i.e. appropriately distributing network benefits and adverse effects etc);
- Lodged in parallel with:
 - AIAL's Airport Precinct Transport Improvements resource consent application package (including regional consents); and
 - Alteration to the Waka Kotahi designations to accommodate the widened SH20B state highway corridor and the overlap of the SH20B and SH20 designations for SH20B to SH20 ramp; and
- Via the 'traditional approach' RMA application process determined by the territorial authority (Auckland Council).



4 PART TWO – 20Connect

4.1 Project Summary

20Connect will deliver additional state highway infrastructure changes to improve journey time reliability, network resilience and safety.

Key project elements in this section are summarised in **Appendix A** but consist of the following:

- New two-lane SH20A/SH20 system interchange ramp (and Bader Drive eastbound off-ramp removed and associated lane reconfiguration);
- Widening of a short section of SH20B and a new southbound SH20B to SH20 ramp (these improvements are integrated with A2B and are covered in Part One);
- SH20 widening between Mangere bridge and Lambie Drive overpass
 - o Widening of SH20 (north of SH20A):
 - o One additional southbound lane between Rimu Road and the SH20A/SH20 system interchange.
 - o One additional northbound lane between the SH20A/SH20 interchange and Mangere Bridge.
 - o Widening of SH20 (between SH20A/SH20 south-facing system interchange ramp and SH20B):
 - o One additional lane northbound between the Puhinui Road northbound on-ramp and SH20A/SH20 system interchange;
 - o One additional lane southbound between the SH20A/SH20 system interchange and Massey Road southbound off-ramp; and
 - o One additional lane southbound between the SH20A/SH20 system interchange and the Puhinui Road southbound off-ramp.
 - o Widening of SH20A:
 - o Double lane gains from the Kirkbride Road eastbound on-ramp to the SH20A/SH20 system interchange, with four lanes in the mid-block; and
 - o Walking and cycling facilities along SH20 and the northern side of SH20A.

4.1.1 Context

Waka Kotahi, alongside investment partners AT and AIAL are seeking to improve the experience of customers who travel to and from the Airport and the surrounding area via the land transport system.

Land transport access to the Airport is currently primarily via SH20, SH20A and SH20B. These state highways are each classified as National, High Volume highways under the One Network Road Classification (ONRC). The existing cross-sectional context and capacity of each of these State highways is as follows:

- SH20A is a four-lane expressway, which was upgraded to motorway standard via the 20A to Airport project (completed mid-2018). It carried approximately 43,000 vehicles per day (in 2016), of which, approximately 7% were heavy vehicles.
- SH20 is a four-lane motorway, connecting Manukau to the south with Waterview to the north. It carried approximately 74,000 vehicles per day in 2016, between the Puhinui and Massey Road interchanges, of which approximately 6% were heavy vehicles.
- SH20 and SH20A each have deficiencies that have been identified in terms of existing infrastructure as well as their ability to meet forecast demands.

4.1.2 Location

The area within the 20Connect project footprint encapsulates a rural / urban transition – with a mix of urban activities as well as mixed rural and peri-urban / industrial activities and character. The existing land use adjacent to SH20A predominantly comprises light industrial and business park activities. Some of the land towards the west and south remains a productive rural landscape, with more urbanised commercial and residential areas located to the north and east of Auckland Airport, including the Māngere Town Centre.

This section of the project corridor is highly sensitive and located in an area of recognised significance to Mana Whenua. It is a highly modified environment that has identified archaeological sites, is intersected by freshwater watercourses and extents of the CMA and contains extents of Significant Ecological Area – Marine along parts of the coastal areas of SH20, Outstanding Natural Features and Sites of Significance to Mana Whenua (refer AUP zones, overlays and controls at **Appendix C**).

A key recognised feature and area of particular sensitivity in this section is Ngā Kapua Kohuora / Crater Hill. There are also numerous public and privately-owned properties (including marae, recreational reserves, residential and commercial properties) impacted by these improvements.

The area is also inextricably connected with the Auckland International Airport and the surrounding commercial and industrial areas located in the south-west of the Auckland region. The modified topographical and landscape features of the study area include the Pūkaki Peninsula characterised by a mixture of coastal, volcanic and geological features (some are modified remnants) and a flat to gently rolling topography.

The surrounding existing environment comprises low density suburban areas, the Māngere town centre, other local town centres and several concentrated employment areas, predominantly industrial and commercial activities.

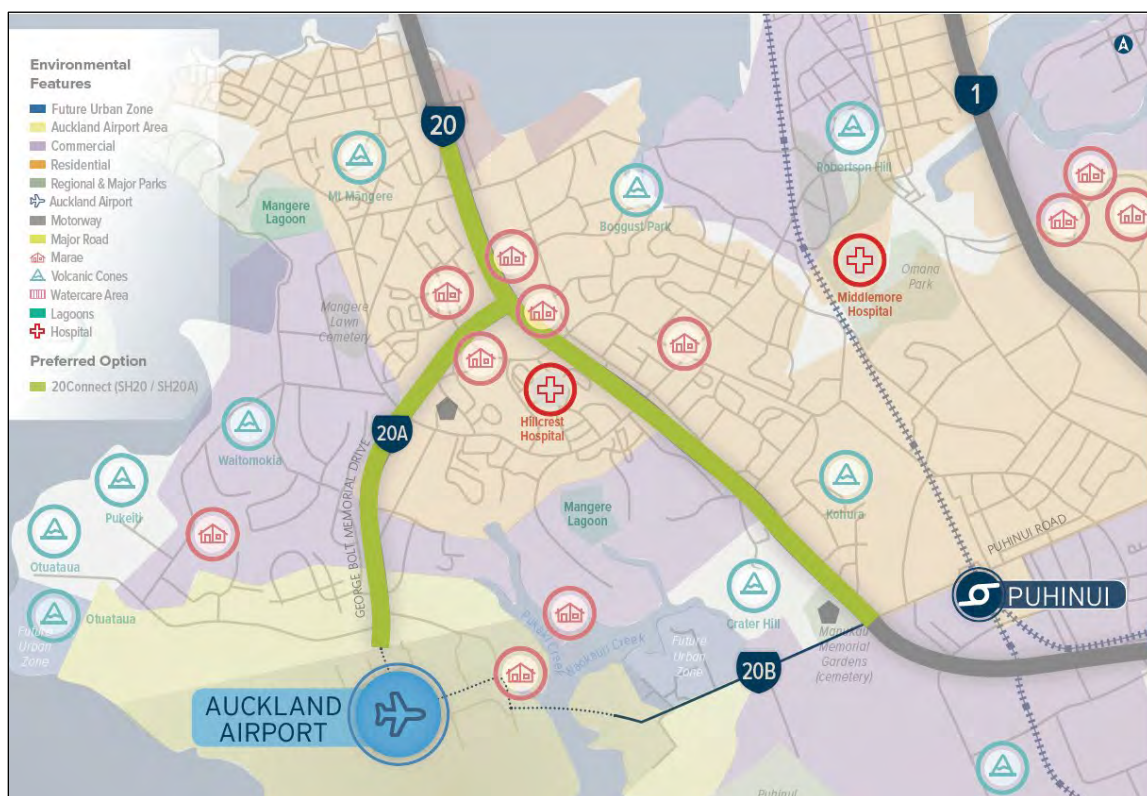


Figure 10: 20 Connect (SH20 and S20A Only – excluding SH20B) Preferred Route and Key Surrounding Environmental Features



4.1.3 Project Investment Objectives and Description

The 20Connect investment objectives¹⁵:

- **Investment objective 1:** Reliable and resilient transport system in south and east Auckland that is easy to use
- **Investment objective 2:** Transport network that enables the efficient movement of goods and people.
- **Investment objective 3:** Minimal impact of the transport system on the environment and taonga.
- **Investment objective 4:** Safe and secure transport facilities in south and east Auckland.

4.1.4 Mana Whenua

Engagement with Mana Whenua has been undertaken for the Southwest Gateway Programme via the AT Southern Table hui during the development of the SSBC for 20 Connect. To date several hui, a site visit and Long and Shortlist workshops (involving Mana Whenua) have been held. Ongoing engagement with the Southern Table hui continues with the view to collaboration and sharing information. The Southern Table hui require ongoing engagement through the detailed design, particularly in relation to incorporation of cultural identity within the state highway corridor, avoiding adverse effects on Crater Hill and the wider cultural landscape, potential effects on taonga such as stormwater in waterways and restoration the mauri of the area.

4.1.5 Property Considerations

The PWA sets out the process and requirements for acquisition of land, including compulsory acquisition, by a Requiring Authority and the provision of compensation.

The acquisition process generally takes place after all required consents for the use of the land have been granted, or a designation has been confirmed by a Requiring Authority. The designation provides a basis for the subsequent acquisition of land needed for the works and may warrant partial land acquisition, or full property acquisition. However, property negotiations can commence earlier, in particular in the case where there is a willing seller.

The works required for the Project are likely to impact a substantial number of privately and publicly owned properties. A breakdown of the properties potentially impacted by Project component is detailed in the Property Strategy.

However, as previously noted the delivery of this section of the Project is not until later project delivery horizons (potentially second or third decade).

4.1.6 Engagement and Consultation

As the consenting strategy evolves, a communications plan will need to be developed. Consultation and stakeholder engagement to date has been with Project partners, key stakeholders, local communities and the public.

Project Partners

Te Ākitai Waiohū, Waka Kotahi, AIAL and AT are key to making decisions for the project and as well as holding information relevant to decisions.

A high level of engagement with Programme Partners will be important during the development of the detailed design, obtaining necessary RMA approvals and property acquisition. Early buy-in of the consenting strategy and associated staging of the project is important to the delivery of the Project.

¹⁵ 20 Connect Investment Objectives as listed in Table 3-2 in the 20 Connect SSBC- Part A- Strategic Case



Information Holders

Ongoing engagement with information holders would likely be required during development of the detailed design, obtaining necessary RMA and other statutory approvals. A relevant information holder includes the Heritage New Zealand (Historic Places Trust – Pouhere Taonga), regarding Archaeological Authorities required under the Heritage New Zealand Pouhere Taonga Act 2014 ('HNZPTA').

Affected Property Owners/Occupiers

The Project would affect property owners and occupiers in selected locations requiring partial or full acquisition for the construction and operation of the Project (as discussed above at Section 4.1.4). To date and given the long-term delivery horizons for this section of the Project, no directly impacted owners or occupiers have been engaged with.

Temporary land requirements are unknown at the time of writing.

At the appropriate point in time, face to face meetings to discuss the proposed improvements would be required to inform property owners and occupiers of the Project and the potential impacts.

Utility and Network Operators

To date, meetings have not yet been held with the following utility and network operators in relation to this section of the Project:

- Auckland Council/Healthy Waters (Stormwater);
- Watercare (watermain, wastewater);
- Spark New Zealand Limited (Southern Cross Chorus Fibre Optic);
- Chorus Limited (Chorus Fibre Optics);
- Transpower New Zealand (National Grid);
- Vector Limited (electricity, gas, communication, street lights); and
- Vodafone New Zealand (communication).

Engagement with these utility and network operators will be critical to Project delivery and will occur at the appropriate time at a later stage

Local Community and General Public

During the first consultation stage, selected groups have been consulted with. In addition, the wider public has been engaged with via Open Days, social media and target letter drops while Project Partners and key stakeholders have been involved throughout the optioneering process to inform the preferred alignment. Engagement with the local community and residents during the second round of engagement was centred on presentations, small group and one-on-one meetings

Key stakeholders of the project (not mentioned above) include:

- Auckland Council
- Bus operators
- Local Boards
- Panuku
- Ministry of Education
- Kāinga Ora – Homes and Communities (formerly Housing NZ)
- Freight and road user groups

- Unions
- Advocacy and interest groups (i.e. National Road Carriers, Bike Auckland and Howick and Pakuranga Grey Power).
- Community stakeholders
- Business associations
- Network utility operators
- Emergency services
- Directly affected property owners, lessees and tenants

4.2 ESR Screen

The objective of the ESR screening process is to identify environmental or social opportunities and risks as well as providing a broad assessment of the preferred option. ESR screens have been undertaken for the long list options developed as part of the Project. The ESR screens were informed by a suite of technical notes prepared by environmental specialists as an input to the MCA framework.

The effects that have the potential to be significant as identified through the screening process relate to impacts on the CMA, impacts on social infrastructure (such as parks and reserves) and heritage. The 20Connect Project is largely set within an existing roading corridor and therefore effects are likely to be relatively low, however further mitigation, where achievable, should be considered to reduce the level of effects.

Overall, the ESR screens completed for the long list options indicated that there is a medium risk associated with the Project in terms of potential environmental effects given the nature of the identified effects.

Notably, since the ESR screens were carried out at long list Mana Whenua engagement has elevated the risk status of widening and construction works at SH20 near Ngā Kapua Kohuora / Crater Hill to significant / high risk.

4.2.1 Waka Kotahi NZ Environment and Social Responsibility Standard

Waka Kotahi Z19 State Highway Environmental and Social Responsibility Standard (the Standard) was updated in February 2016. The purpose of the Standard is to describe to the Waka Kotahi project and maintenance and contract managers and their teams, how and where to implement the Waka Kotahi environmental and social standard requirements, including urban design, for any state highway work.

The Standard sets expectations about the tasks that must be undertaken during state highway project development and delivery as well as when maintaining and operating the network. A requirement of the Standard is the preparation of an ESR screen at the SSBC stage of a project.

The ESR screen is categorised into six topic areas: General, Natural Environment, Culture and Historic Heritage, Human Health, Social, and Urban and Landscape Design. The purpose of the screen is to identify opportunities, inform the risk management process and provide a guide that sets out how the environmental and social matters of a state highway project have been addressed during the business case phase. The completion of the screen is an important step in the risk management process to identify the environmental or social risks and issues associated with the Project.

ESR screens were undertaken for the long list options for the Project. The ESR screen were informed by high level commentary and technical notes provided by the Project's environmental team as part of the long-list MCA assessments (outlined in brief in Section 4.2.2 below and discussed in detail at Part B of the SSBC report).

4.2.2 Relationship of the Multi Criteria Analysis to Environmental and Social Responsibility Screen

A MCA process has been undertaken to respond to the Waka Kotahi requirements for the business case process to ensure that the most appropriate overall package of works is identified. This process has been undertaken with a view towards the future preparation of a more detailed and robust alternatives assessment to support any RMA approvals (either in relation to a future NoR and/or resource consent for activities involving significant adverse effects).

The Project options were assessed using a MCA Framework, which considered the performance of each of the options against the Project objectives, transport outcomes and benefits, constructability, affordability, and social and environmental impacts. The MCA Framework was developed with consideration of the aforementioned Standard and incorporated criteria that aligned to the topic areas and considerations of the ESR screen. Project specialists completed environmental technical notes to inform the MCA long and short list assessments (including the MCA scoring). The information contained within these technical notes has been carried forward and forms the basis for the ESR screen. This process is shown in Figure 11.



Figure 11: Relationship between ESR screens, MCA and PEAs

4.2.3 Summary of Environment and Social Responsibility Screen

Bearing in mind the ESR screen was undertaken at longlist and a significant amount of additional assessment and design development took place to develop the preferred option, this section summarises the key conclusions of the environmental technical notes completed by the Project specialists which underpinned the ESR screen.

Section 4.3 of the Consent Strategy summarises the PEAs and Corridor Strategy¹⁶ that were developed in the context of the learnings of the longlist ESR.

Natural Environment:

- Increased impervious area resulting in increased volumes of stormwater discharge. Will require treatment to ensure adequate quality before entering CMA. Consultation with AC and Mana Whenua will be required;
- Will require works within CMA and likely streamworks - sea level rise and ecological impact will require assessment;
- Potential for adverse effects during construction (e.g. sedimentation) - methodologies, erosion and sediment control and best practice management will be required.

Culture and Historic Heritage:

- Potential for accidental discovery of unknown substrata archaeology.

¹⁶ Following longlist assessment, a Corridor Strategy was jointly scoped between the Waka Kotahi and AT – recognising this as a pre-cursor to an ULDF in later project phases and the opportunity to consider the Southwest Gateway Programme of projects comprehensively with other public and private sector investment in this part of Auckland.

- Impact on built heritage - Item 2625 in the AUP (Homestead at Mangere Centre Park) is affected if the designation extends into its extent of place. The preparation of a preliminary archaeological assessment is recommended;
- Area of significance to Mana Whenua (i.e. Ngā Kapua Kohuora / Crater Hill) / cultural and archaeological landscape - consultation required and to include request for Cultural Values Assessment;
- Adjacent Marae, particularly those at/near the SH20/SH20A interchange.

Human Health:

- Potential noise increases to nearby residential properties (through potential removal of dwellings directly adjacent current motorway) and also through cumulative noise. Construction and operational noise including vibration considerations to be design and construction methodologies;
- Existing motorway and likely adjacent sites considered HAIL. Recommended a DSI is undertaken to confirm presence or otherwise of contaminants within project extents and CSMP to support authorisation/construction;
- SUP to be included in design to encourage active modes of transport.

Social:

- Additional lanes improve accessibility to and around airport environs;
- SUP provides modal choice as well as a recreational resource (addition to Mangere Bridge to Clover Park circuit);
- Potential for frustration during construction / delays / effects especially given Kirkbride project just complete;
- Adjacent areas of existing social benefit including schools, recreational reserves which may be directly impacted as a result of the works;
- Will require property acquisition (both residential/commercial and open space).

Urban and Landscape Design:

- Amenity planting and berm vegetation clearance will be required resulting in reduction of landscaping along the route (or required to be replanted if room within the designation after widening);
- Utilising existing roading corridors;
- Opportunity to strengthen NZ culture and identity to international visitors through urban design - ULDF required.

The ESR screen includes recommendations for PEAs to be undertaken which are reported on in Section 4.3, below.

Overall, the ESR screens undertaken indicate that there is a medium risk associated with the Project in terms of potential environmental effects given the nature of the identified effects and the proposed benefits of the Project will deliver, with many of the potential effects limited to the construction phase only. The visual impact associated with the proposed motorway structures and the effects on cultural and archaeological values and potential effects on coastal natural character and processes are key considerations moving forward as are the potential impacts on adjacent parks and reserves.

It is important that engagement with both Mana Whenua and key stakeholders, continues in the process so that any concerns can be addressed in the design and/or mitigation measures included where practicable.

4.3 Key Planning and Environmental Considerations

The following provides planning and environmental considerations for 20Connect, which includes construction and operation on SH20A and SH20¹⁷.

¹⁷ As identified earlier, SH20B improvements are dealt with in Part 4 of this consent strategy.

Environmental assessments were completed based on nine long-list options. The long-list options were further developed into six short-list options based on the outcomes of a Multi-Criteria Analysis process. Further environmental assessments were carried out on the short list options. The information contained in these assessments forms the basis of the considerations below.

PEAs have been completed for the preferred option for those discipline areas known to be of particular risk or require specific mitigation. PEAs have been prepared for ecology, coastal processes, heritage and archaeology, social, noise and vibration, stormwater and landscape, visual and urban design. Other discipline areas have been addressed in Section 4.3.2 below.

The PEAs have identified potential adverse environmental effects and opportunities for environmental mitigation measures, to assist in mitigating identified adverse effects. An overview of the environmental mitigation opportunities is provided within this Consenting Strategy at Section 4.3.3.

Some PEAs and technical notes indicate assumptions and limitations specific to the topic area. These are indicated in the 'assumptions and limitations' section of each of the documents. Based on the PEAs, key environmental focus areas have been identified that are likely to experience potential adverse effects which are depicted in Figure 12 below.

A summary of the environmental considerations (based on the environmental assessment tech notes produced for the short list and long list options and the PEAs) is summarised in the subsections below and include recommendations for further assessment and mitigation measures.



Figure 12: Key environmental areas

4.3.1 Preliminary Environmental Assessments

Overview

Assumptions regarding the Project Scope applied to the PEAs are as follows:

- Interfacing projects - Auckland Airport Precinct Improvements, Auckland Manukau Eastern Transport Initiative (AMETI) Eastern Busway, City Centre to Mangere (CC2M) Light Rail, Supporting Growth (South



Auckland), Airport Taskforce, Southern Connections. These interfacing projects should be referred to but not explicitly assessed as part of the scope of the Southwest Gateway projects.

- Construction method – not available at this stage. As such generic construction methods to be considered.
- MCA and ESR information prepared to date by discipline expert – to be used to inform the assessment.
- Construction and operational timeframe – not available at this stage.

Planning and Environment Summary

Based on the PEAs undertaken, and the technical notes and assessments produced for the long list and short list options assessment, and the ESR screen a range of positive and adverse effects are likely to be experienced from the construction and operation of the Project.

- The project has potential to result in significant adverse effects relating to the CMA and on natural character due to the proximity of several identified landscapes and features, including Tararata Creek and Ngā Kapua Kohuora / Crater Hill. Ngā Kapua Kohuora is subject to an Outstanding Natural Feature Overlay which is impacted by the design and the proposed project has the potential to result in highly significant adverse effects on this feature.
- The CMA bounds the study area to the north and to the west, including both the Manukau Harbour and Māngere Inlet. Of particular relevance to SH20 and SH20A is the Tararata Creek which is also identified as CMA and subject to the coastal inundation control layer in the AUP. Coastal areas of the Manukau Harbour are identified as marine SEAs (M1 and M2) within the AUP, valued for its habitat, particularly as a feeding ground for international migratory wading birds. It is considered that sea-level rise and climate change aspects can be managed via the design of the new bridges and culverts required as part of the Project.
- The primary construction effects in the marine environment are likely to be the loss of mangrove and salt marsh habitat and the loss of coastal vegetation within 20m of mean high-water springs. Furthermore, there is the potential for the interruption of migration of diadromous fish through the estuarine habitats. There is also potential for scour and deposition around the bridge support structures in the CMA and estuarine environment, however these potential effects can be mitigated through detailed design and/or the placement of the supports to avoid main channels and high energy areas.
- Changes to the focal point Regionally Significant Viewshaft M4 toward Mangere Mountain due to the south facing ramp from SH20A to SH20 need further consideration and there are Significant Ecological Area (SEA_M2) along parts of the coastal areas.
- The Project requires the crossing of and/or interaction with the CMA at the northern extent of the Project, near Mangere Bridge and Tararata Creek.
- The loss of residential properties, parks and businesses could adversely change a community's sense of place as well as the loss or reduced functionality of community services and facilities.
- Potential loss of privacy and amenity for some residential properties due to overlooking by users of the SUP.
- Increased impervious surface area will result in increased stormwater discharge volumes that will require treatment to ensure an adequate level of water quality is achieved before any water is discharged to the CMA or to freshwater habitats.
- There are several areas within the project that indicate flooding inundation during the 1%AEP rainfall event and for most of these areas a catchment wide solution will be required to mitigate existing flooding issues.
- The project also has potential to result in the temporary displacement of potential banded rail foraging habitat.
- Considering archaeological and heritage values of the Project area there is potential that archaeological features may be adversely impacted by these works, especially near to waterways or the esplanade reserve and where historic structures may have been.

- A Detailed Site Investigation should be completed to confirm the presence of contaminants and that a Contaminated Site Management Plan (CSMP) should be implemented for construction.
- Operational noise effects within this area will be limited given noise levels in this area are dominated by high traffic volumes on SH20, however there are a few noise sensitive activities in the area that may require further consideration [REDACTED]
- Engagement and further discussions will be required in relation to stormwater discharge, property acquisition and impacts to community parks, reserves, and in relation to impacts to other utilities along the route.
- The project is likely to impact cultural values given the range of known and anticipated cultural, spiritual and historical values along SH20 and SH20A section further and the identified environmental effects (some of which are potentially significant) ongoing engagement, in partnership with Mana Whenua, in accordance with the principles of Te Tiriti o Waitangi is critical. Moreover, the Project presents the opportunity to strengthen Mana Whenua cultural identity through design and increase understanding and collaboration through partnership.
- For SH20, places and sites of significance include Mangere, Tararata Creek (directly impacted by the project) and Ngā Kapua Kohuora (Crater Hill) (also directly impacted by the project). The western extent of SH20 is closest to the centre of the explosion crater of Crater and should be avoided. The eastern extent of SH20 is still a part of the crater but represents the outer extent of the pa with food gardens and a pond. It is preferred that any expansion of SH20 should therefore be on the eastern side with appropriate mitigation measures acknowledging the impact of such development on the site.

The mitigation recommended, including further assessment required within the PEAs is detailed further in **Appendix E** and Section 4.6. Further consideration of how impacts on the Crater Hill Outstanding Natural Feature can be avoided or minimised is recommended.

A SWG Corridor Strategy was drafted to support the long-term 20Connect SSBC with the purpose to:

- Assist with future stakeholder engagement in order to help ‘tell the whole story’ through presenting the context of the corridor;
- Identify urban, environment and transport projects with potential collective benefit of broader third-party project investment in the corridor environments;
- Identify constraints and opportunities, both high-level and site-specific, within the corridor to inform future planning and design work.

4.4 Required Approvals and Analysis of Approval Methods

This section sets out the likely approvals required for 20Connect (SH20 and SH20A). It considers:

- RMA approvals – including the AUP and relevant national environmental standards; and
- Other statutory approvals under the Marine and Coastal Area (Takutai Moana) Act 2011 and HNZPTA 2014.

The list of identified statutory approvals should be reviewed and confirmed based on further information and detailed design during the pre-implementation phase.

The section of the Project lies largely within existing Waka Kotahi designations, but either alterations or new designations would be required to deal with corridor widening, property acquisition and overlap / boundaries between the various state highway designations.

The staging of the Project identifies that there is no short or mid-term need for the proposed 20Connect improvements on SH20 and SH20A. As such, route protection and associated land acquisition would not be justifiable in the near-term horizon. The SH20B section of 20Connect will be progressed in conjunction with A2B and is covered in Part 3.

4.4.1 Resource Consent Considerations

Existing Designations

Several designations apply to the land within or directly adjacent to the Project Area. A summary of the existing Transport designations is provided in Table 5 below. A full list of all designations applicable to A2B and 20Connect is provided at **Appendix B**.

Table 4: Existing Transport Designations within the 20 Connect Project Area

Requiring Authority	Designation	Location	Purpose
Waka Kotahi NZ Transport Agency	6717 State Highway 20B	State Highway 20B ¹⁸	To undertake maintenance, operation, use and improvement to the State Highway network.
Waka Kotahi NZ Transport Agency	6709 State Highway 20	State Highway 20 between Rimu Road on-ramp and Coronation Road on-ramp	To undertake maintenance, operation, use and improvement to the State Highway network.
Waka Kotahi NZ Transport Agency	6708 State Highway 20	State Highway 20 between Coronation Road off-ramp and Bader Drive off-ramp and Massey Road off-ramp. Includes a small section on the southern side of Massey Road overbridge	To undertake maintenance, operation, use and improvement to the State Highway network.
Waka Kotahi NZ Transport Agency	6710 State Highway 20	Northern boundary of the Waterfront Road and the ends of Coronation Road and Mahunga Drive at Mangere Bridge	To undertake maintenance, operation, use and improvement to the State Highway network
Waka Kotahi NZ Transport Agency	6712 State Highway 20A	State Highway 20A	To undertake maintenance, operation, use and improvement to the State Highway network.
Waka Kotahi NZ Transport Agency	6713 State Highway 20A	State Highway 20A	To undertake maintenance, operation, use and improvement to the State Highway network.
Waka Kotahi NZ Transport Agency	6716 State Highway 20	State Highway 20, Cavendish Drive interchange	To undertake maintenance, operation, use and improvement to the State Highway network.

Other designations held by other requiring authorities in the Project area which are located directly adjacent to, or overlap the Transport Agency's state highway designations, include¹⁹

- Auckland Airport (110), George Bolt Memorial Drive by AIAL (adjoining SH20A);

¹⁸ The Designation Alteration sought as part of the SH20B short term improvement works have been confirmed

¹⁹ Designations as at 31 October 2019 in the AUP.



- Auckland Airport – Airspace Restriction Designation - Protection of aeronautical functions - obstacle limitation surfaces (includes height limitations for structures within this designation) by AIAL;
- Te Kura Kaupapa Māori o Māngere - kura kaupapa māori years 0-13 (4998) at 7S Comet Crescent, Mangere (southwest of the SH20A and SH20 interchange) by the Minister of Education;
- Sir Douglas Bader Intermediate School (4990) at 1/6S Court Town Close by the Minister of Education;
- Jean Batten School at 6S Imrie Avenue (4937) by the Minister of Education;
- Mangere Central School at 244S Kirkbride Road, Mangere (4947) by the Minister of Education;
- Robertson Road School at 203 Robertson Road, Mangere (4985) by the Minister of Education;
- Petroleum Pipeline - Urban (6501) crosses SH20B between Richard Pearse Drive and Westney Road by the New Zealand Refining Company Limited (crosses SH20A); and
- Manukau Memorial Gardens (cemetery) (607) by Auckland Council (north of SH20B).

Existing Resource Consents

The Project will need to be designed to comply with Auckland Council's recently obtained Stormwater NDC (DIS60069613). This is not considered to be a significant consenting risk for the project as compliance with the Waka Kotahi's own standards aligns with the requirements of the NDC.

Auckland Unitary Plan Zones and Controls

The Project area is regulated by the AUP, which contains the planning provisions for development within the Auckland region.

The AUP largely enables the Project through the inclusion of Waka Kotahi designations (which cover the majority of Project area), the underlying Strategic Transport Corridor Zone, and the supportive policy framework which recognises the role and importance of infrastructure and the public benefits it generates.

Zones and Precincts

The zoning within the Project area is displayed in **Appendix C**. The Project area is predominantly subject to the Strategic Transport Corridor which applies to land within the Transport Agency's designations. The surrounding land use is subject to a range of zoning, including, but not limited to:

- Light Industrial located at the north eastern extent near Mangere Bridge, south west of SH20A; and
- A mix of residential zones (the majority being Mixed Housing Suburban and Mixed Housing Urban zone with some Terrace and Housing and Apartment Building Zone located near Mangere Town Centre).

In addition to the zoning there are four precincts that the improvements are located within or adjacent to. A high-level summary of each precinct is provided below:

- **Auckland Airport Precinct** - The Auckland Airport Precinct applies to Auckland International Airport and its surrounds. Its purpose is to enable the efficient operation and development of Airport and the associated land and activities in recognition of its role in connecting Auckland to other parts of New Zealand and the world;
- **Puhinui Precinct** - A significant portion of land located within the study area to the west of SH20 is within the Puhinui Precinct. The Puhinui Precinct sets out the framework to enable a transition from rural to urban development, while recognising the cultural, spiritual and historical values and relationships that Te Ākitai Waiohū have with the land and sea in Puhinui as part of the Māori cultural landscape;
- **Māngere Gateway Precinct** - The Māngere Gateway Precinct is comprised of land generally north of the Auckland Airport and west of George Bolt Memorial Drive and Kirkbride Road. The area has been historically rural in character, however is in transition with industrial development occurring within the precinct;

- **Mana Whenua Management Precinct** - The purpose of the Mana Whenua Management Precinct is to formally recognise and provide for the special relationship Mana Whenua have with the Coastal Marine Area (CMA) particularly Whātāpaka Creek and Pūkaki-Waiokauri Creek that are contained within a Māori reservation. The precinct seeks to avoid direct discharges of wastewater. It also seeks to control the direct discharge of stormwater and all other contaminants into the precinct from activities undertaken both within and outside the precinct that could adversely affect water quality and the spiritual and cultural values of the Whātāpaka Creek and Pūkaki-Waiokauri Creek.

Overlays and Controls

The Project area is subject to or adjacent to the following overlays and controls within the AUP (refer to **Appendix B** for a full appendix of the key overlays and controls impacting Southwest Gateway):

- **High Use Stream Management Overlay** - Applicable to the 20Connect project area south of the SH20A intersection with Kirkbride Road and east of the SH20 Intersection with Massey Road (Manukau Southeast Kaawa and Manukau Waitemata Aquifer);
- **Aircraft Noise Overlay – Aircraft noise Notification Area** – covers majority of the south-eastern extent of the project area;
- **Significant Ecological Areas Overlay – Marine 1 and Marine 2** – covers the CMA north of Rimu Road (northern-most extent of 20 Connect);
- **National Gird Corridor Overlay – National Grid Yard Uncompromised** – cuts across SH20 near Waterfront Road;
- **Regionally Significant Volcanic Viewshafts And Height Sensitive Areas Overlay – Mangere Mountain, Height Sensitive Areas** – applicable to project are north of the SH20 and SH20A intersection;
- **Outstanding Natural Features Overlay – ID 22, Crater Hill** – applicable to SH20 widening;
- **Historic Heritage Overlay Extent of Place – 2625, Samuel Ward House Homestead** - located next to SH20 near the intersection with Bader Drive; and
- **Quarry Buffer Area Overlay** – located south of SH20 between Puhinui Road and Portage Road;
- **Stormwater Management Area Control – Flow 1** – located west of SH20 between Puhinui Road and south of Portage Road;
- **Building Frontage Control – General Commercial Frontage** – Mangere Town Centre;
- **Vehicle Access Restriction Control** – applicable at various points on key SH20 and SH20A intersections within the project area;
- **Coastal Inundation 1 per cent AEP Plus 1m Control** – near the intersection of SH20 and Coronation Road and again near Rimu road; and
- **Macroinvertebrate Community Index Area** - entire project area.

Resource Consent Requirements

District Plan Requirements

The key District Plan requirements relevant to this section of A2B are summarised below:

- In addition, off-road pedestrian and cycling facilities are permitted in all zones (E27.4:A10).

In addition:

- The construction, maintenance, upgrade and use of cycleways and walkways associated with the proposed SUP facilities in the Strategic Transport Corridor zone are a permitted activity (Rule H22: A1);

- The removal of any trees within the road corridor greater than 4m in height will require consent as a restricted discretionary activity (E26.4.3.1:A92);
- The project will require network changes to the focal point Regionally Significant Viewshaft M4 toward Mangere Mountain as a result of the south facing ramp from SH20A to SH20 which is not provided for in the Volcanic Viewshafts and Height Sensitive Areas Overlay, which will require a consent for a non-complying activity (E26.11.3.1: A165);
- Earthworks will be required associated with the road network activities within an Outstanding Natural Feature Overlay (i.e. Ngā Kapua Kohuora / Crater Hill for 20Connect which may not comply with all the relevant standards (E26.7.3.1: A117); and
- Noise and Vibration associated with the works may exceed that permitted for the relevant zones (E25.4.1: A2).

The Project may also require works to occur within a Historic Heritage Overlay which may not comply with the permitted activity standards in E26.8.5.1. (i.e. at Samuel Ward House Homestead - located next to SH20 near the intersection with Bader Drive).

There are no provisions in the Mana Whenua Management Precinct²⁰ (I419) of relevance to this project, given they relate to prohibiting direct discharge wastewater only.

Overall, based on the information known to date, consent is anticipated to be required for a non-complying activity if resource consents were to be applied for instead of a NoR.

Regional Plan Requirements

A broad range of regional plan resource consents will be required to authorise the SH20 and SH20A section of the Project, including in relation to:

- activities in, on under or over the bed of rivers, streams and wetlands (E3:A1);
- extensions to existing (E3.4.1: A26) and new culverts (E3.4.1: A33) that are greater than 30m in length;
- any reclamation or drainage, including filling over a piped stream (E3: A49);
- any diversion of streams to accommodate for the proposed stormwater management (E7:A13);
- new stormwater outfalls (E3.4.1:A44)
- stormwater - discharge and diversion (E8.4.1: A86)
- stormwater quality (E9.4.1: A97)
- dewatering to accommodate the proposed works (E7.4.1: A13, E7.4.1:A20 and E7.4.1: A26);
- permits relating to the construction, occupation and use of the CMA (A124 / A133: F2), including alteration or removal of existing vegetation (E26.3.3.1 (A77);
- any air discharge permits relating to dust generated by earthworks and construction (E14.4.1:A83)

There will also be relevant regional policy framework considerations from the Mana Whenua Management Precinct (I419). At this stage based on the limited information held to date, consent is anticipated to be required for a discretionary activity.

²⁰ There are no relevant District Plan rules in this precinct – only the additional objectives and policy framework



National Environmental Standards

National Environmental Standard for Assessing and Managing Contaminants in Soils to Protect Human Health 2011

The NES: Soil applies to land where HAIL activities have been identified. A contaminated land investigation has been undertaken for the Project area, but a Preliminary Site Investigation is yet to be undertaken. Given the anticipated presence of contamination along the proposed route it is anticipated that a detailed site investigation ('DSI') will be required to establish contamination conditions within parts of the Project area.

Provided this is produced and submitted as part of the RMA approvals application, resource consent is anticipated to be required as a restricted discretionary activity subject to Regulation 10 of the NES: Soil.

4.4.2 Notice of Requirement Considerations and Other Approvals

Requiring Authority

This state highway improvements aspect of the proposed project falls clearly within the purpose of the Agency as a requiring authority. Therefore, the Agency would designate all components of this section of the project which will result in changes to the underlying state highway network infrastructure.

The primary benefit of a Requiring Authority seeking a designation (or altering an existing designation) is that it cannot be altered by any other party, unlike provisions of a Plan. The outline plan process also allows for greater flexibility and for details to be provided at a later stage, compared to a granted land use resource consent. In addition, this approach maximises the requiring authority powers for route protection and gives long-term operational benefits. The design of the Project should be of sufficient detail to justify the extent that the area is reasonably necessary for the NoR and to enable its environmental effects to be appropriately assessed.

An additional consideration for a NoR is to obtain approval for a route protection only (without other Statutory approvals). A benefit of this approach is that it provides some certainty to landowners, however delays the detail and further consents to a later date. Conversely, this process potentially increases costs/time associated with the need for further regulatory processes. Moreover, long-term route protection involving property acquisition may be difficult to justify for a longer horizon project due to the enduring encumbrance it places on land owners. Accordingly, without other factors (such as network demand and associated funding) accelerating delivery, this approach is not recommended for the SH20 / SH20A section.

4.4.3 Other Approvals

Marine and Coastal Area (Takutai Moana) Act 2011 (MACA)

Ongoing consideration will need to be given to whether particularly engagement is required under the Marine and Coastal Area (Takutai Moana) Act 2011 and in relation to other customary rights. It is also recognised that engagement needs to consider the potentially differing land-based and coastal interests held by Mana Whenua groups.

The interaction of MACA obligations and the Project is critical item to monitor and re-evaluate.

Heritage New Zealand Pouhere Taonga Act 2014

An Archaeological Authority is recommended this project given known archaeological sites within the Project area – particularly the potential impact on Ngā Kapua Kohuora / Crater Hill and throughout the broader Mana Whenua Management Precinct.



Third Party Consents

The works are anticipated to generate third party consent implications, particularly at locations where there will be substantial private property impacts – particularly where land acquisition and site reconfiguration is required and/or there is a substantially altered proximity to the state highway corridor / ramp structures.

4.4.4 Approval Method Recommendation

Based on the assessment above, were the Project to seek the relevant approvals, it is recommended that the Waka Kotahi develop an integrated NoR (with regional consents including other approval detailed above) to alter the existing State Highway designation.

4.5 Approvals Pathway

There is currently no need for route protection for 20Connect given the project comprises long-term state highway improvements with the delivery timeframe extending to potentially the second or third decade. It would be high risk and therefore very challenging to justify associated land acquisition (let alone a suite of other related consents/approvals that would be required).

As concluded at Section 4.7 of the Consent Strategy, authorisation (irrespective of the planning tool and process) of this section of 20Connect in the near term is not recommended. However, for completeness the consent strategy does outline and explore the potential use of current RMA pathways and associated risks / benefits to authorising the project in the short or mid-term.

There are currently²¹ four RMA approvals processing options available to the Waka Kotahi for obtaining the necessary NoR and resource consents for 20Connect. These options are:

- Determination by a Board of Inquiry through a proposal of national significance call-in process;
- Determination by the Environment Court through a proposal of national significance call-in process;
- Direct referral to the Environment Court; and
- Determination by the Consent Authority (Auckland Council).

As with the approval tools, the pathways have also been comprehensively assessed in Section 2.7.2.

4.5.1 Assessment of Pathway Options

The following section assesses the use of each available approval pathway for 20Connect:

Determination of a Board of Inquiry or Environment Court through a proposal of national significance call-in process

A sufficient level of design (including construction methodology) would be required for all components before a Board of Inquiry or Environment Court which, without significant acceleration, would not be developed for these later priority (second or third decade) components of the Project at the proposed time of lodgement; and

Determination by a Board of Inquiry or the Environment Court as Project of National Significance is not considered appropriate at the time of writing for 20Connect given the scale of the Project (at a national level).

While there is anticipated to be a significant amount of local / regional level interest (some aspects at a national level) and potentially significant adverse effects to be dealt with, the SH20 and SH20A improvements on their own would not meet the tests under section 142(3) of the RMA unless it was accelerated and considered as part of a wider application authorising the whole Southwest Gateway programme. Accordingly, as an individual project section, there are no reasons to contemplate the Project of National Significance process;

Direct referral to the Environment Court

²¹ The RMA tools and pathways to authorise this section of 20 Connect are expected to change before the project is delivered in the currently forecast (second or third decade) horizon.



A sufficient level of design (including construction methodology) would be required for all components before a Board of Inquiry or Environment Court which, without significant acceleration, would not be developed for these later priority (second or third decade) components of the Project at the proposed time of lodgement; and



Determination by the Consent Authority (Auckland Council)

This section of 20Connect is anticipated to be a contentious - particularly if project authorisation is sought early and/or there is no property acquisition funding secured. However, provided the public interest, technical assessments, design and engagement can be modified to suit areas of higher risk along this section, determination by Consent Authority is recommended over Direct Referral to the Environment court given it is considered to be more collaborative with the decision maker, submitters, stakeholders and Mana Whenua. In addition, it means that if the project were to be appealed then an Environment Court hearing would be limited to the resolution of outstanding issues rather than rehearing all submitter issues. For clarity, unless there is significant acceleration authorising this section of 20Connect in the near term is not recommended (as they are very long-term state highway improvements that are currently unfunded).

4.5.2 Approval Pathway Recommendation

If early authorisation was sought the recommended approval pathway is lodgement with Auckland Council for determination by the Consent Authority.

4.6 Key effects, constraints and risks







4.7 Summary

The recommended planning pathway is:

- [REDACTED]
- Unless the project delivery horizon is significantly accelerated (to a short or mid-term), the RMA framework (tools and processes to authorise the project) may have fundamentally changed by the time these aspects of 20Connect progress to pre-implementation (potentially second or third decade).
- If a decision was made to advance the project in the near term the recommended pathway is an integrated NoR and regional plan application processed by the 'traditional approach' RMA application process determined by the territorial authority (Auckland Council).

Other Approvals:

- Archaeological Authority – an authority would be necessary given the relationship to Ngā Kapua Kohuora / Crater Hill on SH20.

Significant Stakeholder Engagement:

- Impacts on private property
 - Property acquisition – including full and partial acquisition (including residential property and landscaping, vehicle access, car-parking and loading / servicing of commercial property); and
 - Third-party consents will need to be altered and/or obtained.
- Potential s177 RMA approvals from other requiring authorities including the Minister of Education.

Key Planning and Environment Risks and Opportunities:

- Potential to cause adverse effects on natural character due to the proximity of several identified landscapes and features, including Tararata Creek and Ngā Kapua Kohuora / Crater Hill. Ngā Kapua Kohuora is subject to an Outstanding Natural Feature Overlay and is currently impacted by the design;
- Changes to the focal point Regionally Significant Viewshaft M4 toward Mangere Mountain due to the south facing ramp from SH20A to SH20;
- Potentially significant effects relating to the CMA, impacts on social infrastructure (such as parks, and reserves) and heritage;
- Significant Ecological Area (SEA_M2) along parts of the coastal areas of SH20. The Project requires the crossing of and/or interaction with the CMA at the northern extent of the Project, near Mangere Bridge and Tararata Creek;
- Archaeology – there is significant potential for archaeological material within the project area (the portion of SH20 between Puhinui Road and Massey Road runs through the extent of Ngā Kapua Kohuora / Crater Hill);
- Opportunity for the programme partners and Mana Whenua to resolve / mitigate the cultural effects associated with the projects impact along the 20Connect corridor (specifically - Ngā Kapua Kohuora, Tararata Creek and the CMA).



Appendix A

Summary of SWG Project Components

Summary of SWG Project Components

Project Component (relates to overall SSBC Staging Diagram)	Contained within SWG Part	Description	Subject to existing designation	NoR Required?	Resource Consents Required?	Anticipated Construction Timeframe in Relation to Overall SSBC Staging	Property Impact	Key Environmental Considerations	Other Considerations	Complexity
Bus Lanes (20B) Airport to SH20 (Short Term State Highway Improvements)	Part 1 (A2B)	The construction of two priority vehicle lanes; a new shared use path; and safety and capacity improvements at the Manukau Memorial Gardens intersection and the Campana Road intersection.	Yes - Designated 6709 'South Western Motorway' (SH20) by the Transport Agency and 6717' State Highway 20B Road purposes for the maintenance, operation and improvement of the State Highway (including road widening)'	Alteration to Designation 6709 currently being sought.	Yes - regional consents required	Horizon 1	* New Zealand Refining Company Ltd and Wiri Oil Services Ltd pipelines are located within the Alteration area at the Campana Road intersection	*Effects are assessed as no more than a minor change on the environment *Mana Whenua position / hearing 15/11/2019		Low
Puhinui Road Bus Priority and Walking and Cycling Improvements (Short Term Airport Access Improvements)	Part 1 (A2B)	The Puhinui Road Bus Priority Improvements proposes dedicated bus lanes between SH20 and Lambie Drive; and a Shared Use Path (SUP) on the northern side of the road corridor. Bus priority lanes be introduced along Puhinui Road, Lambie Drive and Cavendish Drive between SH20 and Manukau Station. The lanes and all associated works are proposed within the existing AT controlled road corridor. The proposed lanes will tie in with the various other short-term projects proposed including; Puhinui Interchange (Early Deliverable) and SH20B improvements.	No	No - bus priority and SUP can be accommodated all within the existing road corridor.	Yes – street tree removal and stormwater (SMAF)	Horizon 1	* Approval from Auckland Council's Community Facilities team required for street tree removals and mitigation (constrained corridor).	*Notable tree overlay (and approx. 25 trees anticipated to impacted/removed, 23 requiring consent) * landscape and visual effects *Impervious surface area increase *constrained environment for tree mitigation		Low
Puhinui Interchange (Early Deliverable)	Part 1 (A2B)	Puhinui Interchange - construct and operate a rail/bus interchange at the existing Puhinui Station	Yes (partial) - KiwiRail Designation but the purpose does not explicitly include a Public Transport Facility	No.	Resource Consent has been granted and OPW but a s.127 change of consent conditions is required to accommodate altered design.	Horizon 1	Limited to Auckland Council and KiwiRail land only	*effects of change (s127) *TBC if additional RC trigger (stormwater / overland flowpath east of interchange)	*TBC new consent triggers (stormwater)	Low
Bus Lanes (Manukau to Botany)	Part 1 (A2B)	Construction of bus Lanes from Manukau to Botany town centres and associated walking and cycling infrastructure	No	No	Yes - assume road corridor widening required.	Horizon 2	Assume road carriageway widening required - within road corridor (TBC following completion of RTN widening MCA).	TBC	Integration with Manukau and Botany town centre redevelopment plans include Panuku at Manukau	Low
Interim Stations / Bus Stops (Manukau to Botany)	Part 1 (A2B)	Interim stations located between Manukau to Botany town centres to support the	No	No	Yes - assume road corridor widening required.	Horizon 2	Assume road corridor widening required.	TBC	Integration with Manukau and Botany town centre redevelopment plans	Low

		extension of the public transport service from Manukau to Botany							include Panuku at Manukau	
RTN Corridor Ronwood and Davies Avenue (Manukau Town Centre)	Part 1 (A2B)	The construction (but later operation) of the full RTN Corridor on Ronwood Avenue and Davies Avenue (Manukau)	No	No	Yes	Horizon 2	*Loss of on-street car parking. * Largely within existing road reserve but there are proposed to be some minor property impacts (i.e. at the road frontage to accommodate widening). This is particularly at intersections and around the Manukau Station.	TBC - impact of carpark loss on centre		Low
Puhinui Rail Crossing Bridge	Part 1 (A2B)	New bridge across the rail-line at Puhinui Interchange includes the A2B RTN upgrades. Substantial ramp up required with a full bridge required from Kenderdine Road intersection to Cambridge Terrace Intersection.	Yes (partial KiwiRail designation over rail corridor)	Yes - anticipate a NOR will be required given the property implications	Yes - anticipated to be required.	Horizon 3	TBC following detailed design - Substantial corridor widening required with private property take and tree removal / mitigation	TBC but likely to include * significant visual and streetscape effects (6m high structure) * construction effects - traffic, noise, tree removal etc.	*Bridge Street Bridge widening and lengthening to be done by others as part of the addition to the 3rd and 4th main being added to the railway line.	High
RTN Corridor Widening Manukau	Part 1 (A2B)	Further staged delivery of the final RTN corridor around Manukau (extending on from Ronwood and Davies Avenue)	No	No	Yes - anticipated to be required.	Horizon 3	General Arrangements Indicate the RTN is largely within the existing road corridor.	* Minor adverse visual and landscape, arboricultural effects. * Limited opportunities to provide stormwater management devices	* City Centre to Mangere (CC2M) Light Rail	Low
SH20B Long Term Upgrades	Part 1 (A2B)	Widening of SH20B Corridor for 4 lane expressway, A2B RTN, SH20B southbound upgrade	Yes - Designated 6709 'South Western Motorway' (SH20) by the Waka Kotahi and 6717 'State Highway 20B Road purposes for the maintenance, operation and improvement of the State Highway (including road widening)'	Yes - anticipate new NOR or alteration will be required.	Yes - stormwater; works, structures and occupation of CMA.	Horizon 3	* third party consents (area of potentially substantial future development) * designations - i.e. Wiri Oil Services Ltd and NZ Refining Company Ltd	* Pūkaki Bridge * Eastern Access Agreement * CMA * Māori Reserve Land title * AIAL connection * archaeological sites * freshwater watercourses * extents of significant ecological area	* AIAL Airport Precinct Developments * Marine and Coastal Area (Takutai Moana) Act 2011 regarding Customary Marine Titles (CMT) and Protected Customary Rights (PCR) for proposals at Pūkaki Creek * Archaeological Authority	High
SH20B Long Term Upgrades - New Ramp	Part 1 (A2B)	New ramp at the SH20B/SH20 Interchange	Yes - Designated 6709 'South Western Motorway' (SH20) by the Waka Kotahi and 6717 'State Highway 20B Road purposes for the maintenance, operation and improvement of the State Highway (including road widening)'	Yes - anticipate alteration may be required (to deal with overlap of existing designations). Footprint not expected beyond Waka Kotahi designations	Yes	Horizon 3	* None - entirely within State Highway corridor	* visual effects * Impervious surfaces * construction effects * archaeology	* Archaeological Authority	Medium

Final Bus Stops and RTN Corridor Completion (Manukau to Botany)	Part 1 (A2B)	Final stations located between Manukau to Botany to support the extension of the public transport service from Manukau to Botany (upgrades to interim stations).	No - existing transport designation but the route does interact with a number of various designations	Yes - new NOR anticipated to be required.	Yes	Horizon 4	*multiple properties impacted along the route to support corridor widening (property acquisition required) *third party asset relocation required (i.e. power pylon)	* tree removals * stormwater * third party consent implications	* Eastern Busway (AMETI) * Site access / kerbside car-park changes TBC / LGA process	Medium
Upgraded SH1 Bridge	Part 1 (A2B)	Widening to the SH1 bridge to accommodate the wider road corridor that can support the RTN.	Yes - 6714 'State Highway 1 – Manukau City Centre to Takanini' the Transport Agency	Yes - as part of broader RTN NOR (if advanced as part of a stage not likely).	Yes	Horizon 4	*widening required to facilitate the wider bridge - private property implications (i.e. on AUT at 640 Great South Road).	* visual effects * Impervious surfaces * construction effects * third party consent implications		Medium
20 Connect SH20 Upgrades	Part 2 (20 Connect)	New ramp from SH20A to SH20, widening of SH20 to accommodate 6 vehicle lanes, establishment of shared use path along SH20.	Yes - Designated 6708 and 6709 'South Western Motorway' (SH20) by the Transport Agency	Yes - alteration to the existing designations (the Transport Agency)	Yes - regional consents required	Horizon 5	* route will impact private parties and necessitate property take and third-party consents.	*adverse effects on natural character (proximity to several identified landscapes and features) *several significant geological features in the area (i.e. two volcanic explosion craters that are classified as NZ national significant geological features) * regionally significant viewshaft M4 toward Mangere Mountain * significant ecological area along parts of the coastal area *Mana Whenua/cultural values (i.e. key places of significance include Mangere (ancient pa sites), Tararata Creek (strategically important transport route), Ngā Kapua Kohuora (Crater Hill), Onehunga (trading hub) and Te Hopua a Rangi (mooring site for traders)) * several marae, parks, schools and early childhood centres in the area * coastal marine area	* Archaeological Authority	Medium



Appendix B

Designations Within the Project Area

Designation	Location		Purpose and Authority	Relevance
Part One: A2B (Botany Town Centre to SH20B, including the Puhinui Interchange)				
6302	North Island Main Trunk Railway Line from Buckland to Britomart Station, Auckland Central		KiwiRail Holdings Limited Purpose - to develop, operate and maintain railways, railway lines, railway infrastructure, and railway premises as defined in the Railways Act 2005.	A2B will cross the Designation 6302 at Puhinui Station.
6708	South Western Motorway (State Highway 20) State Highway 20 from (1) east of Great South Road, Manukau City Centre to Cavendish Drive interchange, Wiri and from (2) Massey Road to Walmsley Road, Mangere		New Zealand Transport Agency South Western Motorway (State Highway 20).	When the RTN transitions from Lambie Drive to Manukau Station Road it will interact with Designation 6708.
1817	Public Car Park – Davies Avenue 2 Davies Avenue, Manukau		AT Purpose: Public off-street parking, including ongoing maintenance, repairs and like for like replacement works to the existing parking facility and minor operational improvements to the same.	Works will occur adjacent to the public car park.
1822	Public Car Park – Davies Avenue 8 Davies Avenue, Manukau		AT Purpose: Public off-street parking, including ongoing maintenance, repairs and like for like replacement works to the existing parking facility and minor operational improvements to the same	Works will occur adjacent to the public car park.
1814	Car Park - Osterley Way (AMI) 9 Osterlery Way, Manukau Central		AT Purpose: Public off-street parking, including ongoing maintenance, repairs and like for like replacement works to the existing parking facility and minor operational improvements to the same	

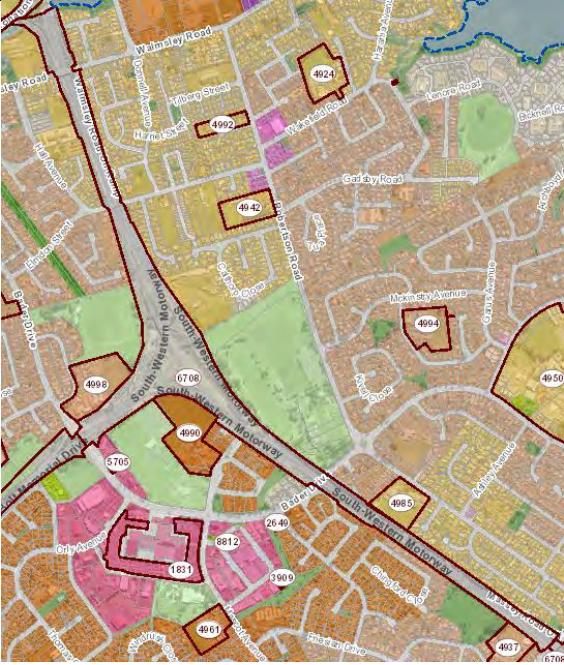
6102	AUT Manukau Campus 640 Great South Road, Manukau		Minister for Tertiary Education, Skills and Employment Purpose: The construction, undertaking, establishment, management, operation and maintenance of a tertiary educational facility and every use of the land for educational and ancillary purposes.	Works on Te Irirangi Drive are likely to interact with the AUT Designation.
6714	State Highway 1 – Manukau City Centre to Takanini State Highway 1 from north of Highbrook Drive, Otara to south of Great South Road, Takanini		New Zealand Transport Agency Purpose: Southern Motorway (State Highway 1)	Works on Te Irirangi Drive will interact with The Waka Kotahi Designation.
1802	Road Widening – 128 Ormiston Road, Flat Bush		AT Purpose: Road Widening	Yet to be confirmed if works will interact with this designation.
8517	Brownhill Road to Otahuhu Underground Electricity Transmission Cables 143 Brownhill Road, Whitford to 26-28 Kaitawa Street, Otara		Transpower New Zealand Ltd Purpose: Electricity transmission - the construction, operation and maintenance of a double-circuit underground 220kV cable as part of the upper North Island Grid Upgrade Project, to convey electricity between the Otahuhu Substation and the substation site at Brownhill Road, and ancillary activities.	Works on Te Irirangi Drive will interact with this designation
8516	Brownhill Road to Pakuranga Underground Electricity Transmission Cables 143 Brownhill Road, Whitford to 109 Golfland Drive, Howick		Transpower New Zealand Ltd Purpose: Electricity transmission-the construction, operation and maintenance of a double circuit underground 220kV cable as part of the upper North Island Grid Upgrade Project, to convey electricity between the Pakuranga Substation and the substation site at Brownhill Road, and ancillary activities.	Works on Te Irirangi Drive will interact with this designation

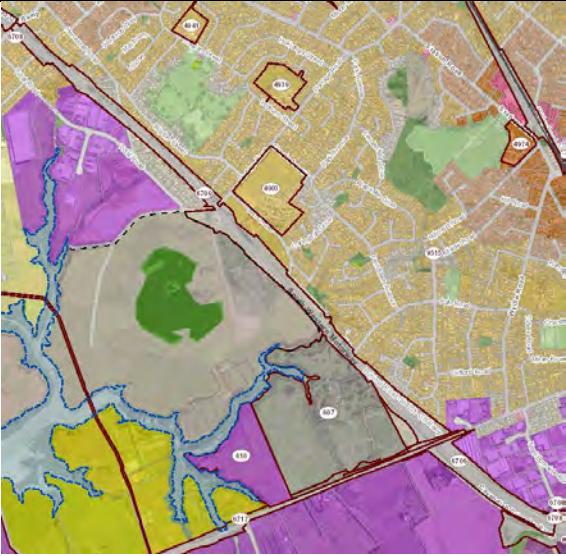
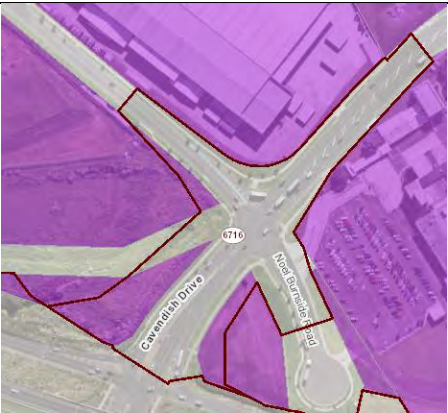
9104	Mill Road (Waikato District Council boundary), Pukekohe to 65 Highbrook Drive, East Tamaki		First Gas Limited Purpose: Gas Transmission Pipeline	Works on Te Irirangi Drive will interact with this designation
6717	State Highway 20B		New Zealand Transport Agency Purpose: State Highway 20B: State Highway 20 To Auckland International Airport	Note the overlap of designations
9700	Along Puhinui Road and adjacent properties		Wiri Oil Services Ltd Purpose: Wiri to Auckland International Airport Jet Fuel Pipeline	
6501	Along Campana Road and adjacent properties		New Zealand Refining Company Ltd Purpose: Petroleum Pipeline – Urban Section	Note that 20 Connect intersects with this designation at 20A as well as 20B

* The entire A2B project from Puhinui Interchange to Botany is also located within an Airspace Restriction Designation (1102).

Part Two: 20 Connect (SH20 and SH20A)

Designation	Location		Purpose and Authority
6710	Northern boundary of the Waterfront Road and the ends of Coronation Road and Mahunga Drive at Mangere Bridge		New Zealand Transport Agency Purpose: State Highway 20: To undertake maintenance, operation, use and improvement to the State Highway network

6709	State Highway 20 between Rimu Road on-ramp and Coronation Road on-ramp		New Zealand Transport Agency Purpose: State Highway 20: To undertake maintenance, operation, use and improvement to the State Highway network
6708	State Highway 20 between Coronation Road off-ramp and Bader Drive off-ramp and Massey Road off-ramp. Includes a small section on the southern side of Massey Road overbridge		New Zealand Transport Agency Purpose: State Highway 20: To undertake maintenance, operation, use and improvement to the State Highway network
4998	7S Comet Crescent, Mangere		Minister of Education Purpose: Educational purposes - kura kaupapa māori years 0-13 (Te Kura Kaupapa Māoriā o Mangere)
4990	1/6S Court Town Close, Mangere		Minister of Education Purpose: Educational purposes - primary school years 0-8 and may include early childhood education preschool (Sir Douglas Bader Intermediate School)
4937	6S Imrie Avenue, Mangere		Minister of Education Purpose: Educational purposes - primary school years 0-8 and may include early childhood education preschool (Jean Batten School)

6709	State Highway 20 between Massey Road on-ramp and Puhinui Road 20B on and off ramps.		New Zealand Transport Agency Purpose: State Highway 20: To undertake maintenance, operation, use and improvement to the State Highway network
607	361 Puhinui Road, Papatoetoe, adjacent the intersection of SH20 and SH20B		Auckland Council Purpose: Cemetery (Manukau Memorial Gardens) <i>Note the overlap of designations</i>
6708	State Highway 20		New Zealand Transport Agency Purpose: State Highway 20: To undertake maintenance, operation, use and improvement to the State Highway network
6716	State Highway 20, Cavendish Drive interchange		New Zealand Transport Agency Purpose: State Highway 20: To undertake maintenance, operation, use and improvement to the State Highway network
6712	State Highway 20A		New Zealand Transport Agency Purpose: State Highway 20A: To undertake maintenance, operation, use and improvement to the State Highway network
4947	244S Kirkbride Road, Mangere		Minister of Education Purpose: Educational purposes - primary school years 0-8 and may include early childhood education preschool (Mangere Central School)



6713	State Highway 20A		New Zealand Transport Agency Purpose: State Highway 20A: To undertake maintenance, operation, use and improvement to the State Highway network
6501	Crosses SH20A between Richard Pearse Drive and Westney Road		New Zealand Refining Company Ltd Purpose: Petroleum Pipeline - Urban Section
1100	George Bolt Memorial Drive, Mangere		Auckland International Airport Ltd Purpose: Auckland International Airport Ltd Subject to Appeal
* The entire 20 Connect project is also located within an Airspace Restriction Designation (1102).			

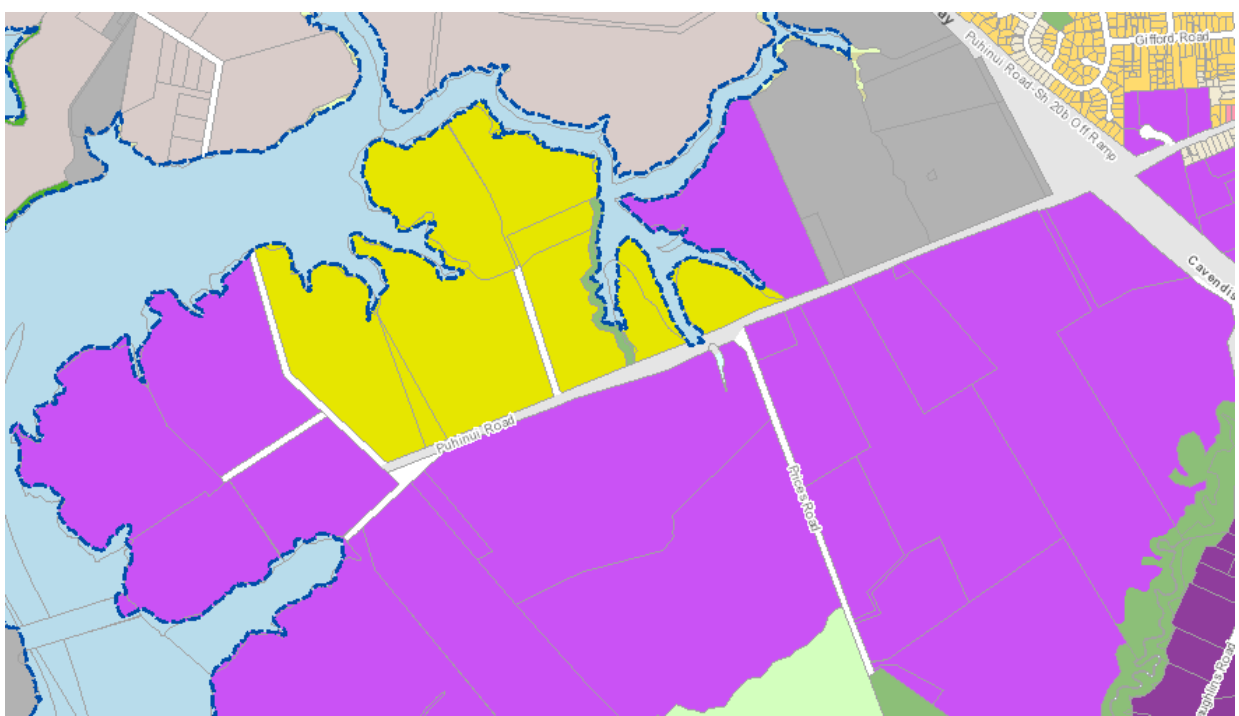


Appendix C

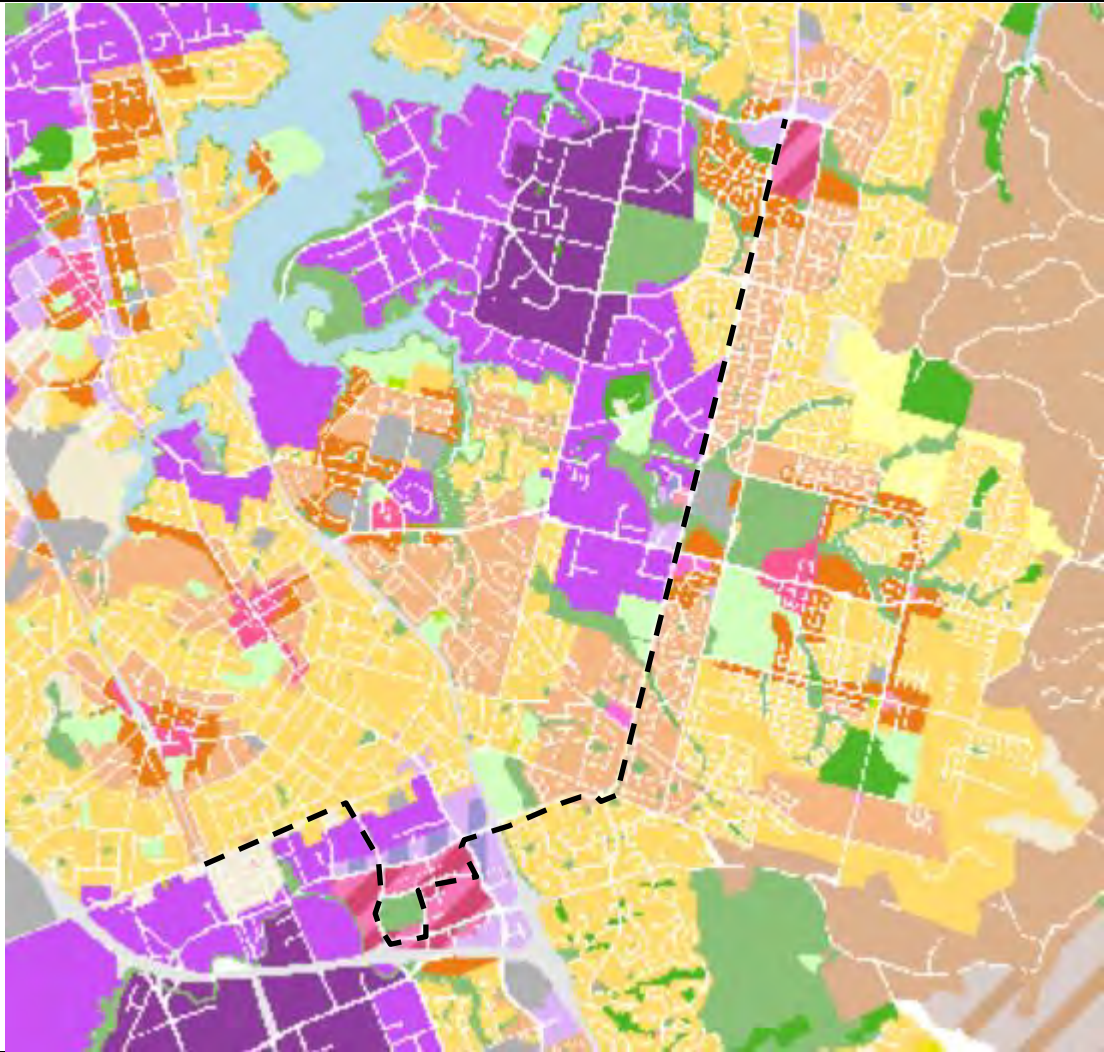
AUP – Zoning, Overlays, Controls and Notations



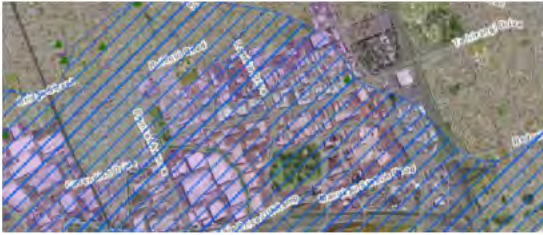
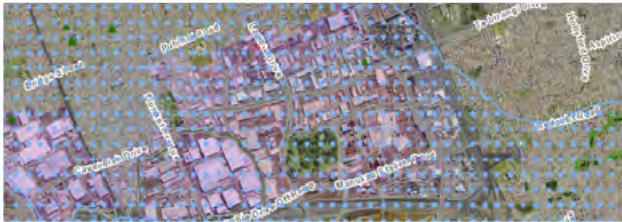
A2B	
Zoning	
Residential - Residential - Large Lot Zone - Residential - Rural and Coastal Settlement Zone - Residential - Single House Zone - Residential - Mixed Housing Suburban Zone - Residential - Mixed Housing Urban Zone - Residential - Terrace Housing and Apartment Buildings Zone Business - Business - City Centre Zone - Business - Metropolitan Centre Zone - Business - Town Centre Zone - Business - Local Centre Zone - Business - Neighbourhood Centre Zone - Business - Mixed Use Zone - Business - General Business Zone - Business - Business Park Zone - Business - Heavy Industry Zone - Business - Light Industry Zone Open space - Open Space - Conservation Zone - Open Space - Informal Recreation Zone - Open Space - Sport and Active Recreation Zone - Open Space - Civic Spaces Zone - Open Space - Community Zone - Water [i]	Rural - Rural - Rural Production Zone - Rural - Mixed Rural Zone - Rural - Rural Coastal Zone - Rural - Rural Conservation Zone - Rural - Countryside Living Zone - Rural - Waitakere Foothills Zone - Rural - Waitakere Ranges Zone Future Urban - Future Urban Zone - Green Infrastructure Corridor (Operative in some Special Housing Areas) Infrastructure - Special Purpose Zone - Airports & Airfields Cemetery Quarry Healthcare Facility & Hospital Tertiary Education Māori Purpose Major Recreation Facility School - Strategic Transport Corridor Zone Coastal - Coastal - General Coastal Marine Zone [rcp] - Coastal - Marina Zone [rcp/dp] - Coastal - Mooring Zone [rcp] - Coastal - Minor Port Zone [rcp/dp] - Coastal - Ferry Terminal Zone [rcp/dp] - Coastal - Defence Zone [rcp] - Coastal - Coastal Transition Zone
Proposed Corridor	

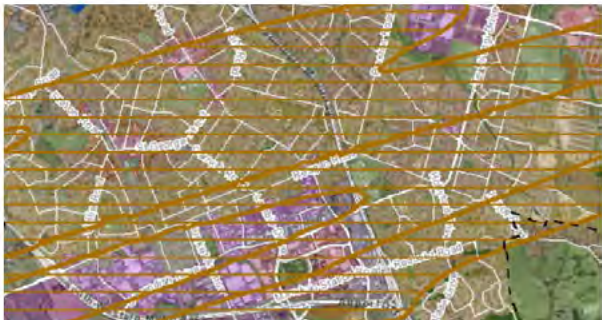


A2B AUP Zoning





Relevant Overlays	
High Use Stream Management  Applicable to project area west of Great South Road  	High-Use Aquifer Management Area  Applicable to project area west of the Southern Motorway (SH1) Manukau Southwest Kaawa and Manukau Waitemata Aquifer – Whole of SH20B
National Grid Corridor Overlay National Grid Yard Uncompromised (Running to the immediate of east of the Southern Motorway (SH1)) National Grid Substation Corridor (The National Grid Substation Corridor runs along Te Irirangi Drive from the intersection with Great South Road and just east of Diorella Drive. It also travels along Great South Road in the vicinity of the project area). 	
National Grid Corridor Overlay National Grid Yard Compromised	National Grid Corridor Overlay National Grid Yard Uncompromised

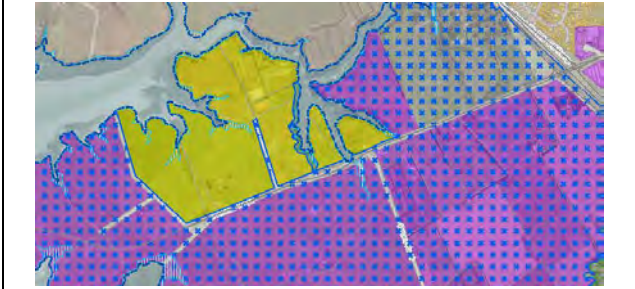
 The Overlay cuts across Te Irirangi Drive north of the intersection with Boundary Road.	 The Overlay cuts across Te Irirangi Drive north of the intersection with Belinda Avenue
Aircraft Noise Overlay  The project area south of Ormiston Road is located within the Aircraft Noise Overlay. Aircraft noise notification area (ANNA), Auckland Airport – Whole of SH20B	National Grid Corridor Overlay National Grid Substation Corridor  The overlay covers the Te Irirangi Drive and Te Rakau Drive intersection and extends south on Te Irirangi Drive to align with the existing Countdown and PAKn'SAVE buildings
National Grid Substation Corridor National Grid Substation Corridor  The overlay intersects with the Tarnica Road and Botany Road intersection	Notable Tree Historic Heritage Overlay Extent of Place The Notable Tree and Historic Heritage Overlay is located at 280 Botany Road
Relevant Controls	
Stormwater Management Area Control – Flow 1	Buildings Frontage Control General Commercial Frontage




Applicable to the project area west of Great South Road



Manukau Town Centre



Buildings Frontage Control
General Commercial Frontage



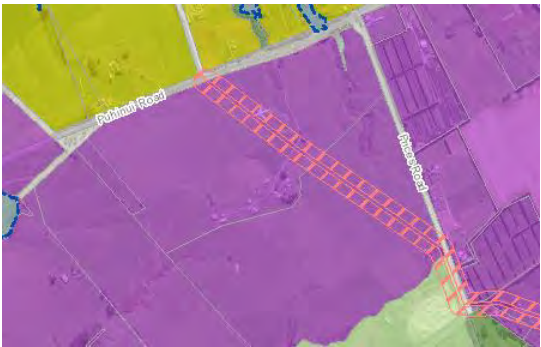
Botany Town Centre

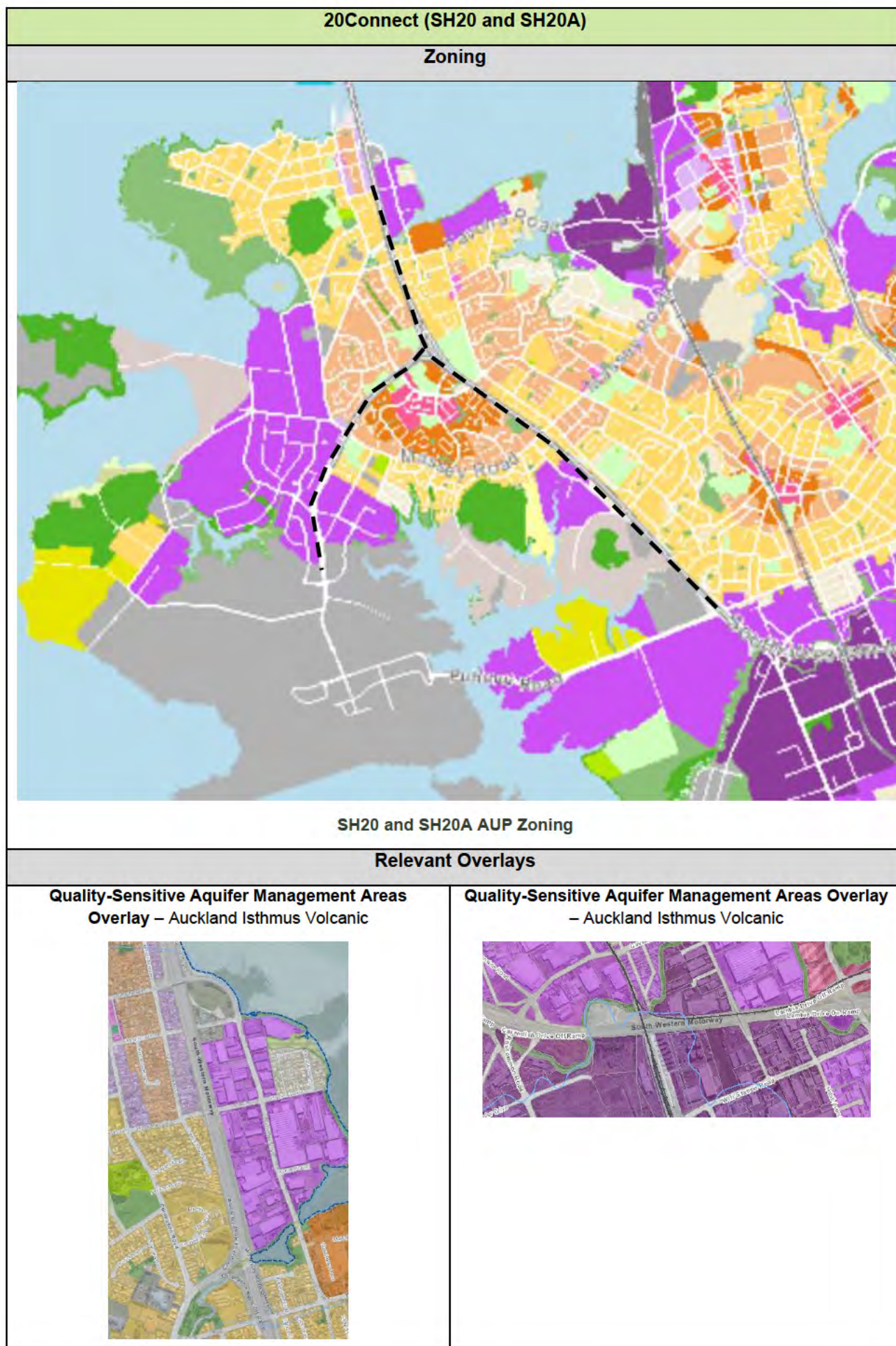
Macroinvertebrate Community Index Area
Entire project area

Coastal Inundation 1% AEP plus 1m control



Emergency Management Area Control –
Infrastructure



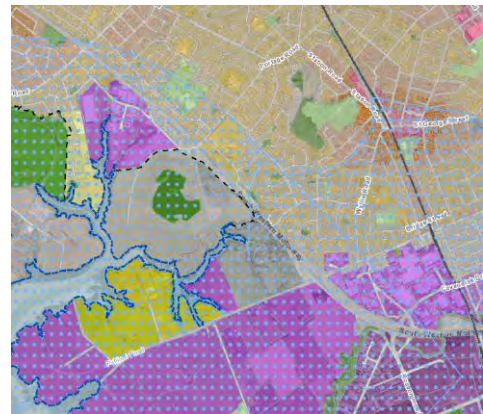




**High-Use Aquifer Management Areas Overlay –
Manukau Southeast Kaawa**



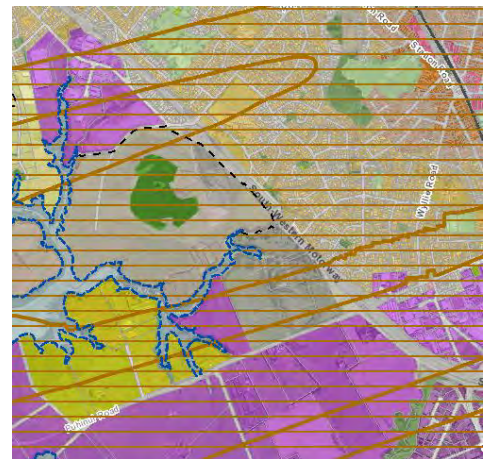
**High-Use Aquifer Management Areas Overlay –
Manukau Southeast Kaawa and Manukau Waitemata
Aquifer**



**Aircraft Noise Overlay – Aircraft noise notification area
(ANNA), Auckland Airport**



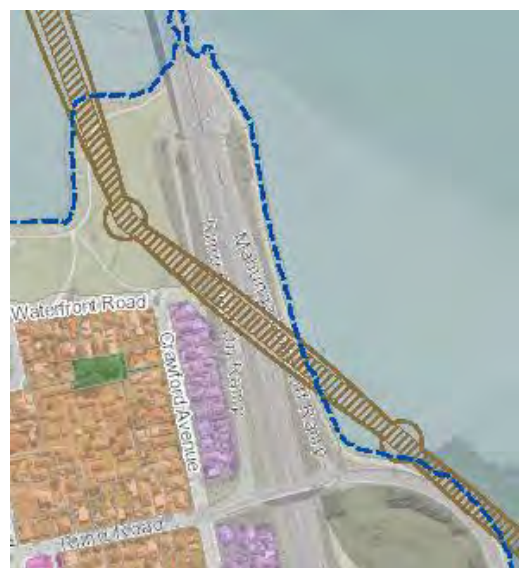
**Aircraft Noise Overlay – Aircraft noise notification area
(ANNA), Auckland Airport**



**Significant Ecological Areas Overlay – Marine 1 and
Marine 2**



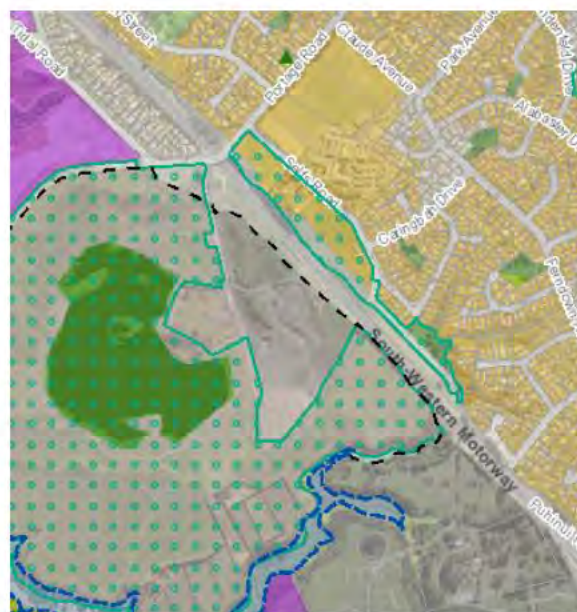
National Grid Corridor Overlay



Regionally Significant Volcanic Viewshafts And Height Sensitive Areas Overlay – Mangere Mountain, Height Sensitive Areas



Outstanding Natural Features Overlay – ID 22, Crater Hill



High-Use Stream Management Areas Overlay



Quarry Buffer Area Overlay



Historic Heritage Overlay Extent of Place – 2625, Samuel Ward House homestead

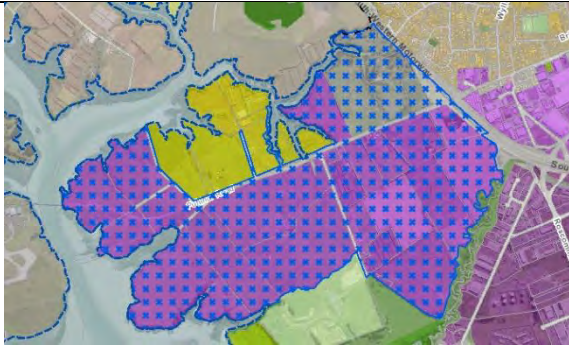


161R Robertson Road, Mangere East

Relevant Controls

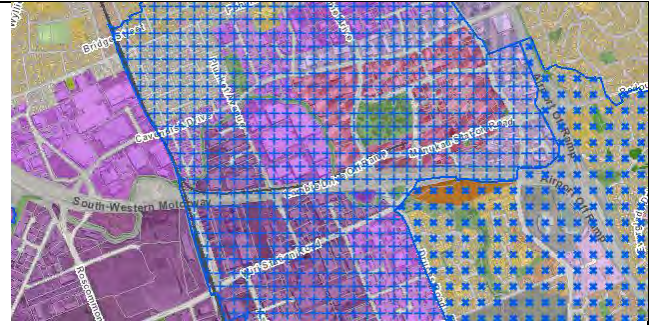
Stormwater Management Area Control – Flow 2

Stormwater Management Area Control – Flow 1 and Flow 2



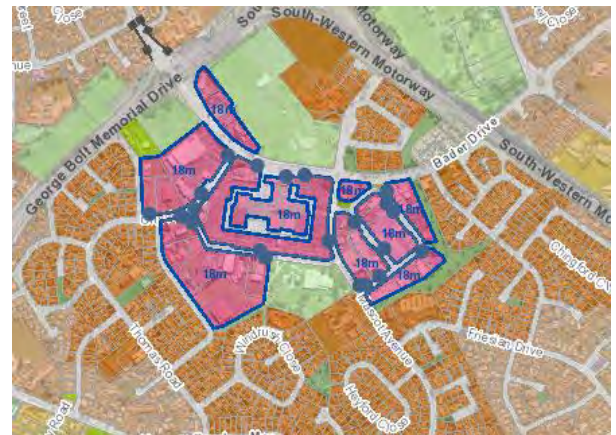
Building frontage control – general commercial frontage

Height variation control 27m

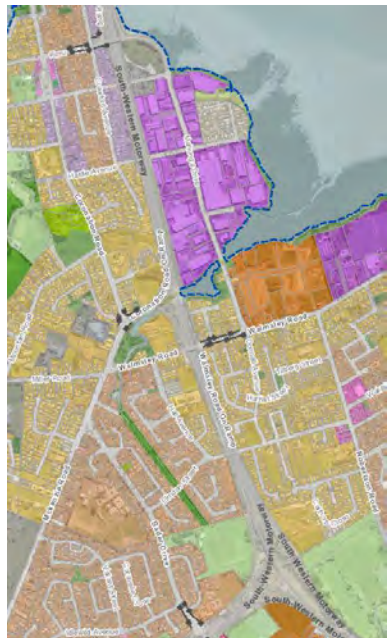


Building frontage control – general commercial frontage

Height variation control 18m

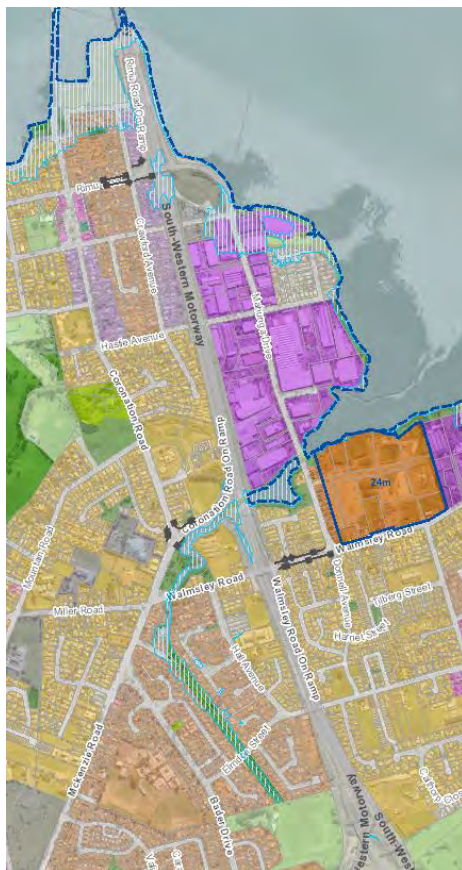


Vehicle restriction control – motorway interchange control





Coastal Inundation 1% AEP plus 1m Control



Macroinvertebrate Community Index Area

Entire project area

Appendix D

Indicative List of Key AUP Provisions

Auckland Unitary Plan: Regional Plan

The following provides a high-level summary of the potentially relevant regional plan rules under the AUP. This is not a comprehensive list.

Reference	Rule	Status	Comment
Rule E3.4.1 (A1) Lakes, rivers, streams and wetlands	Any activities in, on or under or over the bed of lakes, rivers, streams and wetlands not otherwise provided for.	Discretionary	Any other activities that are not provided for will require resource consent under this rule.
Rule E3.4.1 (A29) Lakes, rivers, streams and wetlands	Bridges or pipe bridges complying with the standards in E3.6.1.16.	Permitted	Some bridge structures may be required across streams to accommodate for the works.
Rule E3.4.1 (A26) Lakes, rivers, streams and wetlands	Works on structures lawfully existing on or before 30 September 2013 and the associated bed disturbance or depositing any substance, diversion of water and incidental temporary damming of water. Any activities not complying with the general permitted activity standards in E3.6.1.1 or the specific standards in E3.6.1.10 – E3.6.1.13.	Discretionary	Extensions will be required to culverts which extend beneath the existing road corridor and this is likely to extend their length to more than 30m.
Rule E3.4.1 (A49) Lakes, rivers, streams and wetlands	New reclamation or drainage, including filling over a piped stream.	Non-Complying	Any streams proposed to be piped or reclaimed, would be non-complying.
Rule E4.4.1 (A1) Other discharges of contaminants	Discharge of water and/or contaminants (including washwater) onto or into land and/or into water from road construction activities.	Permitted	During construction, discharges of water and contaminants may occur from road construction activities.
Rule E7.4.1 (A13) Taking, using, damming and diversion of water and drilling	Diverting surface water not meeting the permitted activity standard or not otherwise listed.	Discretionary	The diversion of streams may be required to accommodate for the proposed stormwater management.
Rule E7.4.1 (A26) Taking, using, damming and diversion of water and drilling	Take and use of groundwater not meeting the permitted or restricted discretionary activity standards or not otherwise listed.	Discretionary	Dewatering may be required to accommodate the proposed works.
Rule E7.4.1 (A35) Taking, using, damming and diversion of water and drilling	Dams not otherwise listed or not meeting the permitted activity standards or controlled activity standards.	Permitted, if not Discretionary	Off-stream dams may be required for stormwater ponds or wetlands proposed as part of the stormwater management. Where a proposed stormwater pond or wetland is unable to comply with the permitted standards for dams, resource consent will be required.

Rule E8.4.1 (A5)	Diversion and discharge of stormwater runoff from additional impervious areas greater than 5,000m ² of road (which include road ancillary areas that are part of a road, motorway or state highway operated by a road controlling authority) or rail corridor that complies with Standard E8.6.1 and Standard E8.6.4.1	Restricted Discretionary	The majority of stormwater from the new and redeveloped impervious area will be diverted to freshwater bodies and CMA via conveyance and treatment swales prior to being discharged. The proposed treatment devices will be designed to meet Standard E8.6.1 and Standard E8.6.4.1.
Rule E10.4.1 (A6) Stormwater management area – Flow 1	Development of new or redevelopment of impervious areas greater than 1,000m ² and up to 5,000m ² for a road, motorway or state highway operated by a road controlling authority or rail corridor within Stormwater Management Area control – Flow 1 or Stormwater Management Area control – Flow 2 that complies with Standard E10.6.1 and Standard E10.6.3.1.	Controlled	Stormwater from the new and redeveloped impervious areas greater than 1,000m ² and up to 5,000m ² for parts of the Project occur within Flow 1 and Flow 2 Stormwater Management Control Areas. Proposed treatment devices will be designed to comply with Standards E10.6.1 and E10.6.3.1.
Rule E10.4.1 (A7) Stormwater management area – Flow 1	Development of new or redevelopment of impervious areas greater 5,000m ² for a road, motorway or state highway operated by a road controlling authority or rail corridor within SMAF- 1 that complies with Standard E10.6.1 and Standard E10.6.4.2.	Restricted Discretionary	Stormwater from the new or redevelopment of impervious areas greater 5,000m ² for the Project. Proposed treatment devices will be designed to comply with Standards E10.6.1 and E10.6.3.1.
Rule E11.4.2 (A14) Land disturbance – Regional	The temporary, diversion and damming of surface water and the discharge of treated sediment-laden water from any land disturbance allowed by...	Permitted	Provided resource consent is granted for earthworks under Chapter E26, resource consent for the discharge of treated sediment-laden stormwater during construction to land, water and the CMA will be a permitted activity.
Rule E14.4.1 (A83) Discharge of contaminants into air from dust generating processes	Earthworks and the construction, maintenance and repair of public roads and railways not meeting the general permitted activity standards.	Restricted Discretionary	The Project will involve dust generating activities as a result of earthworks and is anticipated to meet the relevant restricted discretionary standards under Rule E14.6.3.4.
Rule E26.3.3.1 (A77) Network utilities and electricity generation and vegetation management Operation, maintenance, renewal, repair, construction and removal of network utilities and electricity	Vegetation alteration or removal that does not comply with Standards E26.3.5.1 to E26.3.5.4.	Restricted Discretionary	The Project requires the crossing of and/or interaction with the CMA at the northern extent of the Project, near Mangere Bridge and Tararata Creek. The works will not comply with Standards E26.3.5.1 to E26.3.5.4.

generation facilities and minor infrastructure upgrading			
Rule E26.5.3.2 (A102) Network utilities and electricity generation – Earthworks all zones and roads	Greater than 10,000m ² up to 50,000m ² where land has a slope less than 10 degrees outside the Sediment Control Protection Area (SCPA) other than for maintenance, repair, renewal, minor infrastructure upgrading.	Controlled	Earthworks will be required in certain areas between 10,000m ² up to 50,000m ² where land has a slope less than 10 degrees outside the Sediment Control Protection Area.
Rule E26.5.3.2 (A103) Network utilities and electricity generation – Earthworks all zones and roads	Earthworks greater than 50,000m ² where land has a slope less than 10 degrees outside the Sediment Control Protection Area other than for maintenance, repair, renewal, minor infrastructure upgrading.	Restricted Discretionary	Earthworks across the entire Project will exceed an area of 50,000m ² . Depending on the area consented in a given stage, this rule may be triggered.
Rule E26.5.3.2 (A106) Network utilities and electricity generation – Earthworks all zones and roads	Greater than 2,500m ² where the land has a slope equal to or greater than 10 degrees other than for maintenance, repair, renewal, minor infrastructure upgrading	Restricted Discretionary	Across the Project extent, there are localised areas where work is required on slopes greater than 10 degrees.
Rule E3.4.1 (A33)	Culverts or fords more than 30m in length when measured to the direction of water flow.	Discretionary	New culverts are likely to be required and given the width of the road corridor there is potential that these will exceed 30m in length.
Rule E3.4.1 (A44)	Stormwater or wastewater outfall not complying with the standards in E3.6.1.14	Restricted Discretionary	Rule E3.4.1 (A39) provides for the new stormwater or wastewater outfalls as a permitted activity provided the standards in E3.6.1.14 can be met. Stormwater outfalls are proposed to be constructed or modified as part of the Project. Confirmation is required with the standards.
Rule E7.4.1 (A20)	Dewatering or groundwater level control associated with a groundwater diversion authorised as a restricted discretionary activity, not meeting the permitted activity standards or is not otherwise listed.	Restricted Discretionary	Dewatering will be required for the construction of the Project for groundwater encountered during the construction period. Confirmation of compliance with the relevant standards is required.
Rule E4.4.1 (A11)	Discharge of water and/or contaminants (including washwater) onto or into land and/or into water from any of the following: a) cleaning, maintenance and preparation of surfaces of buildings, and associated structures; b) construction, repair, maintenance, upgrade or removal of network utility infrastructure; or	Controlled	The discharge of water (some of which may contain contaminants) will be required for the Project as the activity involves the construction and upgrading of network utility infrastructure and the construction, repair and upgrading of the network.

Rule E14.4.1 (A83)	Earthworks and the construction, maintenance and repair of public roads and railways not meeting the general permitted activity standards	Restricted Discretionary	Dust will be generated as a result of the earthworks and construction activities and there is potential that this would traverse beyond the boundary of some parts of the Project area and will therefore be unable to meet the permitted activity standards.
Rule 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	Discretionary	Compliance with the permitted or controlled activity standards will not be achieved with the standards in E30.6.2.1 as a Detailed Site Investigation has not yet been undertaken but will be available prior to the commencement of construction.

Auckland Unitary Plan: District Plan

The following provides a high-level summary of the potentially relevant district plan rules under the AUP. This is not a comprehensive list.

Reference	Rule	Status	Comment
Rule E27.4 (A12) Public transport facilities	Public Transport Facilities	Restricted Discretionary	The proposed new stations will be restricted discretionary activities in all zones.
Rule E27.4 (A10) Off-road pedestrian and cycling facilities	Off-road pedestrian and cycling facilities	Permitted	Off-road pedestrian and cycling facilities are a permitted in all zones pursuant to sections 9(3) and 11 of the Resource Management Act 199.
Rule E26: A67 Road Network Activities	Construction, operation, use, maintenance and repair of road network activities	Permitted	The new pedestrian and cycling facilities, road safety devices, new traffic signs, traffic control devices, stormwater management devices, noise attenuation walls, etc., associated with the establishment of the A2B RTN will all be permitted where they are located within the local public road network.
Rule H22:A1 Strategic Transport Corridor Zone	Construction, maintenance, upgrade and use of cycleways and walk ways.	Permitted	The Project will involve construction, maintenance and upgrades and use of cycleways and walkways.
Rule E25.4.1 (A2) Noise and Vibration Activity table	Activities that do not comply with a permitted activity standard	Restricted Discretionary	The Project will involve noise and vibrations that will likely exceed the noise level

			requirements in several different zones.
Rule E26.7.3.1 (A117) Network utilities and electricity generation – Earthworks Outstanding Natural Features Overlay	Earthworks for network utilities and electricity generation facilities that do not comply with standards in E26.7.5.2.	Restricted Discretionary	Earthworks associated with road network activities (included in the definition of network utilities) may be required within an Outstanding Natural Feature Overlay (i.e. Ngā Kapua Kohuora / Crater Hill for 20Connect) that may not comply with the standards set out in E26.7.5.2.
Rule E26.6.3.1 (A118) Network utilities and electricity generation – Earthworks in overlay areas except Outstanding Natural Features Overlay	Earthworks greater than 2500m ² or 2500m ³ .	Discretionary	Earthworks associated with road network activities (included in the definition of network utilities) will be required within overlay areas (i.e. Historic Heritage and Significant Ecological Areas Overlays) may exceed areas greater than 2500m ² and volumes greater than 2500m ³ .
Rule E26.4.3.1(A87) Network utilities and electricity generation – Trees in roads and open space zones and the Notable Trees Overlay	Works within the protected root zone in road and public open spaces that comply with Standard E26.4.5.2	Permitted	The Project will require works to occur within the protected root zone of trees within the road and public open spaces. Compliance with the permitted standards is yet to be determined.
Rule E26.4.3.1 (A88) Network utilities and electricity generation – Trees in roads and open space zones and the Notable Trees Overlay	Works within the protected root zone not meeting the permitted standards	Restricted Discretionary	The Project will require works to occur within the protected root zone of trees, and it is likely that not all of this will meet the permitted standards.
Rule E26.4.3.1 (A89) Network utilities and electricity generation – Trees in roads and open space zones and the Notable Trees Overlay	Tree removal of Notable Trees	Discretionary	The removal of the notable tree at 250 Puhinui Road and Puhinui Road Reserve (near Vision Place) would be a discretionary activity.
Rule E26.4.3.1 (A92)	Alteration or removal of trees 4m or more in height and/or 400mm or more in girth in roads or open space zones.	Restricted Discretionary	The Project will require the removal of trees within the road corridor, many of which are greater than 4m

			in height (i.e. along Te Irirangi Drive for A2B).
Rule E26.11.3.1 (A165) Network utilities and electricity generation – Volcanic Viewshafts and Height Sensitive Areas Overlay	Network utilities and electricity generation facilities not otherwise provided for.	Non-Complying	The Project will require network changes to the focal point Regionally Significant Viewshaft M4 toward Mangere Mountain as a result of the south facing ramp from SH20A to SH20 which is not provided for in the Volcanic Viewshafts and Height Sensitive Areas Overlay. Only applicable to Part 3 (20 Connect).
Rule E26.8.3.1 (A130) Network utilities and electricity generation – Historic Heritage Overlay	Network utilities and electricity generation facilities that do not comply with permitted activity standards in E26.8.5.1.	Restricted Discretionary	The Project may require works to occur within a Historic Heritage Overlay which may not comply with the permitted activity standards in E26.8.5.1. (i.e. Cambria House - 250 Puhinui Road (A2B – Part 2) and Samuel Ward House Homestead - located next to SH20 near the intersection with Bader Drive (SH20B – Part 3).
Puhinui Precinct Rules			
Rule I432.4 – Table 0.4.2 (A51) Activities specific to sub-precincts A-F	Development which complies with Standard I432.6.1 Transport	NA	The Project works are expected to occur in sub-precincts A and B. This will be compliant with Standard I432.6.1 Transport.
Rule I432.6.3 - Yards	Sites adjoining edge of State Highway 20B (Puhinui Road) - New Zealand Waka Kotahi Designation 6717 (as at 30 September 2013)	Permitted	The Project works are expected to meet the yard requirements.

Appendix E

Preliminary Environmental Assessments

**Southwest Gateway Programme:
20 Connect and Airport to Botany
Rapid Transit Corridor Preliminary
Ecological Assessment
April 2020**



Southwest Gateway Programme: 20 Connect and Airport to Botany Rapid Transit Corridor Preliminary Ecological Assessment April 2020

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4	25 February 2020	Version 4	██████████ ██████████	AT, NZTA	

Reference: Bioresearches (2020). Southwest Gateway Programme: 20 Connect and Airport to Botany Rapid Transit Corridor Preliminary Ecological Assessment. Report for Aurecon NZ Ltd. pp 22

Cover Illustration: Waokauri Bridge – State Highway 20B.

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1. INTRODUCTION

The Southwest Gateway Programme is an overarching collection of transport projects being progressed by investment partners comprising Waka Kotahi New Zealand Transport Agency (Waka Kotahi), Auckland Transport (AT) and Auckland International Airport (AIAL) (collectively referred to as 'the Project Partners').

The purpose of the programme is to create a well-connected, efficient transport system that provides choice and reliability for how people and freight travel through southwest and southeast Auckland, including to, and from, the Auckland Airport. The two of the cornerstone projects of the programme are:

- Airport to Botany (A2B) - the AT component comprising high frequency public transport provision between Botany and the Airport); and
- 20Connect - the Waka Kotahi component comprising the State Highway (SH) network in the south west of Auckland (SH20, SH20A and SH20B).

1.1 Purpose of the Report

The purpose of this report is to provide a Preliminary Environmental Assessment (PEA) of the potential issues and constraints with respect to ecological impacts relating to the preferred options for the two business cases.

1.2 Description of the Preferred Options

1.2.1 Airport to Botany Preferred Option

The Airport to Botany Rapid Transit will deliver a frequent rapid transit system between Auckland Airport, Manukau and Botany. The Project will consist of the following elements:

- A dedicated Rapid Transit corridor from Auckland International Airport to Botany via:
 - Te Irirangi Drive (entire length)
 - Great South Road (between Te Irirangi Drive and Ronwood Ave intersections)
 - Ronwood Ave (From Te Irirangi Drive to Davies Ave intersections)
 - Davies Ave (entire length)
 - Manukau Station Road (from Lambie Drive to Davies Ave intersection)
 - Lambie Drive (From Manukau Station Road intersection to Puhinui Road)
 - Puhinui Road (from Lambie Drive to SH20 interchange)
 - State Highway 20B (Covered in the 20Connect project)
- Improved walking and cycling facilities along the roads above.

1.2.2 20Connect Preferred Option

20Connect will make additional infrastructure changes to local highways to improve journey time reliability, network resilience and safety. These changes are:

- New SH20A/SH20 and SH20B/SH20 southbound ramps
- Widening of SH20 between Manukau Harbour Crossing and SH20A (online at grade)
- Widening of SH20 between SH20A and SH20B (online at grade)
- Widening of SH20B to four lanes (including over Pukaki Bridge) – online at-grade
- Walking and cycling facilities along SH20 and SH20B.

1.3 Study Area

The study area is comprised of the 20Connect Project area to the west, and Airport to Botany, to the east. These Project areas link at Manukau, east of Auckland International Airport (Figure 1).

To the west, 20Connect extends from the Mangere Inlet of the Manukau Harbour. It generally follows State Highway 20.

The study area was considered to be all areas directly affected by the preferred option alignment, including all cut / fill for terrestrial, freshwater and marine environments.



Figure 1. Study Area, showing the two Project Areas, 20 Connect and Airport to Botany (A2B). A2B Botany Station indicated in green at the northern extent of A2B.

1.3.1 A2B - Botany Station

At the time of writing, the preferred option for Botany Station has not been developed. For the purpose of this PEA, the study area is shown below and a high level assessment has been undertaken.



Figure 2. Botany Station Study Area.

2. METHODS

2.1 Method

This PEA has been prepared at the Single Stage Business Case (SSBC) stage of the business case process and is based on knowledge developed during the long-list and short-list review, as well as additional desktop research following the preferred options.

This PEA has been reviewed technically by Graham Don, M.Sc. (Hons), Senior Consulting Scientist, and by Aurecon for consistency. A review schedule is provided at the beginning of this assessment.

2.2 Information Used

A desktop review of existing information on the Project Areas included the following reports and Plans:

- Aurecon 2019 (a). Airport to Botany RTC SSBC. Preferred Option General Arrangement Plan. Rev C (8.10.19) Sheets 1-17.
- Aurecon 2019 (b). A2B / 20 Connect SSBC. General Arrangement Plan. Rev B (2.08.19) Sheets 1-21.
- Bioresearches 2018(a). Airport to Botany Short List Options: Multi-Criteria Analysis Scoring Sheet: Terrestrial Ecology. 4 pp.
- Bioresearches 2018 (b). Airport to Botany Short List Options: Multi-Criteria Analysis Scoring Sheet: Freshwater Ecology. 4 pp.
- Bioresearches 2018 (c). Airport to Botany Short List Options: Multi-Criteria Analysis Scoring Sheet: Marine Ecology. 4 pp.
- Bioresearches 2018 (d). 20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Terrestrial Ecology. 20 pp.
- Bioresearches 2018 (e). 20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Freshwater Ecology. 22 pp.
- Bioresearches 2018 (f). 20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Marine Ecology. 25 pp
- Bioresearches 2019. State Highway 20B Short Term Improvements AEE -Ecological Assessment. Prepared for NZ Transport Agency. Revision B. Document ID 504330-0000-REP-NN-0021. 79 pp.

A site visit was undertaken on 21 October 2019, during which the Project Areas were driven to gain an overview and understanding of the potential ecological values within and around the A2B and 20Connect preferred Option areas.

2.3 Assumptions

The following assumptions have been considered as part of this assessment:

2.3.1 General

- It is noted that there are interfacing projects such as the Auckland Airport Precinct Improvements (AIAL), Auckland Manukau Eastern Transport Initiative (AMETI) Eastern Busway, City Centre to Mangere (CC2M) Light Rail, Supporting Growth (South Auckland), Airport Taskforce, Southern Connections. These interfacing projects have been referred to but are not explicitly assessed as part of the scope of the Southwest Gateway projects.

- The Construction Method is not available at the time of writing. As such generic construction methods to be considered.
- The construction and operational timeframe was not available at the time of writing.

2.3.2 Ecological Assumptions

- The proposed bridge at the SH20/SH20A intersection will not involve structures in or reclamation of the watercourse immediately east of SH20 Chainage 750 – 850, and there is no aquatic habitat under the trees immediately west of SH20 Chainage 850 – 1000 that will be affected by the bridge.
- Work on Puhunui Creek Bridge at SH20 Chainage 7000 – 7050 will not involve streamworks.
- Streamworks will also include some effects on the 10m riparian yard.
- There will be no marine ecological effects of the proposal on the habitats at SH20B Waokauri Bridge.
- Vegetation along the existing corridors has been planted for amenity value.

2.4 Limitations

This PEA is a high level, desktop-based assessment and no survey work was undertaken for vegetation or fauna within terrestrial, freshwater or marine environments.

3. ASSESSMENT OF PREFERRED OPTION

3.1 Airport to Botany Preferred Option

3.1.1 Existing Environment – Freshwater Ecology

The freshwater environment of the preferred option for A2B between Botany Station and the Puhinui Road – State Highway 20 intersection comprises upper tributary streams draining to the Waitemata Harbour via the Tamaki River (Otara Creek, and un-named tributaries) and to the Manukau Harbour via Puhinui Creek.

Six tributaries, freshwater habitats or potential habitats are present on the proposed route (Appendix 1).

1. Hayman Park east –a small section of poor quality, likely intermittent, open watercourse drainage channel receiving the flow from Hyman Park stormwater pond before joining the piped network draining to Wiri Stream. (GA Plan Sheet 6, Chainage 1000). Potentially intermittently habitat for shortfin eel but unlikely to provide habitat for other native freshwater fish. Riparian area is dominantly impervious surfaces and lawn.
2. Te Irirangi Drive crossing of an upper tributary of Otara Creek near Belinda Avenue (GA Plan Sheet 11, Chainage 2550). Permanent stream with established riparian vegetation draining through reserves. Highly likely to provide habitat to a number of native freshwater fish.
3. Ormiston Road / Te Irirangi Drive –a small upper section of a tributary to Otara Creek (GA Plan Sheet 12, Chainage 3600). Stream habitat, likely a permanent stream, in a steep section between Te Irirangi Drive and 128 Ormiston Road. Riparian vegetation dominated by exotic trees and shrubs. Likely to provide habitat to a number of native freshwater fish.
4. Te Irirangi Drive north of Ormiston Road – potential intermittent stream within well-established native vegetation. (GA Plan Sheet 12, Chainage 3850)
5. Te Irirangi Drive bridge over Otara Creek. Wide permanent stream with established riparian vegetation (GA Plan Sheet 13, Chainage 3950). Likely presence on native freshwater fish.
6. Te Irirangi Drive culvert for Otara Creek tributary. Permanent stream with well-established riparian vegetation (GA Plan Sheet 13, Chainage 4400).

3.1.2 Existing Environment – Terrestrial Ecology

1. No terrestrial Significant Ecological areas (Auckland Unitary Plan) occur within the Project Study area.
2. Vegetation is predominantly planted, including native mixtures for corridor buffer, riparian and amenity value.
3. Native birds that commonly occur in roadside planting in urban Auckland include fantail (*Rhipidura fuliginosa*); grey warbler (*Gerygone igata*); tui (*Prosthemadera novaeseelandiae*);

kingfisher (*Todiramphus sanctus*); pukeko (*Porphyrio melanotus*) and less frequently, kereru (*Hemiphaga novaeseelandiae*). None of these species are classified as At Risk or Threatened (Robertson et al. 2017).

4. Te Irirangi Drive crossing of an upper tributary of Otara Creek near Belinda Avenue – cut and fill will remove riparian vegetation (GA Plan Sheet 11, Chainage 2550). Vegetation is planted but may support native lizards. Non-riparian planted vegetation on the eastern side may also support native lizards.
5. Te Irirangi Drive bridge over Otara Creek to Ormiston Road Intersection – cut and fill will remove vegetation, including riparian (GA Plan Sheet 13, Chainage 3900-4000 on western side, and Chainage (Sheet 12) 3650-3950 (Sheet 13) on eastern side). Vegetation is planted but may support lizard habitat on both sides.
6. Te Irirangi Drive crossing of Otara Creek tributary - cut and fill will remove riparian vegetation (GA Plan Sheet 13, Chainage 4850). Vegetation is planted but may support lizard habitat on western and eastern sides.

3.1.3 Construction – Freshwater Ecology

Six potential freshwater constraints are present on the proposed route.

1. Hayman Park east – Cut/fill affecting a small section of open watercourse (GA Plan Sheet 6, Chainage 1000).
2. Te Irirangi Drive crossing of an upper tributary of Otara Creek near Belinda Avenue – cut and fill within a small section of the water course (GA Plan Sheet 11, Chainage 2550).
3. Ormiston Road / Te Irirangi Drive – works for SUP, cycle lane and bus platform in a small upper section of a tributary to Otara Creek (GA Plan Sheet 12, Chainage 3600).
4. Te Irirangi Drive north of Ormiston Road – potential intermittent stream affected by proposed footpath, SUP and cut and fill (GA Plan Sheet 12, Chainage 3850).
5. Te Irirangi Drive bridge over Otara Creek – cut and fill will remove riparian vegetation (GA Plan Sheet 13, Chainage 3950).
6. Te Irirangi Drive culvert for Otara Creek tributary - cut and fill will remove riparian vegetation (GA Plan Sheet 13, Chainage 4400).

The primary construction effects would likely be:

- minor loss of aquatic habitat under the cut and fill and
- loss of riparian vegetation under the cut and fill.

There is potential for adverse effects on the receiving environment through

- sedimentation and fuel contaminants during construction unless well managed, including fully stabilising the sites immediately after the works.

The loss of riparian vegetation could be mitigated by weed control and the reinstatement of vegetation within the riparian yard. The revegetation should comprise native vegetation attractive to native fauna.

3.1.4 Construction – Terrestrial Ecology

The primary construction effects would likely be:

- Minor loss of riparian vegetation under the cut and fill;
- Minor loss of vegetation cover that provides buffer, wildlife corridor and amenity value;
- Potential loss of native lizard and bird (nesting, roosting, foraging) habitat under the cut and fill.

The loss of riparian vegetation can be mitigated by weed control and the reinstatement of vegetation within the riparian yard. The revegetation should comprise native vegetation attractive to native fauna.

The loss of vegetation cover that provides buffer, wildlife corridor and amenity value could be replaced through strategic planting of native vegetation in patches and along corridors in accordance with the Landscape Plan.

Potential loss of native lizard habitat could be confirmed by a native lizard survey, which would need to be undertaken outside winter months (September-May inclusive). Where appropriate, a native lizard management plan that details capture and relocation methods, and replacement or enhancement of lizard habitat as appropriate.

3.1.5 Operation – Freshwater Ecology

There is potential for stormwater discharges from the project area to impact the freshwater habitats both in terms of a reduction of water quality and scour effects. These potential effects can be mitigated through appropriate stormwater treatment and engineering design to ensure the operation effects of the corridor on freshwater habitats are less than minor.

3.1.6 Operation – Terrestrial Ecology

Given the vegetation and potential habitats occur within a highly modified, urban and industrial environment, no adverse effects of the operation of the corridor on terrestrial ecology values are expected. There may be opportunities to enhance existing habitats for native birds in the surrounding area through the Landscape Plan.

3.1.7 Botany Station

The preferred option for the Botany Station has not been confirmed at the time of writing this report. The Town Centre is highly modified and does not support any freshwater or marine ecological values. Terrestrial ecology is limited to amenity gardens and trees only. Therefore, it is not anticipated that there will be ecologically significant adverse effects that cannot be avoided through the detailed design.

3.2 20Connect Preferred Option

3.2.1 Existing Environment - Freshwater Ecology

Eleven tributaries, areas of freshwater habitats or potential habitats are present on the proposed route (Appendix 1).

1. SH20/SH20A interchange - headwaters of Tarata Creek. Flow paths highly modified by previous interchange and motorway works. Extensive areas of aquatic habitat present but stream classifications and/or habitats types uncertain. (GA Plan Sheet 5, west of SH20A Chainage 14850 – 15100).
2. Imrie Park
 - Adjacent to 70 Chingford Close – potential intermittent stream present (GA Plan Sheet 7, Chainage 1950). Riparian vegetation mown grass. Very low potential for native fish.
 - Adjacent to Jean Batten Primary School - potential intermittent stream in two places. (GA Plan Sheet 7, Chainage 2200). Very low potential for native fish.
3. SH20 adjacent to
 - 39 Tidal Road Mangere – Stream channel present. (GA Plan Sheet 8, Chainage 2800). Upper northern tributary to Waokauri Creek. Well established riparian vegetation. Good potential for native fish habitat.
 - 27 Geoffrey Place - straightened stream (upper northern tributary to Waokauri Creek) on opposite side of SH20 (GA Plan Sheet 8, Chainage 2800). Poor quality riparian vegetation but potential for native fish habitat.
4. SH20 adjacent to:
 - 53 Tidal Road Mangere – Steep embankment to stream channel. (GA Plan Sheet 8, Chainage 2925). Upper northern tributary to Waokauri Creek. Mix of poorly and well established riparian vegetation. Good potential for native fish habitat.
 - 62 Henwood Road – steep embankment to straightened stream (upper northern tributary to Waokauri Creek) on opposite side of SH20 (GA Plan Sheet 8, Chainage 2925). Poor quality riparian vegetation but potential for native fish habitat.
5. SH20A east of Bader Drive. Stormwater pond with potential native fish habitat. (GA Plan Sheet 18, SH20A Chainage 15300 - 15350).
6. SH20A east of Bader Drive – Flow path. Potentially a watercourse or wetland habitat. Highly modified and likely of low ecological value. (GA Plan Sheet 18, SH20A Chainage 15000 - 15250). Riparian vegetation low quality.
7. SH20B west of Campana Road - Wetland/modified intermittent stream north of SH20B and wetland habitat south of SH20B. Intermittent habitats surrounded by pasture and with low potential for native fish habitat. (GA Plan Sheet 19, SH20B Chainage 1550).

8. SH20B crossing of Waokauri West Tributary – wetland and permanent stream habitat both north and south of SH20B. (GA Plan Sheet 20, SH20B Chainage 1825). Site drains north to SEA Marine (SEA-M2-27a). Native freshwater fish present. Shading riparian vegetation north of SH20B, pasture south of SH20B.
9. SH20B bridge crossing of Waokauri Creek – raupō wetland and stream habitat. (GA Plan Sheet 20, SH20B Chainage 2050 – 2100). Native freshwater fish recorded at the site. Patchy riparian vegetation present. Site abuts SEA Marine (SEA-M2-27a).
10. SH20B crossing of Waokauri East Tributary – stream and wetland habitat both north and south of SH20B. (GA Plan Sheet 20, SH20B Chainage 2300-2350). Native freshwater fish highly likely. Riparian vegetation north of the highway dominated by exotic vegetation providing patchy shading to the stream. Riparian zone south of the highway dominantly pasture. Native fish habitat present.
11. SH20B crossing of Waokauri Manukau Memorial Gardens Tributary – stream and wetland habitat with some shading riparian vegetation. Native fish habitat present. (GA Plan Sheet 21, SH20B Chainage 2700).

3.2.2 Existing Environment – Terrestrial Ecology

1. No terrestrial Significant Ecological Areas (Auckland Unitary Plan) occur within the Project study area.
2. Vegetation is predominantly planted, including native mixtures for corridor buffer, riparian and amenity value.
3. Opportunities may exist for restoring vegetation buffers and potential wildlife corridors where they currently exist (particularly along State Highway 20), through the landscape plan.
4. State Highway 20: South-western Motorway, approximately Mahunga Dr to Tarata Creek (GA sheets 1 - 3; Chainage 12300 – 13500, eastern side) cut and fill will remove a strip of approximately 1.6ha of planted, mature vegetation on both sides of the carriageway. Vegetation is planted but may support native lizards.
5. State Highway 20: Southwestern Motorway crossing of Tarata Creek (GA Sheet 3; Chainage 13500 – 13550) cut and fill will remove riparian / coastal yard vegetation. Vegetation is planted but may support native lizards.
6. State Highway 20: South-western Motorway, approximately Walmsley Rd to Watchfield Cl (GA sheets 3 – 4; Chainage 13850 - 14650, western side) cut and fill will remove a strip of approximately 1ha of planted, mature vegetation. Vegetation is planted but may support native lizard habitat.

7. State Highway 20: Southwestern Motorway, approximately Bader Dr. to Massey Rd (GA sheets 6 – 7; Chainage 1250 - 2200) works and shared path will remove approximately 2ha of strips of mature vegetation on both sides of the carriageway. Vegetation is planted but may support lizard habitat.
8. State Highway 20: Southwestern Motorway, approximately Massey Rd to Portage Rd (GA sheets 8 – 7; Chainage 2500 - 3850) works and shared path will remove approximately 1ha of strips of mature vegetation on both sides of the carriageway. Vegetation is planted but may support native lizard habitat.
9. State Highway 20: Southwestern Motorway, area of flax east of Cavendish Dr Interchange (GA sheet 14; Chainage 7150 – 7350). Small area of flax may support native lizard habitat.
10. State Highway 20B: Waokauri Creek tributary crossings (GA sheet 20; Chainage 1800 – 2350). Identified copper skink (Not Threatened) habitat on northern side.
11. State Highway 20B: Waokauri Creek central tributary crossing (GA sheet 20; Chainage 2050). Banded Rail (*Gallirallus philippensis*) (Nationally At-Risk-Declining) foraging habitat (confirmed by surveys, Bioresearches 2019).
12. State Highway 20B: Manukau Memorial Gardens (GA sheet 21; Chainage 2750 – 3100). Identified copper skink habitat.

3.2.3 Existing Environment – Marine Ecology

Three marine ecological areas are present on the proposed route.

1. SH20 bridge over Tarata Creek – mangrove dominated estuarine habitat within the Coastal Marine Area (CMA) on the eastern sides of the existing road bridge and potentially the CMA on the western side of the bridge (GA Plan Sheet 3, Chainage 13500). SEA Marine 2 habitat (SEA-M2-23a) east of the Walmsely Road off ramp. SEA-M2-23a is identified in the Auckland Unitary Plan as a feeding ground for thousands of international migratory and New Zealand endemic wading birds and a variety of other coastal bird species, including a number of threatened species. With the exception of potential use by banded rail (as described above) there will be minimal use of these upper mangrove areas by wading birds and coastal bird species.
2. Coronation Road off ramp – upper estuarine, mangrove dominated habitat, with mixed exotic and native coastal vegetation (GA Plan Sheet 3, Chainage 13600).
3. Waokauri Creek Bridge, SH20B – north of the bridge mangrove and saltmarsh dominated habitat, within a SEA Marine 2 (SEA-M2-27a).

3.2.4 Construction – Freshwater Ecology

10 potential sites or areas have freshwater constraints present on the proposed route.

1. SH20/SH20A interchange - headwaters of Tarata Creek under SUP or cut and fill in three areas (GA Plan Sheet 5, west of SH20A Chainage 14850 – 15100).
2. Imrie Park
 - Adjacent to 70 Chingford Close – Shared Use Path (SUP) crosses a potential intermittent stream (GA Plan Sheet 7, Chainage 1950).
 - Adjacent to Jean Batten Primary School - SUP crosses a potential intermittent stream in two places (GA Plan Sheet 7, Chainage 2200).
3. SH20 adjacent to
 - 39 Tidal Road Mangere - SUP crosses stream (GA Plan Sheet 8, Chainage 2800).
 - 27 Geoffrey Place - Potential cut and fill in stream on opposite side of SH20 (GA Plan Sheet 8, Chainage 2800).
4. SH20 adjacent to:
 - 53 Tidal Road Mangere - SUP crosses stream (GA Plan Sheet 8, Chainage 2925).
 - 62 Henwood Road - Cut and fill in stream on opposite side of SH20 (GA Plan Sheet 8, Chainage 2925).
5. SH20A east of Bader Drive – SUP and cut and fill will result in the loss of the existing stormwater pond. Potential fish recovery and relocation. (GA Plan Sheet 18, SH20A Chainage 15300 - 15350).
6. SH20A east of Bader Drive – SUP and cut and fill will result in the loss/modification of the existing watercourse (potentially only a swale). (GA Plan Sheet 18, SH20A Chainage 15000 - 15250).
7. SH20B west of Campana Road – loss of approximately 85m of wetland/modified intermittent stream north of SH20B and loss of wetland habitat south of SH20B under new culverts and cut and fill (GA Plan Sheet 19, SH20B Chainage 1550). The degree of streamworks shown on Plan Sheet 19 is greater than that assessed in the A2B / 20 Connect SSBC Plans issued for the MCA (SH20B Plan Section Footprints Sheet 5, Drawing No. 501094 – 4403 – SKT – RR – 0305 – A, undated)
8. SH20B crossing of Waokauri West Tributary – loss of habitat with new culvert extensions both north (26m) and south (23m) with associated cut and fill. (GA Plan Sheet 20, SH20B Chainage 1825). The degree of streamworks shown on Plan Sheet 20 is different and generally greater than that assessed in the A2B / 20 Connect SSBC Plans issued for the MCA (Section 3: Waokauri Creek Bridge Option 3A – Sheet 6, Online widening of existing alignment; Option 3B – Sheet 6, Offline replacement on northern side; Option 3C – Sheet 6, Offline replacement on southern side. Drawing No.s 501094 – 4403 – SKT – RR – 0351, 0353, 0535 – A, undated).

9. SH20B Bridge crossing of Waokauri Creek – loss of wetland and stream habitat. (GA Plan Sheet 20, SH20B Chainage 2050 – 2100). The degree of streamworks shown on Plan Sheet 20 is different and generally greater than that assessed in the A2B / 20 Connect SSBC Plans issued for the MCA (refer point 8 above).
10. SH20B crossing of Waokauri East Tributary - loss of habitat with new culvert extensions both north and south (to approximately 105m) with associated cut and fill. (GA Plan Sheet 20, SH20B Chainage 2300-2350). The degree of streamworks shown on Plan Sheet 20 is different and generally greater than that assessed in the A2B / 20 Connect SSBC Plans issued for the MCA (refer point 8 above).
11. SH20B crossing of Waokauri Manukau Memorial Gardens Tributary - loss of habitat with new culvert extensions south (to approximately 20m) with associated cut and fill. (GA Plan Sheet 21, SH20B Chainage 2700).

The primary construction effects would likely be:

- minor loss of aquatic habitat under the cut and fill and
- loss of riparian vegetation under the cut and fill.

There is potential for adverse effects on the receiving environment through

- sedimentation and fuel contaminants during construction unless well managed, including fully stabilising the sites immediately after the works.

The loss of riparian vegetation can be mitigated by weed control and the reinstatement of vegetation within the riparian yard. The revegetation should comprise native vegetation attractive to native fauna.

3.2.5 Construction – Terrestrial Ecology

The primary construction effects would likely be

- minor loss of riparian vegetation under the cut and fill;
- Loss of vegetation cover that provides buffer, wildlife corridor and amenity value;
- Loss of native lizard and bird (nesting, roosting, foraging) habitat under the cut and fill.
- Temporary displacement of potential banded rail foraging habitat.

The loss of riparian vegetation could be mitigated by weed control and the reinstatement of vegetation within the riparian yard. The revegetation should comprise native vegetation attractive to native fauna.

The loss of vegetation cover that provides buffer, wildlife corridor and amenity value can be replaced through strategic planting of native vegetation in patches and along corridors in accordance with the landscape plan.

Potential loss of native lizard habitat would be confirmed by a lizard survey, and where appropriate, a lizard management plan should be prepared that details capture and relocation methods, and replacement or enhancement of lizard habitat as appropriate.

Displacement of banded rail from foraging habitat would be localised, temporary, and not significant. Given the proximity of the Project area to nearby habitats for banded rail, some activities have potential to have a positive effect through revegetation around stormwater wetlands, where any occur adjacent to their current foraging or nesting habitats.

3.2.6 Construction - Marine Ecology

Three potential marine ecological constraints are present on the proposed route.

1. SH20 bridge over Tarata Creek - potential reclamation and effects on the Coastal Marine Area (CMA) on both sides of the existing road bridge and SEA-M2-23a east of the Walmsely Road off ramp (GA Plan Sheet 3, Chainage 13500) and loss of coastal vegetation
2. Coronation Road off ramp – cut and fill resulting in loss of coastal vegetation and potential effects on estuarine habitats (GA Plan Sheet 3, Chainage 13600).
3. Waokauri Creek Bridge, SH20B – potential for construction related effects on estuarine habitats and loss of vegetation within the 20m coastal yard.

The primary construction effects in the marine environment would likely be

- Loss of mangrove and salt marsh habitat and
- Loss of coastal vegetation within 20m of mean high water springs.

There is potential for adverse effects on the marine environment through

- sedimentation and fuel contaminants during construction unless well managed, including fully stabilising the sites immediately after the works.
- Interruption of migration of diadromous fish through the estuarine habitats.

3.2.7 Operation – Freshwater Ecology

Provided the stormwater discharged to the streams from the transport area is either of good quality or treated, there should be no adverse effects of the operation of the corridor on freshwater habitats.

3.2.8 Operation – Terrestrial Ecology

Given the vegetation and potential habitats occur within a highly modified, urban and industrial environment, no adverse effects of the operation of the corridor on terrestrial ecology values are expected.

3.2.9 Operation - Marine Ecology

There is potential for scour and deposition around the bridge support structures in the CMA and estuarine environment if they are situated in the main channel or a high-energy area. These potential effects can be mitigated through detailed design and/or the placement of the pylon or piers supporting the structure to avoid main channels and high energy areas.

There is potential for stormwater discharges from the project area to impact the coastal marine habitats both in terms of a reduction of water quality and scour effects. These potential effects can be mitigated through appropriate stormwater treatment and engineering design to ensure the operation effects of the corridor on coastal marine habitats are less than minor.

The SUP would likely allow for easier access by the public to the estuarine habitats, which has the potential to lead to physical damage of the estuarine habitats but conversely greater opportunities for education and protection of these habitats.

4. RECOMMENDATIONS

4.1 Mitigation

4.1.1 Freshwater Ecology

- Fish recovery and relocation in habitats identified with native fish

4.1.2 Terrestrial Ecology

- Replacement planting should aim to provide ecological corridors and connections for species moving through urban environments, particularly around SH20, where potential ecological corridors are comprised of mature native (planted) trees and would be removed. In particular, works along the existing corridor from Mangere Bridge to Portage Road would remove approximately 5.5 ha of established native vegetation. Where contiguous areas for revegetation are not available, The Landscape Plan should identify strategic areas where clusters of native trees may provide 'stepping stones'.
- The loss of native lizard habitat would be confirmed by a lizard survey, and where appropriate, a lizard management plan should be prepared that details capture and relocation methods, and replacement or enhancement of lizard habitat as appropriate.
- Lizard recovery and relocation (where identified by recommended surveys)
- Displacement of banded rail from foraging habitat around Waokauri Creek would be localised, temporary, and not significant. Banded rail have a threat status of 'At Risk- declining' and therefore are a high value species (EIANZ 2018). They are a typical species of coastal wetlands and are widespread throughout many of Auckland's estuarine inlets where their habitats provide for foraging and nesting within or near the CMA (e.g. Mangere Inlet; Pahurehure Inlet; Pakuranga Creek). While a fairly secretive bird, their persistence adjacent to urban and industrial environments demonstrates that they are tolerant of human activities. The proposed construction works near Waokauri Creek bridge may cause the temporary displacement of banded rail from foraging habitat, however these effects will be negligible because this area does not support nesting habitat and the construction works are localised and temporary. Therefore, no specific mitigation is recommended. However, given the proximity of the Project area to nearby habitats for banded rail, some activities have potential to have a positive effect through revegetation around storm water wetlands, where any occur adjacent to their current foraging or nesting habitats.

4.2 Further Assessments Required

- All freshwater and marine habitats will need to be assessed for flora and fauna to support a consent application.
- Terrestrial assessments, including surveys, would need to provide more detail on the presence of native fauna (lizard & bird) habitat and vegetation composition to inform actual values affected.
- The preferred Option at Botany Station will need to be assessed once more information is available.

5. REFERENCES

Aurecon 2019 (a). Airport to Botany RTC SSBC. Preferred Option General Arrangement Plan. Rev C (8.10.19) Sheets 1-17.

Aurecon 2019 (b). A2B / 20 Connect SSBC. General Arrangement Plan. Rev B (2.08.19) Sheets 1-21.

Bioresearches 2018(a). Airport to Botany Short List Options: Multi-Criteria Analysis Scoring Sheet: Terrestrial Ecology. 4 pp.

Bioresearches 2018 (b). Airport to Botany Short List Options: Multi-Criteria Analysis Scoring Sheet: Freshwater Ecology. 4 pp.

Bioresearches 2018 (c). Airport to Botany Short List Options: Multi-Criteria Analysis Scoring Sheet: Marine Ecology. 4 pp.

Bioresearches 2018 (d). 20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Terrestrial Ecology. 20 pp.

Bioresearches 2018 (e). 20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Freshwater Ecology. 22 pp.

Bioresearches 2018 (f). 20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Marine Ecology. 25 pp

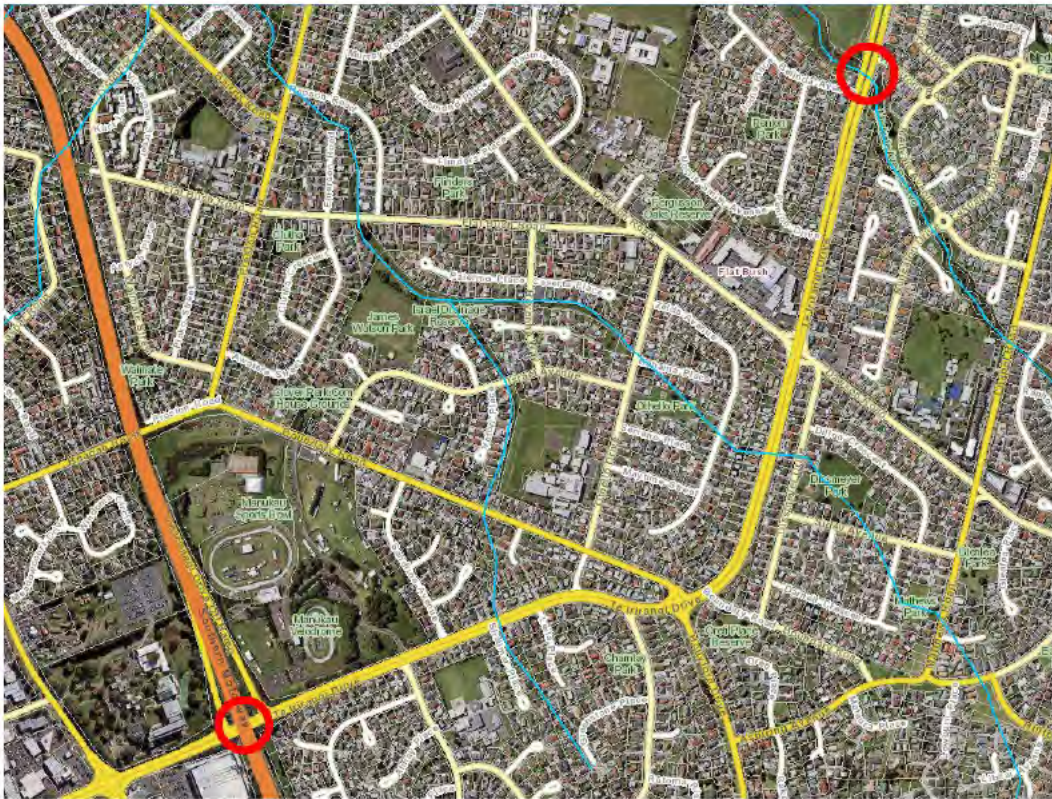
Bioresearches 2019. State Highway 20B Short Term Improvements AEE -Ecological Assessment. Prepared for NZ Transport Agency. Revision B. Document ID 504330-0000-REP-NN-0021. 79 pp.

Robertson, H.A.; Baird, K.A.; Dowding, J.E.; Elliot, G.P.; Hitchmough, R.A.; Miskelly, C.M.; McArthur, N.; O'Donnell, C.F.J.; Sagar, P.M.; Scofield, P.; and Taylor, G.A. (2017). *Conservation status of New Zealand birds, 2016*. New Zealand Threat Classification Series 19. Department of Conservation, Wellington

Appendix 1. Aquatic Habitats – Potential impact sites.

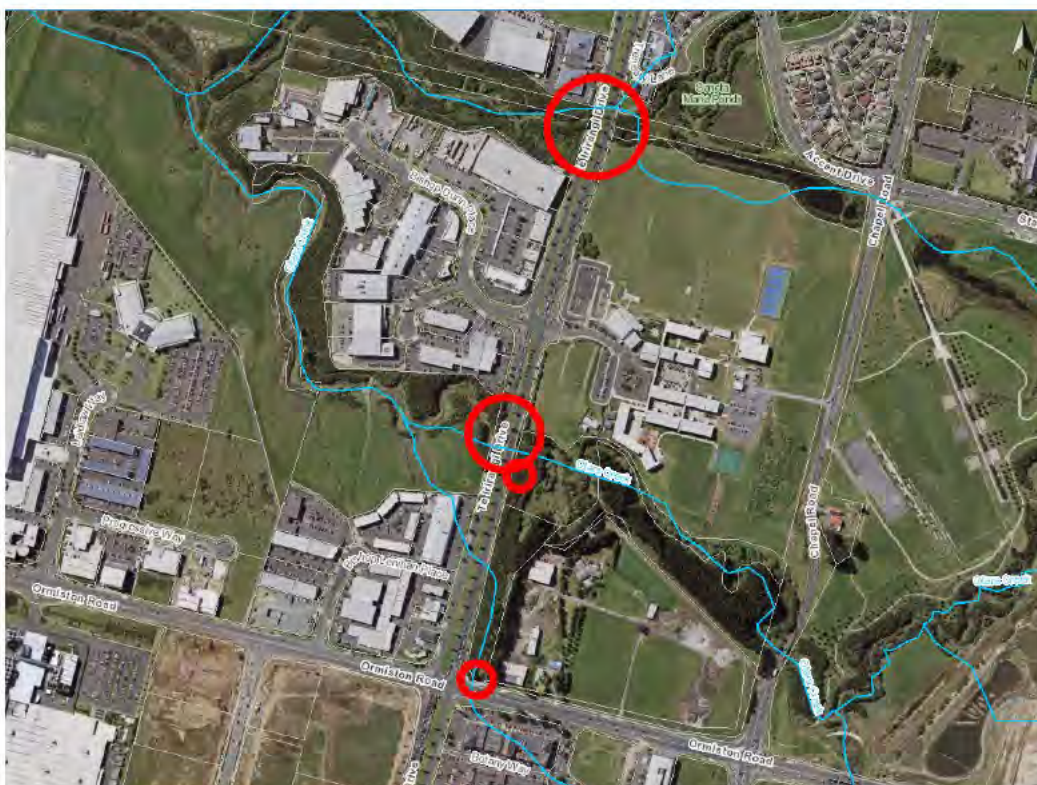
A. Airport to Botany Preferred Option.

Hyman Park East and Te Irirangi Drive crossing of a tributary near Belinda Avenue.



B. Airport to Botany Preferred Option.

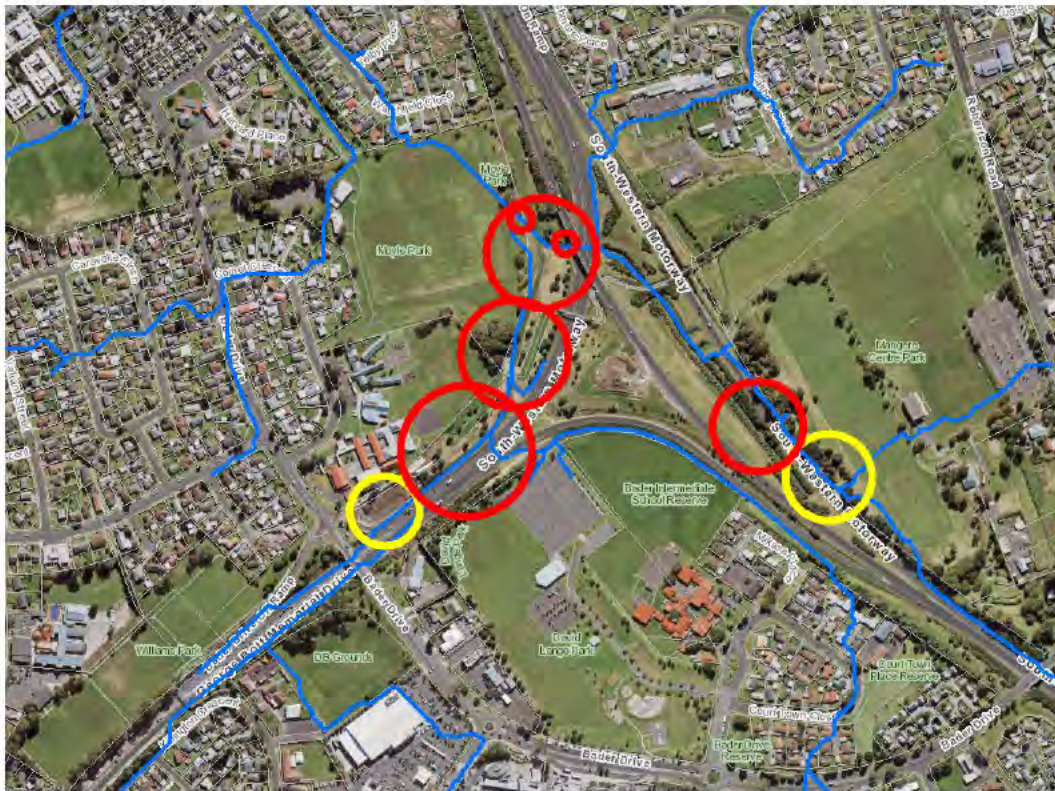
Ormiston Road – tributary to Otara Creek; Te Irirangi Drive north of Ormiston Road; Te Irirangi Drive bridge over Otara Creek; Te Irirangi Drive culvert for Otara Creek tributary.



C. 20 Connect Preferred Option

SH20/SH20A interchange - headwaters of Tarata Creek.

SH20A east of Bader Drive. Stormwater pond & Flow path



D. 20 Connect Preferred Option

Imrie Park; SH20 adjacent to Tidal Road, Geoffrey Place and Henwood Road, Mangere.



E. 20 Connect Preferred Option

SH20B west of Campana Road;
SH20B crossing of Waokauri West Tributary ;
SH20B bridge crossing of Waokauri Creek ;
SH20B crossing of Waokauri East Tributary ;
SH20B crossing of Waokauri Manukau Memorial Gardens





Southwest Gateway

**Preliminary Environmental
Assessment
Landscape and Visual Effects**

Prepared for Auckland Transport, Waka
Kotahi & Aurecon

March 2020

W A Y F I N D E R

Landscape Planning & Strategy



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Revision History

Rev	Date	Author	Reviewer
1	28.10.2019	S Bray	M McBain (Wayfinder)
2	6.11.2019	S Bray	E Sparrow (Aurecon)
3	2.03.2020	S Bray	Waka Kotahi



Introduction

The Southwest Gateway Programme is an overarching collection of transport projects being progressed by investment partners comprising Waka Kotahi New Zealand Transport Agency (Waka Kotahi), Auckland Transport (AT) and Auckland International Airport (AIAL) (collectively referred to as ‘the Project Partners’).

The purpose of the programme is to create a well-connected, efficient transport system that provides choice and reliability for how people and freight travel through southwest and southeast Auckland, including to, and from, the Auckland Airport. The two of the cornerstone projects of the programme are:

- ▶ Airport to Botany (A2B) - the AT component comprising high frequency public transport provision between Botany and the Airport; and
- ▶ 20Connect - the Waka Kotahi component comprising the State Highway (SH) network in the south west of Auckland (SH20, SH20A and SH20B).

Purpose of the Report

The purpose of this report is to provide a Preliminary Environmental Assessment (PEA) of the potential issues and constraints with respect to landscape and visual impacts relating to the preferred options for the two business cases.

Description of the Preferred Options

Airport to Botany Preferred Option

The Airport to Botany Rapid Transit will deliver a frequent rapid transit system between Auckland Airport, Manukau and Botany. The Project will consist of the following elements:

- ▶ A dedicated Rapid Transit corridor from Auckland International Airport to Botany via:
 - Te Irirangi Drive (entire length)
 - Great South Road (between Te Irirangi Drive and Ronwood Ave intersections)
 - Ronwood Ave (From Te Irirangi Drive to Davies Ave intersections)
 - Davies Ave (entire length)
 - Manukau Station Road (from Lambie Drive to Davies Ave intersection)
 - Lambie Drive (From Manukau Station Road intersection to Puhinui Road)
 - Puhinui Road (from Lambie Drive to SH20 interchange)
 - State Highway 20B (Covered in the 20Connect project)
- ▶ Improved walking and cycling facilities along the roads above

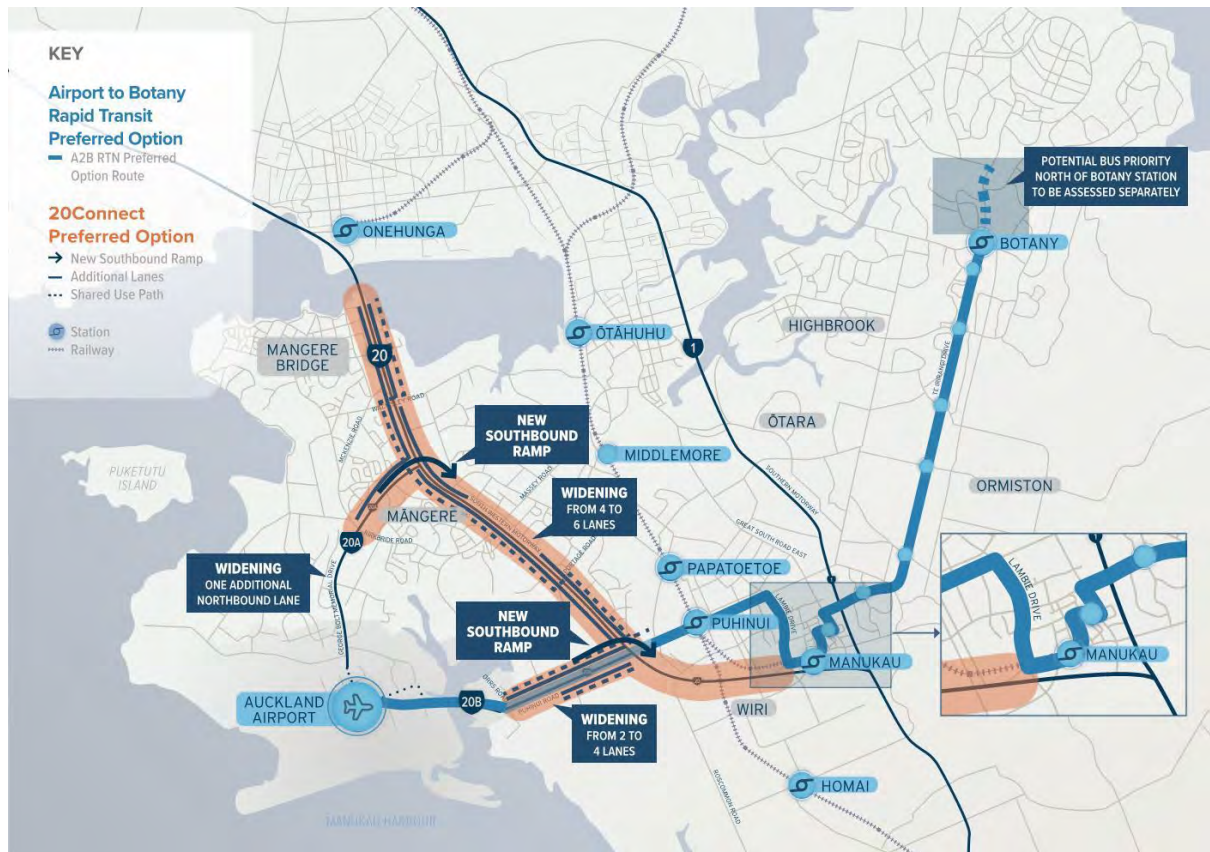
20Connect Preferred Option

20Connect will make additional infrastructure changes to local highways to improve journey time reliability, network resilience and safety. These changes are:

- ▶ New SH20A/SH20 and SH20B/SH20 southbound ramps

- ▶ Widening of SH20 between Manukau Harbour Crossing and SH20A (online at grade)
- ▶ Widening of SH20 between SH20A and SH20B (online at grade)
- ▶ Widening of SH20B to four lanes (including over Pukaki Bridge) – online at-grade
- ▶ Walking and cycling facilities along SH20 and SH20B.

Figure 1: Preferred Option



Study Area

The study area focusses on the immediate corridors outlined in the map above, including immediate neighbouring properties (both public and private). The assessment was undertaken in the context of the wider urban area through which the project passes, including its existing form and the legislative context, but effects considered are only on immediately adjacent properties..

1.3.1 A2B - Botany Station

At the time of writing, the preferred option for Botany Station has not been developed. For the purpose of this PEA, the study area is shown below and a high level assessment has been undertaken.

Figure 2: Botany Station Study Area



Methodology

Method

This PEA has been prepared at the Single Stage Business Case (SSBC) stage and is based on knowledge developed during the long-list and short-list review, as well as additional desktop research following the preferred options. Multiple site visits (during 2018 and 2019) have been undertaken in the 20Connect project area (SH20, SH20a and SH20b), and a brief locality visits within the A2B project area (in October 2019).

Ratings in this assessment are based on those generally agreed to by professionals in landscape assessment. A seven-point scale is used as follows:

Effect Level	1	2	3	4	5	6	7
Rating Scale Used	Very-Low	Low	Low-Moderate	Moderate	Moderate-High	High	Very-High
RMA	Less than Minor		Minor	More than Minor		Significant	

This PEA has been reviewed technically by Wayfinder and by Aurecon for consistency. A review schedule is provided at the beginning of this assessment.



Information Used

The following information sources have been used to complete PEA:

- ▶ General Arrangement drawings prepared by Aurecon, dated 12 September 2019
- ▶ Google Earth, Google Maps and Google Street View;
- ▶ Auckland Council Online GIS and Online Unitary Plan Viewer (accessed November 2019); and
- ▶ Previously prepared memos and maps prepared by Wayfinder for the Multi Criteria Analysis (MCA) relating to the SSBC.

Assumptions

The following assumptions have been considered as part of this assessment:

General

- ▶ It is noted that there are interfacing projects such as the Auckland Airport Precinct Improvements (AIAL), Auckland Manukau Eastern Transport Initiative (AMETI) Eastern Busway, City Centre to Mangere (CC2M) Light Rail, Supporting Growth (South Auckland), Airport Taskforce, Southern Connections. These interfacing projects have been referred to but are not explicitly assessed as part of the scope of the Southwest Gateway projects.
- ▶ The Construction Method is not available at the time of writing. As such generic construction methods to be considered.
- ▶ The construction and operational timeframe are not available at the time of writing.
- ▶ A property acquisition strategy is not available at the time of writing, and any reference to property acquisition in the report is considered as potential only.

Further urban design and landscape specific assumptions

At the time of writing, designs for the SH20B Short Term Improvements project were significantly advanced, and subject to Council approval, construction was near commencement. It has therefore been assumed that the existing environment includes the completed SH20B Short Term Improvements Project in accordance with the lodged plans. This includes modifications to the boundary alongside Manukau Memorial Gardens.

This report has not considered what activities may be permitted under the existing Designation conditions (for SH20, SH20A, SH20B and any local road or urban route designations), but considers all potential effects irrespective of their planning status. For example, it is possible that removal of boundary vegetation and/or the installation of noise walls may already be allowed for.

It is assumed that the SH20B corridor, which currently passes through a rural landscape, will (at the time of construction) be significantly altered in character in accordance with the AUP zoning and the Puhinui Precinct Plan which allows for industrial and commercial land uses. Therefore, landscape effects created through widening of the corridor resulting from 'urbanisation' of the landscape (including the number of vehicle lanes and overall width of the corridor) have not been considered.



Future Urban Design and Landscape Outcomes

The assessment undertaken to support the MCA through preliminary design stages and to inform this assessment identified a number of urban design and landscape opportunities not necessarily required for remediation or mitigation purposes under the Resource Management Act 1991 (RMA).

It has been assumed that through the detailed development of the Project, various landscape and urban design improvements will be incorporated, such as planting (which will be contained in a set of 'Landscape Plans', structures, and cultural interpretations). Such improvements will contribute positively to the Project, and may also provide some level of mitigation to potential effects.

In some instances, where the corridor Designation is narrow, it is recognised that mitigation planting may not be possible. In such situations, it should be assumed that any potential effects will be as described in this report. Where planting is possible, it is likely that potential effects will be reduced.

Assessment of Preferred Option

Airport to Botany Preferred Option

Existing Environment

The Airport to Botany section of the project passes through several urban landscapes.

Along Puhinui Road the surrounding environment is largely residential, with houses flanking both sides of the road. Puhinui Road is currently a relatively busy arterial route, but nevertheless the overall character is suburban, with the exception of the western most end where there are a couple of larger industrial properties. A large, notable eucalyptus tree is located on the northern side of the road in this location.

Puhinui Road historically crossed directly over the North Island Main Trunk Railway Line (NIMTR), however it now loops around Bridge Street (as a result of lengthened platforms) and Puhinui Road is only connected by a pedestrian bridge. The railway station is currently closed, pending a significant upgrade that is part of associated works to this Southwest Gateway Project.

Along Lambie Drive, the surrounding character is a mixture of larger (drive-to) commercial and industrial activity. The road through this portion is relatively wide, typical of a main arterial city road. There are few (if any) distinguishing landscape characteristics.

The southern end of Lambie Drive, the Project loops around Hayman Park, a well-manicured green space that is characterised by a number of mature amenity trees. Adjacent to the southern end of the park is the Manukau Train Station, although much of the station is underground and only car parking is visible on the surface.

Manukau City Centre is typical of many secondary city centres, and is characterised by large format retail buildings, restaurants and other service businesses (eg petrol stations, supermarkets). There is some degree of amenity within the road reserve, mainly in the form of street trees, but there are few (if any) other distinguishing landscape characteristics.

East of the SH1 corridor, the project runs along Te Irirangi Drive. Immediately east of SH1, the road is flanked by the Manukau Sports Bowl, which includes a planted border largely consisting of 'roadside native vegetation' (a common mix of flax, hebe, cabbage trees). Between this location and Ormiston Road, Te Irirangi Drive takes the form of a dual carriageway directly flanked by largely residential properties (which



access the road directly). Due to its nature as a relatively busy city arterial route, many residential properties are located behind tall fences. Again, other than some street trees (which tend to be mature palm trees), there are few (if any) other distinguishing landscape characteristics.

Near to Ormiston Road, the western side of Te Irirangi Drive is flanked by Rongomai Park – a large amenity green space, with a relatively newly formed car park being the main visible element from the road. A small waterway (name unknown) passes along the southern boundary of the park, and passes under Te Irirangi Drive in a culvert, in approximately the same location as a pedestrian overpass. Although this waterway appears to have been planted with riparian vegetation, there is little visibility of it from the road.

Between Ormiston Road and Botany Station, Te Irirangi Drive has a more ‘urban corridor’ character, and is largely isolated from immediately surrounding development. Dense native riparian vegetation (largely manuka) is visible around two tributaries of the Otara Creek, and the centre of the road is marked by dual mature palm trees. Off immediate side roads are a number of larger (drive-to) commercial and industrial properties, and closer to Botany Station residential properties are accessed from culdesac side streets which run parallel to Te Irirangi Drive.

Construction

The following potential effects are identified:

- ▶ The widening of Puhinui Road (Sheet RR-0101) near vision place may result in the loss of the notable Eucalyptus tree (ID1514) on the northern side of the road. Mitigation of the loss of this tree will need to be discussed with Auckland Council directly.
- ▶ The widening of Puhinui Road (Sheets RR-0101 to RR-0104) appears to directly impact directly adjacent residential properties on the northern side. It is assumed that mitigation of such effects will need to be incorporated into any property acquisition agreement.
- ▶ Further to the point above, the road remains directly abutted to the northern side properties. Due to the older nature of these properties, many of which face directly towards the road, the increased road width, addition of Shared Use Path (SUP) and rapid transit corridor will elevate the appearance of the road as a significant urban corridor. This is likely to result in **moderate** visual effects. The lack of space on the northern side means that mitigation is difficult, however, the additional space gained by property acquisition on the southern side potentially provides an opportunity to realign the centre of the road away from residential properties, and provide a vegetation buffer (similar to the northern most section of Te Irirangi Road). In addition, the loss of street-facing properties will mean that rear boundaries may flank the road corridor. Special consideration should be given as to how re-establish a community-frontage to the street and avoid only one side of the street being active.
- ▶ The proposed new overbridge across the NIMTR (Sheet RR-0103) will result in an elevated section of road both sides of the tracks, installed on top of vertical retaining walls. This will likely result in increased visual effects on immediately adjacent residential properties, ranging from **low** (at the lowest end) to **moderate-high** (at the highest end). Mitigation of this ramp may be difficult to achieve, although it is assumed that the retaining walls on the ramps will have an urban design treatment.



- ▶ The changes to Puhinui Road and Lambie Drive (Sheets RR-0101 to RR-0106) are likely to result in the loss of roadside vegetation (street trees). It is assumed that these provide only amenity outcomes, and can be mitigated by additional landscaping developed during detailed design.
- ▶ Some earthworks are required within Hayman Park, potentially resulting in the loss of amenity trees within the park (some of which are scheduled as protected trees in the Auckland Unitary Plan). The loss of these trees will require Auckland Council Parks approval, but it is anticipated the effects can potentially be reworked to avoid impact, or be readily mitigated through additional planting in the modified area. The extent of such mitigation can be explored at detailed design stage in consultation with Auckland Council Parks.
- ▶ The widening of Te Irirangi Drive immediately east of SH1 (Sheet RR-0108) will result in the loss of boundary vegetation (including 6 Puriri trees and a variety of native and exotic shrub species) adjacent to the Manukau Sports Bowl. It is assumed that this vegetation is within the park, and therefore will require Auckland Council Parks approval. It is anticipated the effects can be readily mitigated through additional planting in the modified area, or further into the park.
- ▶ The widening of Te Irirangi Drive between SH1 and Rogomai Park (Sheets RR-0108 to RR-0111) appears to directly impact a number of residential properties. It is assumed that mitigation of such effects will need to be incorporated into any property acquisition agreement. The loss of space between the road and such properties will result in increased visual effects, although some mitigation may be possible through the reconstruction of boundary fences (it appears there is little space for roadside vegetation planting). Alternatively, property acquisition on one side of the road potentially provides an opportunity to realign the road away from residential properties, and provide a vegetation buffer (similar to the northern most section of Te Irirangi Road). In addition, the loss of street-facing properties will mean that rear boundaries may flank the road corridor. Special consideration should be given as to how re-establish a community-frontage to the street and avoid only one side of the street being active.
- ▶ The widening of Te Irirangi Drive around the waterway at the southern end of Rongomai Park (Sheet RR-0111) and around the Otara Creek Tributaries (Sheet RR-0113) will result in extension of the culverting of these streams, and the loss of some vegetation. However, the project also results in the removal of the pedestrian bridge near Rongomai, which potentially frees up some space for replacement planting, and around Otara Stream there appears to be space for additional replacement planting. Overall the effects on these waterways (from a landscape and visual effects perspective) appear to be relatively limited, and are assessed as *low*.
- ▶ The placement of the Rapid Transit Corridor in the centre of Te Irirangi Drive (Sheets RR-0108 to RR-0117) will result in the loss of street trees (palm trees) in the centre of the road, and will enhance its appearance as a significant urban corridor. This is likely to be considered by many as a significant landscape effect, even though it is modification of an already fabricated landscape. Widening the corridor further to allow for enhancement planting would be a desirable landscape outcome, but overall the effects of the loss of this vegetation are considered to be *low*.
- ▶ The proposal will require changes to the vegetation that separates the parallel residential cul-de-sacs/skip-lanes from Te Irirangi Road (Sheets RR-0114 to RR-0117). However, it is assumed that this vegetation could be replaced in the space available.



Operation

Most of the operational effects are captured as part of the Construction Effects. In addition:

- Placement of structures, such as signage gantries, lighting, bus stop shelters, etc might result in visual effects on neighbouring properties, or interrupt views to important landscapes. The design and placement of such structures should be considered in terms of their landscape and visual effects.

Botany Station

This part of the project is an urban centre, and it is assumed that any project works will include landscape and urban design treatments that can remedy and mitigate any potential impacts – it may even result in positive landscape and urban design outcomes.

20Connect Preferred Option

Existing Environment

The 20Connect Project encompasses three key motorway corridors, each of which have a slightly different landscape character.

The SH20 Corridor runs through a predominately urban residential landscape, although from the road this is largely set back behind a dense buffer of relatively mature vegetation, and in places earth bunding. The result is that to users of the motorway, the corridor has a relatively green character. South of Portage Road, views outward open up across the Crater Hill Outstanding Natural Feature, the road (and an adjacent quarry) having historically cut through this feature.

Manukau Memorial Gardens is located on the corner of SH20 and SH20B, and from both roads there are views of headstones and memorials.

Around the SH20 and SH20 Interchange are a series of public recreational spaces (including David Lange Park and Mangere Centre Park). These provide for a range of organised field sports. Mangere Centre Park also contains a narrow gauge steam railway.

The SH20A Corridor between the SH20 Interchange and Kirkbride Road has a similar character to SH20. On the northern side, a public reserve and a series of education facilities are set back from the road, with generous native vegetation flanking the roadside. To the south, a series of noise walls separates residential properties from the road along with a narrow strip of planting. West of Kirkbride Road, the road has a more industrial character. Large windowless storage warehouses flank both sides of the road, with the exception of an area of multi-storey hotels on the western side closer to the airport. The road corridor appears to squeeze between the buildings, with limited or no roadside vegetation. In this area, large advertising billboards tend to be a prominent feature.

The Kirkbride underpass was completed in 2017, and features an at-grade crossing of Kirkbride Road with the motorway located sub-surface. The bridge is adorned with mana whenua inspired artworks.

The SH20B Corridor currently has a strong rural character, and supports some well-established horticultural type businesses. It is confined to a relatively small landform, the Puhinui Peninsula, between Waokauri Creek to the north and Puhinui Creek to the south. To the west and south is the Wiri Industrial Area, which is dominated by large warehousing similar to the SH20A corridor.



In all three corridors, the landform has a generally flat elevation, and natural waterways are not immediately discernible from ground level. However, aerial imagery indicates an extensive network of small tributaries that feed into the Pūkaki Estuary.

Auckland International Airport is a dominant feature of both the SH20A and SH20B corridors, this facility being the primary destination the motorways provide access to. At the western end of SH20B there are open views to the airfield, and along much of this route there is a constant presence of low-flying aircraft.

Construction

The following potential effects are identified:

- ▶ The installation of a SUP on the northern side of SH20 (Sheet RR-1101) will result in the loss of some motorway vegetation [REDACTED] potentially increasing visibility of the road [REDACTED] resulting in a ***moderate-high*** visual effect. This could potentially be mitigated through the installation of noise walls (which would also have acoustic benefit).
- ▶ The widening works will potentially result in the loss of roadside vegetation on the southern side of SH20 (Sheet RR-1102), resulting in increased visibility of the road from residential properties on Crawford Avenue, resulting in a ***moderate-high*** visual effect. This could be potentially mitigated through the installation of noise walls, although these might create some shading effects that are greater than those currently experienced. Taller vegetation might be able to be placed on the upper slopes of swales.
- ▶ Widening of the bridges across Tararata Creek (Sheet RR-1103) will result in the loss of vegetation and habitat in the creek. However, it appears from aerial and street imagery that this creek is heavily modified, including mangroves and exotic riparian vegetation. Potentially the project could provide an opportunity for improved vegetation planting around the creek, and better visibility of the creek from both the road and the SUP. It is considered that the potential effects on landscape (and natural character) will be ***low***.
- ▶ The placement of a SUP on the northern side of the corridor leading up to Walmsley Road (Sheet RR-1103) appears to physically impact directly adjacent residential properties, and will result in the loss of some roadside vegetation, resulting in a ***moderate-high*** visual effect. This could potentially be mitigated through the installation of noise walls (which would also have acoustic benefit).
- ▶ The widening of the Walmsley Road overbridge (Sheet RR-1103) appears to physically impact directly adjacent residential properties and will result in the loss of some roadside vegetation, resulting in a ***moderate*** visual effect. This could be mitigated through replacement planting on earthworked slopes.
- ▶ The construction around the southbound onramp from Walmsley Road (Sheet RR-1104) will likely result in the loss of bunding and vegetation directly adjacent to residential properties. Due to the enhanced elevation of this ramp (as it drops down from Walmsley Road), this will potentially result in a ***moderate*** visual effect. This could be mitigated through replacement planting or installation of noise walls.



- ▶ The placement of a SUP on the northbound side of the SH20 corridor south of Walmsley Road (Sheet RR-1104) will likely result in the loss of roadside vegetation, resulting in increased visibility of the road from residential properties on Umu Place [REDACTED]. These will potentially result in a **moderate** visual effect. This could potentially be mitigated through the installation of noise walls (which would also have acoustic benefit).
- ▶ The installation of the SH20A to SH20 connection bridge will most likely span through a Regionally Significant Viewshaft (Viewshaft M4 from SH20 to Mangere Mountain). Previous advice has been provided on this (refer to New Ramp Options memo dated 23 February 2019). However, it is noted that roadside vegetation could also restrict the viewshaft, and that the effect will only be experienced at the southern end of the lineal viewing points (views to Mangere Mountain will still exist once a northbound SH20 traveller has passed under the overbridge). It is therefore considered that the effects on the viewshaft will be **low-moderate**.
- ▶ The installation of the SH20A to SH20 connection bridge appears to impact some land within Mangere Centre Park, including the loss of boundary amenity trees, and may affect the miniature railway line installed and operated by the Manukau Live Steamers Club. Mitigation is likely to be necessary in the form of replacement planting and potential assistance in relocating the railway line. Further mitigation in the form of a solid visual barrier, such as a tall fence (or noise barrier) could also be considered.
- ▶ Widening and potentially lengthening of Bader Drive overbridge (Sheet RR-1106) may result in landscape and visual effects on immediately neighbouring properties on Bader Drive. These can be mitigated with replacement planting.
- ▶ Widening of SH20 on both sides, and the placement of the SUP on the northbound side of SH20 (Sheets RR-1106 and RR-1107) is likely to result in the loss of boundary vegetation and bunding, resulting in increased visibility of the road from residential properties on Steven Street, Roberston Road (rear sections), Chingford Close, and Ilford Crescent, [REDACTED] and Imrie Ave Reserve. These will potentially result in a **moderate** visual effect. This could potentially be mitigated through the installation of noise walls (which would also have acoustic benefit), although it is noted that placement of noise walls on the boundary of the southbound side may result in some afternoon shading effects.
- ▶ The placement of the SUP on the northbound side of SH20, immediately south of Massey Road may result in some limited vegetation clearance and overlooking effects on one directly adjacent property. This can potentially be mitigated through replacement planting and installation of a fence, and as a result the effect is considered to be low-moderate.
- ▶ The installation of 6-8m retaining walls on the northbound side of SH20 near to Portage Road will only be visible from the motorway, and therefore are not considered to have an effect on neighbouring properties.
- ▶ The proposed widening of SH20 through the Crater Hill ONF (Auckland Unitary Plan ONF22)(Sheets RR-1110 and RR-1111) is likely to result in landscape effects. The recent Environment Court case (Self Family Trust v Auckland Council [2018] NZEnvC 49, April 2018) suggests tolerance to effects on this ONF will be low, despite there being significant historical modification to this landscape. Some proposed works go beyond the Designation. The potential landscape effects in this location is therefore considered to be **high**. It is recommended that



further detailed design be undertaken in this area to consider whether landform modifications can be avoided or minimised.

- ▶ The widening of the SH20 corridor over Waokauri Creek (Sheet RR-1111) will likely result in the loss of some riparian vegetation. However, it is assumed that this can be relatively easily mitigated through additional planting in the vicinity. Some of Waokauri Creek is noted to be Coastal Marine Area which will require more detailed design outcomes to ensure appropriate mitigation.
- ▶ The placement of a SUP on the southbound side of the corridor south of Walmsley Road (Sheet RR-1111) will likely result in the loss of roadside vegetation, resulting in increased visibility of the road from residential properties on Umu Place and the church located on Hall Avenue. These will potentially result in a *moderate* visual effect. This could potentially be mitigated through the installation of noise walls (which would also have acoustic benefit), although it is noted these may result in some afternoon shading.
- ▶ The upgrading of the SH20/SH20B interchange is unlikely to result in any landscape or visual effects greater than low (with the exception of impacts on Manukau Memorial Gardens, refer below), and it is considered these can be relatively easily remedied through planting.
- ▶ The widening of the SH20B corridor (Sheet RR-1119) appears to directly impact directly adjacent residential neighbours on the northern side. It is assumed that mitigation of such effects will need to be incorporated into any property acquisition agreement.
- ▶ The widening of the SH20B corridor (Sheet RR-1119) will likely affect the landscape works being undertaken as part of the Auckland International Airport Ltd (AIAL) Park and Ride Area. This has been a matter of discussion between AIAL and Waka Kōtahi, and it is anticipated that any agreements reached between the two organisations will ensure that any effects are remedied.
- ▶ The widening of the SH20B corridor (Sheets RR-1120 and RR-1121) will result in some vegetation loss around the Waokauri Creek tributaries, however it avoids more significant effects by being located on the southern, more modified side of the corridor. It is therefore considered that the landscape effects will be *low*. Further, mitigation can be achieved through additional planting.
- ▶ The widening of the SH20B corridor (Sheet RR-1121) appears to directly impact directly adjacent residential neighbours on the southern side. It is assumed that mitigation of such effects will need to be incorporated into any property acquisition agreement.
- ▶ Through the development of the SH20B Short Term Improvements Project, there has been a significant amount of work undertaken to mitigate potential landscape and visual effects (and also ecological effects) on and around Manukau Memorial Gardens. The proposed alignment, including the reconfiguration of the SH20/SH20B interchange, appears to avoid additional works beyond the revised Short Term Improvements Designation (which, at the time of writing, had not been approved). Nevertheless, there is potential for some landscape and visual effects as a result of various changes to the road layout which will need to be closely monitored through the detailed design process.

Operation

Most of the Construction Effects outlined above could also be considered Operational Effects, however the following additional potential operational effects are identified:



- ▶ The placement of a SUP adjacent to SH20 could result in some adjacent residential properties being overlooked by users of the SUP. This could potentially be mitigated through the installation of noise walls. The extent to which this impact is an issue requires more detailed assessment that is beyond the scope of this PEA.
- ▶ Placement of structures, such as signage gantries, lighting, bus stop shelters, etc might result in visual effects on neighbouring properties, or interrupt views to important landscapes. The design and placement of such structures should be considered in terms of their landscape and visual effects.

Summary of Key Risks

The following are identified as key risks to the project from a landscape and visual effects perspective:

- ▶ Retaining walls adjacent to residential properties near the NIMTR crossing.
- ▶ Loss of park and roadside amenity due to the loss of street trees.
- ▶ Loss of vegetation along various parts of the corridor, particularly where this vegetation provides visual mitigation of the existing motorway. This will need to be addressed through the detailed design stages.
- ▶ Widening of the SH20 corridor adjacent to the Crater Hill ONF.
- ▶ Widening of the SH20B corridor around the Waokauri Creek CMA area.
- ▶ Effects of new structures on the M4 viewshaft from SH20 to Mangere Mountain.
- ▶ Effects on Manukau Memorial Gardens that may result from changes to planting being undertaken as part of the SH20B Short Term Improvements project.

Further Considerations

In addition to the risks outlined above, various opportunities should be considered, as follows:

- ▶ The loss of vegetation may affect ecological values, including streamside/riparian vegetation or wider urban landscape ecology. Assessment of such effects is contained within the Ecology PEA, but mitigation of such effects could be delivered through landscape outcomes..
- ▶ The project may affect heritage or archaeological sites. Assessment of such effects is contained within the Archaeological PEA, but mitigation of such effects could be delivered through landscape outcomes.
- ▶ Many of the corridors which this project involves are key tourist routes, and therefore opportunities for enhancing them with wayfinding and/or interpretative designs and/or signage should be considered.
- ▶ There is potential scope through the development of an Urban and Landscape Design Framework (ULDF) and/or Urban and Landscape Design Masterplan (ULDMP) to integrate landscape outcomes with mitigation or opportunities identified by other disciplines, such as ecology, heritage, archaeological, cultural. Such outcomes could also include delivering outcomes on



structures (such as cultural narratives) that aren't direct mitigation of effects, but provide good quality community outcomes.

- ▶ Potential future changes to the Auckland Unitary Plan around housing densities may provide opportunities for rationalisation of properties, such as reducing driveway or access requirements. Various proposed changes to the Unitary Plan should be considered as the project progresses.

Recommendations

Mitigation

As outlined throughout this report, it is assumed that the Project will be developed to achieve quality urban design and landscape outcomes where possible. In this regard, it is anticipated that most mitigation can be achieved through replacement and additional planting, where possible, which can be better determined through the detailed design process. This could be achieved through the replacement of street trees (where possible), additional planting in roadside verges (particularly where there is additional space as a result of potential property acquisition), or through the consideration of noise walls.

In addition, some effects may be able to be mitigated as part of the property acquisition process. Purchases of adjacent land for the purpose of widening may also allow for enhanced mitigation, and this should be considered as part of the detailed design process.

It is recognised that, particularly through the Airport to Botany part of the project, that the existing road corridors will result in the loss of roadside vegetation (including street trees), which contribute to the character of the road as a whole and also provide some visual mitigation for adjacent residential properties. It is recommended, that where possible through the acquisition of properties, consideration be given to relocating the centreline of the road such that space be provided for replacement roadside vegetation.

It is recognised that to deliver some elements of the project, land acquisitions will be necessary. Once such acquisitions have been identified, it is recommended that the proposals be reconsidered to determine whether the acquired land could be used more efficiently (eg by relocating the centre-line of the road to allow greater mitigation space on both sides of the road, not just the acquired land side).

To achieve these outcomes, it would be worth developing a detailed landscape and urban design framework and/or masterplan (ULDF, ULDMP) for the project to ensure that a corridor approach is considered towards development of landscape plans and mitigation.

Consent Considerations

It is anticipated that an Urban and Landscape Design Framework (ULDF), and/or an Urban and Landscape Design Masterplan (ULDMP) and a set of landscape plans will be developed as a matter of course through the detailed design stages of the project, and that urban design input will be incorporated into the development of structural elements. These plans should provide mitigation of landscape and visual effects, although further detailed assessment will be necessary once they are completed, and should also draw together elements considered by other disciplines such as ecology, heritage, archaeological, cultural narratives – as well as building outcomes based on the landscape context through which the project



passes. Developing a ULDF/ULDMP prior to consenting may result in reduced consenting requirements across a number of disciplines.

At this stage, no specific conditions of consent are required, however this may change following detailed assessment. Allowance for ongoing evolution of an ULDF or ULDMP should be considered – the outcomes delivered by such documents needs to be refined through the detailed design stages of the project.

It is also recognised that in some locations there will be impacts on Council owned reserve spaces, and it is anticipated that agreement on mitigation outcomes will need to be reached with Auckland Council Parks. This is unlikely to need consent conditions if agreement can be reached in advance of consenting.

Further Assessments Required

It is recognised that there may be some effects resulting from the SUP alignment directly adjacent to residential properties, mainly along the SH20 corridor. Further assessment of the level of effects is required, and this assessment should also consider what is potentially allowed for under the existing motorway designation requirements.

The works within the SH20 corridor are likely to effect the Crater Hill Outstanding Natural Landscape. As such, more detailed assessment of the extent of works and how impacts can be minimised will need to be carried out through the detailed design stages of the project.


NZILA Registered Landscape Architect



Landscape Planning & Strategy

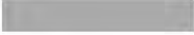
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Preliminary Environmental Arboricultural Assessment (PEAA)

Prepared for: Aurecon New Zealand

Purpose of Report: Arboricultural Assessment of the preferred options for the two Business cases proposed as part of the 20Connect and Airport to Botany (A2B) projects (Southwest Gateway Programme)

Report Compiled by:		Signed: 
Date of PEAA:	3 rd March 2020	

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Approval	
Author signature	_____
Name	
Title	Consultant Arborist

1.0 Introduction

The Southwest Gateway Programme is an overarching collection of transport projects being progressed by investment partners comprising Waka Kotahi NZ Transport Agency (Waka Kotahi), Auckland Transport (AT) and Auckland International Airport (AIAL) (collectively referred to as 'the Project Partners').

The purpose of the programme is to create a well-connected, efficient transport system that provides choice and reliability for how people and freight travel through southwest and southeast Auckland, including to, and from, the Auckland Airport. The two of the cornerstone projects of the programme are:

Airport to Botany (A2B) - the AT component comprising of a high frequency public transport provision between Botany and the Airport; and

20Connect - the Waka Kotahi NZ Transport Agency (Waka Kotahi) component comprising the State Highway (SH) network in the south west of Auckland (SH20, SH20A and SH20B).

1.1 Purpose of the Report

The purpose of this report is to provide a Preliminary Environmental Assessment (PEA) of the potential issues and constraints with respect to Arboricultural impacts relating to the preferred options for the two business cases.

1.2 Description of the Preferred Options

Airport to Botany Preferred Option

The Airport to Botany Rapid Transit will deliver a frequent rapid transit system between Auckland Airport, Manukau and Botany. The Project will consist of the following elements:

- A dedicated Rapid Transit corridor from Auckland International Airport to Botany via:
 - o Te Irirangi Drive (entire length)
 - o Great South Road (between Te Irirangi Drive and Ronwood Ave intersections)
 - o Ronwood Ave (From Te Irirangi Drive to Davies Ave intersections)
 - o Davies Ave (entire length)
 - o Manukau Station Road (from Lambie Drive to Davies Ave intersection)
 - o Lambie Drive (From Manukau Station Road intersection to Puhinui Road)
 - o Puhinui Road (from Lambie Drive to SH20 interchange)
 - o State Highway 20B (Covered in the 20Connect project)
- Improved walking and cycling facilities along the roads above

20Connect Preferred Option

20Connect will make additional infrastructure changes to local highways to improve journey time reliability, network resilience and safety. These changes are:

- New SH20A/SH20 and SH20B/SH20 southbound ramps
- Widening of SH20 between Manukau Harbour Crossing and SH20A (online at grade)
- Widening of SH20 between SH20A and SH20B (online at grade)
- Widening of SH20B to four lanes (including over Pukaki Bridge) – online at-grade
- Walking and cycling facilities along SH20 and SH20B.

Figure 1 below illustrates the Preferred Options for A2B and 20Connect.

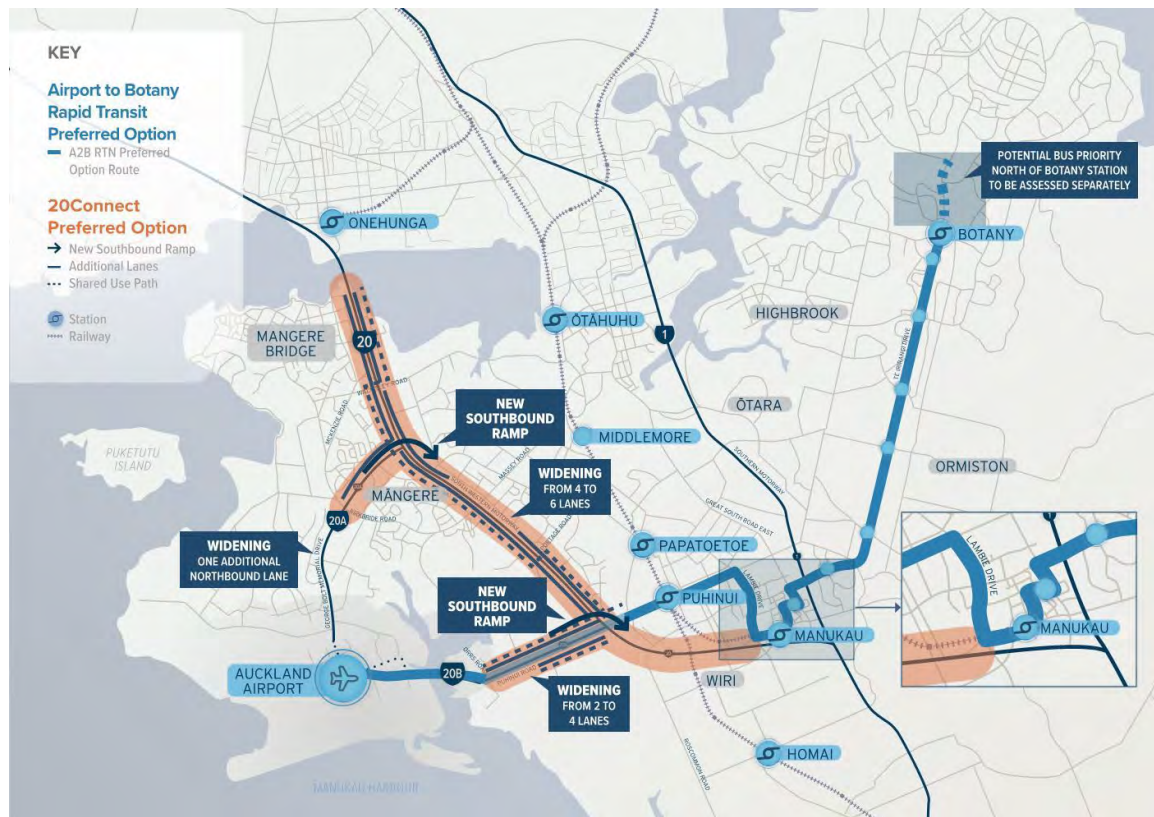


Figure 1: Preferred Options

1.3 Study Area

The purpose of this assessment is to assess protected trees/vegetation within the works area that is predominantly growing outside of the NZTA designation. The particular areas being assessed focus on trees growing on Auckland Transport (AT) owned Road Reserve and Auckland Council (AC) Parks Land.

The main areas of focus for this assessment include:

Airport to Botany Preferred Option

- Te Irirangi Drive (entire length)
- Great South Road (between Te Irirangi Drive and Ronwood Ave intersections)
- Ronwood Ave (From Te Irirangi Drive to Davies Ave intersections)
- Davies Ave (entire length)
- Manukau Station Road (from Lambie Drive to Davies Ave intersection)
- Lambie Drive (From Manukau Station Road intersection to Puhinui Road)
- Puhinui Road (from Lambie Drive to SH20 interchange)

20Connect Preferred Option

- Hall Avenue Reserve
- David Lange Park
- Mangere Centre Park
- Bader Drive (Road Reserve)
- Imrie Ave Reserve
- Open Space Land (West of 477 Massey Road)
- Selfs Road (Road Reserve)

1.3.1 A2B - Botany Station

At the time of writing, the preferred option for Botany Station has not been developed. For the purpose of this PEAA, the study area is shown below in **Figure 2** and a high-level assessment has been undertaken.

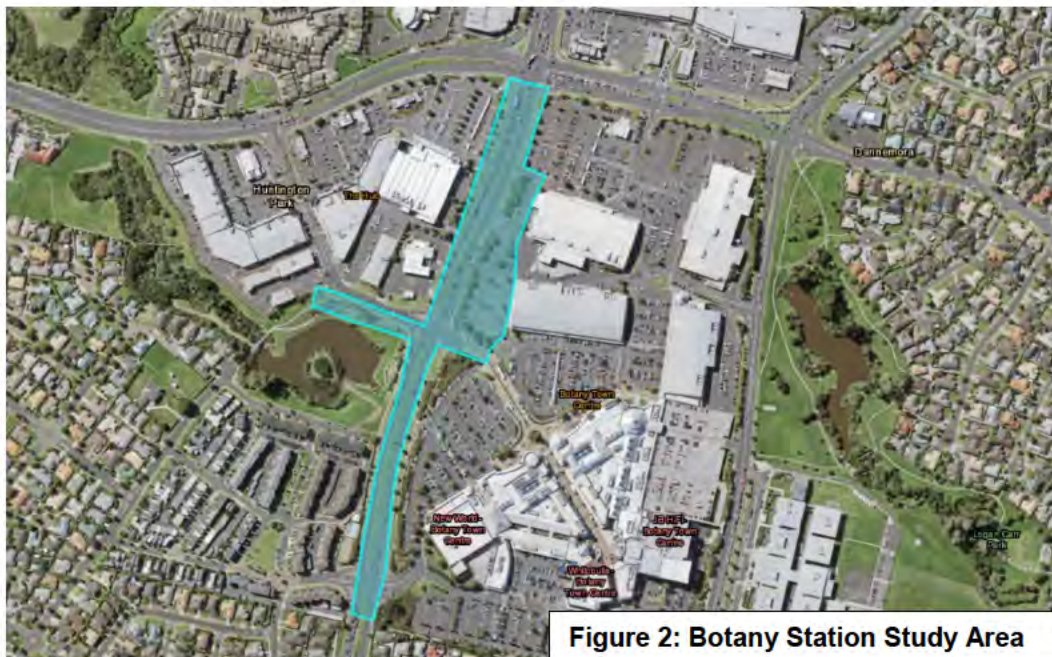


Figure 2: Botany Station Study Area

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2.0 Assessment Methodology

2.1 Method

This PEAA has been prepared at the Single Stage Business Case (SSBC) stage and is based on knowledge developed during the long-list and short-list review, as well as additional desktop research following the preferred options.

This PEAA has been reviewed technically by Richard Peers (Director - Peers Brown Miller Ltd) and by Aurecon for consistency. A review schedule is provided at the beginning of this assessment.

2.2 Information Used

The following information has been referred to in this PEA:

- A2B/20 Connect SSBC – Preferred Option – General Arrangement Plans – Sheets 2-22 – 501094- 4403 –DRG – RR – 1101 to 1121 – B
- Airport to Botany RTC SSBC– Preferred Option – Typical Cross sections – Sheets 1-5 – 502334- 7000 –DRG – RR – 0301 to 0305 – A
- Two site visits were undertaken on the 28/10/19 & 30/10/19 to assess trees/vegetation growing within Parks and Road Reserves that are considered likely to be impacted as part of the project
- The Auckland Unitary Plan Viewer & Google Maps have been utilised where practical to aid in the gathering of additional information where necessary

2.3 Assumptions

The following assumptions have been considered as part of this assessment:

2.3.1 General

It is noted that there are interfacing projects such as the Auckland Airport Precinct Improvements (AIAL), Auckland Manukau Eastern Transport Initiative (AMETI) Eastern Busway, City Centre to Mangere (CC2M) Light Rail, Supporting Growth (South Auckland), Airport Taskforce, Southern Connections. These interfacing projects have been referred to but are not explicitly assessed as part of the scope of the Southwest Gateway projects.

The Construction Method is not available at the time of writing. As such a generic construction method is to be considered.

The construction and operational timeframe is not available at the time of writing.

2.3.2 Arboricultural Assumptions

Those trees/ vegetation assessed as part of this PEAA are considered to be either within the footprint of the proposed works or standing directly adjacent to the works, as illustrated on the provided General Arrangement plans (as referenced in Section 2.0 (v)). This PEAA does not include the assessment of any temporary laydown or construction areas that may be required as part of the project.

2.3.3 Boundary Assumptions

Assumptions are made in terms of tree/vegetation ownership. These assumptions are made based on the information provided by the Auckland Unitary Plan (AUP) viewer and information provided in the General Arrangement plan set. As such, further survey may be required to ascertain the legal ownership of any tree assessed as part of this PEAA.

2.4 Limitations

This assessment is limited to the information available identified above. It does not consider service installations, changes to roading alignments or additional information that may become available following the date of this assessment. All tree numbers, locations and heights are estimates and are provided as a preliminary indication for the SSBC only.

In some instances, private vegetation is recorded where it overhangs Waka Kotahi land, Road Reserve or Open Space zoned land. However, only some privately owned vegetation is recorded, in areas where potential impacts are more severe. Further analysis will likely be required as part of final detailed design of any preferred option. As such, actual effects are subject to change depending on further investigation.

The vast majority of vegetation is within Waka Kotahi land and is not reviewed or discussed. Vegetation within Waka Kotahi is not protected lying within its designations and as such the impact of tree removal does not require assessment against AUP rules or assessment criteria.

3.0 Short Term Works - Puhinui Road and Lambie Drive Improvements

An initial short-term works package is proposed, prior to the future implementation of the A2B project.

The proposed works will involve changes to the roading layout, including the implementation of bus priority lanes and the creation of a walking and cycling facility in the form of a Shared Use Path (SUP) for a portion of the new route.

The short-term works will impact trees growing along Puhinui Road and Lambie Drive. As part of the works, 25 Pohutukawa street trees growing on Puhinui Road will require removal. Works will also be required within the root zones of those trees remaining, including works within the protected root zone of the Flowering Gum tree (ID 1526), with extensive pruning also be undertaken, in order to adequately clear the paths of the new bus priority lanes.

No trees will be removed on Lambie Drive. The short-term works will be restricted to an on-road cycling facility, with pruning required only where trees overhang the new cycleway.

4.0 Assessment of Preferred Option – A2B

4.1 Existing Environment

The proposed works will involve extensive changes to the roading layout, including the implementation of two RTC lanes in the central median and the creation of a separated Shared Use Path (SUP).

The existing environment varies, with a summary of the main typologies in regard to trees/vegetation outlined below:

Puhinui Road (51 trees)

- Puhinui Road is a heavily trafficked two lane road with a narrow berm and the footpath adjacent to private properties.
- The majority of trees potentially impacted by the proposed layout are growing on Road Reserve or 'AT land' adjacent to the existing carriageway and footpath facility.
- A total of **51** protected street trees are growing along the stretch of AT land within the project area (estimated 15 years of age).
- A Notable Flowering Gum tree (ID 1526) is growing within the scope of the project on the corner of Vison Place and Puhinui Road.
- A grouping of Notable trees is identified as growing within 250 Puhinui Road. This site is also covered by a Historic Heritage Overlay (all trees over 3 metres in height protected).
- The majority of trees growing along the potentially impacted route, on AT land, are identified as Pohutukawa (*Metrosideros excelsa*). The remaining trees growing along Puhinui Road are identified as Bottlebrush (*Callistemon* sp.), Titoki (*Alectryon excelsus*) and the occasional Norfolk Island Pine (*Araucaria heterophylla*).

Lambie Drive (55 trees)

- An avenue of protected Norfolk Island Pine (*Araucaria heterophylla*), Gum trees (*Eucalyptus* sp.), and Puriri (*Vitex lucens*) is growing within the central median of Lambie Drive (estimated **50** trees).
- The Norfolk Island Pine trees are a prominent landmark, estimated to be of a similar age to the Pohutukawa growing along Puhinui Road.
- **5** more recently planted Pohutukawa (planted in 2015)(*Metrosideros excelsa*) are planted near the Manukau Station Road intersection.
- A grouping of protected vegetation growing within Hayman Park (western side) will likely be impacted by proposed works.

Manukau Station Road (20 Trees)

- Young Pohutukawa (*Metrosideros excelsa*) (approximately **20** trees) are planted within the outer berms of Manukau Station Road. The trees are less than 5 metres in height in most cases.

Davies Avenue (20 trees)

- Significant semi-mature Pohutukawa growing on the eastern side of Davies Avenue (**8** trees (6-10 metres in height).
- Central green space (west of carriageway) occupied by a number of semi-mature trees including Pohutukawa (**8** trees, 5-7 metres high), Puriri (**4** trees 6-7 metres in height).

Ronwood Avenue (47 trees)

- The Ronwood Avenue section is heavily vegetated (within road reserve).
- Trees species include:
 - o Puriri (**13** trees between 4-8 metres in height) (centre median).
 - o Magnolia (*Magnolia grandiflora*) (approx. **24** trees between 4-8 metres in height) (northern and southern berms).
 - o Norfolk Island Pine (**5** trees between 8-14 metres in height) (centre median).
 - o Gum trees (**5** trees between 10-15 metres in height) (centre median).

Great South Road (7 trees)

- **7** palm trees consisting of 4x Fan Palms (*Washingtonia robusta*) and 3x Phoenix Palms (*Phoenix canariensis*) are located on Road Reserve on the western side of the section of Great South Road impacted by the project area. The trees are mature specimens of 7–12 metres in height.

Te Irirangi Drive (Great South Road to SH1 Motorway Bridge)

- Rows of native vegetation are located on both the northern and southern sides of this section of Te Irirangi Drive - with the majority within Road Reserve. Some overhang from the AUT site.

Te Irirangi Drive (SH1 Motorway Bridge to Diorella Drive) (6 Trees and mixed exotic and native plantings within Manukau Sports Bowl land)

- **6** Puriri (*Vitex lucens*) trees within the southern berm. Additional predominantly native trees growing within Clover Park, but overhanging Road Reserve (Clover Park is zoned Open Space).

Te Irirangi Drive (Diorella Drive to Hollyford Drive) (38 trees)

- **12** street trees (southern side), mixture of Titoki (*Alectryon excelsus*), Puriri (*Vitex lucens*), Pohutukawa (*Metrosideros excelsa*) ranging between 2-8 metres in height.
- **18** Fan Palms (*Washingtonia robusta*) within the central median
- **8** street trees (northern side), mixture of Titoki (*Alectryon excelsa*), Pohutukawa (*Metrosideros excelsa*) Magnolia (*Magnolia grandiflora*) and Fan Palm (*Washingtonia robusta*) ranging between 2-8 metres in height.

Te Irirangi Drive (Hollyford Drive to Dawson Road) (40 trees)

- 15 street trees (eastern side), predominantly Pohutukawa (*Metrosideros excelsa*) ranging between 2-8 metres in height.
- 17 Fan Palms (*Washingtonia robusta*) within the central median.
- 8 street trees (western side), mixture of Titoki (*Alectryon excelsus*), Pohutukawa (*Metrosideros excelsa*) ranging between 2-8 metres in height.

Te Irirangi Drive (Dawson Road to Ormiston Road) (174 trees)

- 31 street trees (eastern side), predominantly Pohutukawa (*Metrosideros excelsa*) and London Plane (*Platanus x acerifolia*) ranging between 3-9 metres in height.
- 103 Fan Palms (*Washingtonia robusta*) within the central median.
- 40 street trees (western side), predominantly Pohutukawa (*Metrosideros excelsa*) and London Plane (*Platanus x acerifolia*) ranging between 3-9 metres in height.

Te Irirangi Drive (Ormiston Road to Accent Drive) (145 trees)

- 34 street trees (eastern side), predominantly Pohutukawa (*Metrosideros excelsa*) ranging in size from 3-9 metres in height.
- 84 Fan Palms (*Washingtonia robusta*) within the central median.
- 27 street trees (western side), predominantly Pohutukawa (*Metrosideros excelsa*) and London Plane (*Platanus x acerifolia*) ranging between 3-9 metres in height.

Te Irirangi Drive (Accent Drive to Smales Road) (187 Trees & Native plantings)

- 30 street trees (eastern side), predominantly Pohutukawa (*Metrosideros excelsa*) ranging between 3-9 metres in height.
- 124 Fan Palms (*Washingtonia robusta*) within the central median.
- 33 street trees (western side), predominantly Pohutukawa (*Metrosideros excelsa*) and London Plane (*Platanus x acerifolia*) ranging between 3-9 metres in height.
- Two areas of native vegetation within the shoulder median.

Te Irirangi Drive (Smales Road to Haven Drive) (104 trees & native shoulder plantings)

- 18 street trees (eastern side), predominantly Pohutukawa (*Metrosideros excelsa*) ranging between 3-9 metres in height. Included in areas of mass native plantings. 3 Pin Oak (*Quercus palustris*).
- 70 Fan Palms (*Washingtonia robusta*) within the central median.
- 16 street trees (western side), predominantly Pohutukawa (*Metrosideros excelsa*) and between 3-9 metres in height. Mass shoulder planting of native species, including Pohutukawa.

4.2 Construction

A significant level of tree removal would be required to facilitate the formation of the majority of the proposed route, due to constraints in corridor widths and the required infrastructure. It is anticipated that trees on Road Reserve and public space would play a significant role in the urban

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environment as the population grows in the area. Further intensive urban pressures would also likely initiate the removal of trees on private property in order to increase housing densities.

Therefore, the retention of existing established trees within Road Reserve and Open Space Zone land, where practical, is deemed of utmost importance.

It is noted that the vast majority of those trees planted along the route are between 10-18 years old. As such, they are deemed to be young to semi-mature, and would provide a useful ecological and environmental function, while also providing a significant level of visual amenity.

The specific areas where tree retention is considered most important are as follows:

4.2.1 Puhinui Road

It is noted in Section 3.0, that the early works will be undertaken as part of the Puhinui Road and Lambie Drive Improvements project and, as such, any additional works as part of future stages should be undertaken within the footprint of those early works.

In order to facilitate the widening into private property on the southern side - between Chainage 700–800, works would be required within 250 Puhinui Road. It is noted that at least 2 Notable trees would require removal as part of A2B works, being the Flowering Gum tree (ID 1526) and the Magnolia tree within 250 Puhinui Road. These trees will not be removed as part of the Puhinui Road and Lambie Drive Improvements.

As a completely new road lane and pedestrian/cycling facility would be required, removal of all trees along the entire route is required. This would involve the removal of all 51 remaining street trees growing along the route. The A2B works would also impact trees growing on Road Reserve at the southern end of Bledisloe Street and Tavistock Avenue, with the full extent of disturbance unable to be confirmed during this initial investigation.

Tree removal within private property will also likely be required on the southern side of Puhinui Road to facilitate the new layout.

Replacement Planting

Replacement planting is important to emulate the existing environment. It is considered that, while some opportunities are possible on adjacent feeder streets (e.g. Clendon Avenue), replacement planting within the Puhinui Road Reserve should be undertaken first and foremost. A plantable berm width of between 1.5-2.0 metres has been provided, according to the provided General Arrangement Plans and cross sections. In my opinion, it is important to provide a treed environment to create better long-term outcomes from an ecological, environmental and amenity perspective.

4.2.2 Lambie Drive

In order to construct the proposed facility, all 55 street trees growing within the central median would require removal.

A new 1.5 metre median is proposed in which replacement planting can be undertaken. However, the Norfolk Island Pine trees likely to require removal are very prominent, so a wider berm is recommended in order to mitigate the effects of this localised tree loss with larger specimens in wider berms (ideally 2.0 – 2.5 metres).

Works proposed within the root zones of protected trees growing within Hayman Park (Chainage 1150-1250).

No tree removal will be required on Lambie Drive as part of the Puhinui Road and Lambie Drive Improvements.

4.2.3 Manukau Station Road

As the trees along Manukau Station Road are relatively young, it is considered that newly planted trees within the allowable 1.5 metre berm would adequately mitigate their loss.

No tree removals are proposed on Manukau Station Road as part of the Lambie Drive as part of the Puhinui Road and Lambie Drive Improvements.

4.2.4 Davies Avenue

Davies Avenue is currently a low traffic shared space. It is considered that the new layout could incorporate new tree plantings with the 2.0 metre raised island and separator arrangements.

It is recommended that the western footpath between Chainage 150 – 300 be redesigned or eliminated in order to protect the prominent Pohutukawa trees growing on the edge of the existing carpark.

4 Pohutukawa and 4 Puriri trees growing within the currently pedestrianised central western island should be considered for transplantation elsewhere or to the neighbouring open space land. Currently, the General Arrangement plans for the Preferred Option indicate potential retention of the 4 Pohutukawa trees within a planted median. Further analysis of this particular aspect of the proposal would be required as part of detailed design.

4.2.5 Ronwood Ave

The removal of all 23 trees growing within the central median would be required to construct the RTN.

Consideration of the northern and southern median should be undertaken to confirm whether the retention of the existing berm trees can be undertaken. Retention of the 24 trees growing on the northern and southern berms is advised so as to maintain the existing treed landscape as much as possible

4.2.6 Great South Road

The 7 Palms growing within the project extents would require removal. It is considered that their removals would be adequately mitigated by replacement planting within the new 2.0 metre berms provided.

4.2.7 Te Irirangi Drive (Great South Road to Diorella Drive)

Vegetation proposed for removal on the boundary of AT land and AUT should be mitigated by new Road Berm plantings where possible.

As indicated in the provided plan set, a significant level of tree removal is proposed for Clover Park. This vegetation should be mitigated through additional screen planting (potentially elsewhere within Clover Park).

Where possible, the existing 6 Puriri street trees should be considered for retention or relocation within the new 2.0 metre berm. At the very least, a 1:1 replacement ratio should be implemented - with additional plantings where required, to bolster the loss of street trees elsewhere (street trees

are recommended at 8-10m intervals along the entire route, dependent on vehicle crossing locations).

4.2.8 Te Irirangi Drive (Diorella Drive to Hollyford Drive)

The 18 Fan Palms within the central median will require removal to facilitate the new RTN.

It is recommended that consideration should be given to the incorporation of 20 existing street trees currently standing on the northern and southern sides of Te Irirangi Drive.

4.2.9 Te Irirangi Drive (Hollyford Drive to Accent Drive)

This stretch of Te Irirangi Drive is largely similar in terms of existing environment and 204 Fan Palm trees will require removal in this section.

Of these, 155 street trees in moderate-good condition are identified as growing within the existing eastern and western berms. It is considered that where possible, the outer berm trees are incorporated into the new scheme.

4.2.10 Te Irirangi Drive (Accent Drive to Haven Drive)

There are 9 areas of shoulder planting identified, including 2 areas for new plantings (Chainage 4850 – 5250) and 7 areas of existing vegetation for retention (Chainage 5400 – 5850) and (Chainage 6150 – 6800).

97 street trees are noted as standing within the eastern and western berms. It is recommended that these be incorporated into the future berm areas where possible.

194 Fan Palms will require removal within the central berm to facilitate the RTN.

4.3 Impacted Tree Summary – A2B

Location	Potential Removal (estimated tree numbers)	Recommended Retention/Incorporation or Mitigation Planting
Puhinui Road (Chainage 150 – 2500)	51, 2 Notable, (number of private trees not included)	<u>1</u> (Notable Gum tree) Mitigation planting is recommended where trees are proposed for removal.
Lambie Drive	55	<u>5</u> Pohutukawa are recommended for retention (Chainage 1250-1300) Mitigation planting is recommended where trees are proposed for removal.
Manukau Station Road	20	Mitigation planting is recommended where trees are proposed for removal.

Location	Potential Removal (estimated tree numbers)	Recommended Retention/Incorporation or Mitigation Planting
Davies Avenue	4 (smaller Pohutukawa excluding shrub and new tree planting)	8 trees recommended for retention (eastern edge near carpark) 8 trees in central island to be retained/transplanted Mitigation planting is recommended where trees are proposed for removal.
Ronwood Avenue	23	24 (growing within northern and southern berms) Mitigation planting is recommended where trees are proposed for removal.
Great South Road	7	Mitigation planting is recommended where trees are proposed for removal.
Te Irirangi Drive	2 Groups, 416 Fan Palms	278 street trees and 7 groups Mitigation planting is recommended where trees are proposed for removal.
Total	569 Street trees, 2 Notable trees & 2 Groupings	323 Street trees, 7 Groupings on Road Reserve

4.4 Potential for Transplanting of trees proposed for removal (A2B)

Some of the 12 subject Pohutukawa trees are candidates for transplant. However, successful transplant depends of a number of factors including, but not limited to the following conditions:

- Location of services;
- Ability to gain an appropriate root ball;
- Suitability and viability of a receiving environment; and
- Economics of the uplift and storage of the tree until which time a new location is available.

It is not deemed appropriate or indeed economical to undertake a full assessment, in terms of the viability of tree transplanting as part of the business case phase of the project. However, a brief list has been compiled below, outlining those trees worthy of further investigation:

Manukau Station Road

- **20** small – medium sized Pohutukawa (*Metrosideros excelsa*) trees growing on the northern and southern sides of Manukau Station Road.

Davies Avenue

- **8** Pohutukawa (*Metrosideros excelsa*) and **4** Puriri (*Vitex lucens*) growing within the proposed works footprint along Davies Avenue.

Ronwood Avenue

- Approximately **5-6** Puriri (*Vitex lucens*) are located within the central median. Further investigations, into the viability of transplant as well as receiving locations are recommended.

Te Irirangi Drive (Great South Road to Diorella Drive)

- Where possible, the existing **6** Puriri street trees should be considered for retention or relocation within the new 2.0 metre berm. Further investigations, into the viability of transplant as well as receiving locations are recommended.

Te Irirangi Drive (Diorella Drive to Hollyford Drive)

- **20** existing street trees currently standing on the northern and southern sides of Te Irirangi Drive. Further assessment will be required on the potential to transplant some of these trees. The trees are largely semi-mature Pohutukawa (*Metrosideros excelsa*). Some of the smaller specimens may be suitable for transplant, subject to suitable replacement locations.

Te Irirangi Drive (Hollyford Drive to Accent Drive)

- **155** existing street trees in moderate-good condition are identified as growing within the existing eastern and western berms. Further assessment will be required on the potential to transplant some of these trees. The trees are largely semi-mature Pohutukawa (*Metrosideros excelsa*). Some of the smaller specimens may be suitable for transplant, subject to suitable replacement locations.

Te Irirangi Drive (Accent Drive to Haven Drive)

- **97** street trees are noted as standing within the eastern and western berms. Further assessment will be required on the potential to transplant some of these trees. The trees are largely semi-mature Pohutukawa (*Metrosideros excelsa*). Some of the smaller specimens may be suitable for transplant, subject to suitable replacement locations.

4.5 Botany Station

Approximately **12** Pohutukawa street trees are located on the eastern side of Te Irirangi Drive within the proposed study area for Botany Station and **8** Fan Palms are located within the central median.

No further design information has been provided at this stage of the project. However, in order to undertake central median works, the 8 Fan Palms are likely to require removal. It is possible some of the 12 Pohutukawa trees may be incorporated into the final scheme, subject to any residual space being adequate to install an SUP where required.

Some of the 12 subject Pohutukawa trees are candidates for transplant. However, a full assessment would be required as part of the detailed design phase of the project.

5.0 Assessment of Preferred Option – 20Connect

5.1 Existing Environment and Potential Effects

The vegetation potentially impacted by the proposed 20Connect project stands largely within NZ Transport Agency (NZTA) designated land. No tree/vegetation protection rules apply within designated areas and, as such, this assessment predominately assesses that vegetation located outside the designation boundaries. However, general comments are made in terms of the typology of vegetation growing with the NZTA designation areas.

5.1.1 Mahunga Drive (Chainage 11950 – 12300)

Existing Environment

- The majority of vegetation within this section of the project is located within Waka Kotahi designated area for the State Highway. The vegetation largely consists of mixed native regenerative species plantings. The plantings are dominated by Harakeke (*Phormium sp.*), with groupings of small Pohutukawa (*Metrosideros excelsa*) trees in the central median between the Mahunga Drive off ramp and the main southbound lanes.
- South of the Mahunga drive overbridge, the vegetation within Waka Kotahi designation is typical of the wider corridor, being young regenerative native species, including Karo (*Pittosporum crassifolium*), Manuka (*Leptospermum ericoides*), Ti Kouka (*Cordyline australis*) and Harekeke (*Phormium sp.*). A number of Pohutukawa (*Metrosideros excelsa*) trees are also growing in this location.

Potential Effects

- Retaining wall works are proposed on the edge of AT land, within an area of land designated as Maori Purpose. It is possible a portion of this vegetation will require removal and will have works undertaken within the root zones of trees that could be protected during construction.
- Vegetation growing within the Waka Kotahi designation in this location will require removal to facilitate the proposed retaining walls to the west of the Mahunga Drive off ramp, with a significant portion of the mass planted vegetation requiring removal for the new SUP to the south.

5.1.2 Mahunga Drive to Tarata Creek Bridge (Chainage 12300 – 13500)

Existing Environment

- The impacted vegetation within this section of the project is located within Waka Kotahi designated land. The vegetation largely consists of mixed native regenerative species plantings. The plantings are dominated by Harakeke (*Phormium sp.*) and young native species, including Karo (*Pittosporum crassifolium*), Manuka (*Leptospermum ericoides*), Ti Kouka (*Cordyline australis*), Ngaio (*Myoporum laetum*) and Taupata (*Coprosma repens*). A number of young Pohutukawa (*Metrosideros excelsa*) trees are also growing in this location.

Potential Effects

- Extensive works are required on the eastern side of the existing South Western Motorway to install a new SUP along the entire length, running from Mahunga Drive to the Walmsley Road off ramp. The construction of the SUP will require the removal of the vast majority of vegetation growing along the eastern banked section between the motorway and Waka Kotahi land boundary.
- Some vegetation, of the same typology, will also require removal on the western side, as part of the relocation of the off ramp and re-profiling of the existing contours between Chainage 13500 and 13850.

5.1.3 Tarata Creek Bridge Works (Chainage 13500 -13550)

Existing Environment

- This portion of Tarata Creek is moderately vegetated, dominated by native regenerative species such as Ngaio (*Myoporum laetum*) and Taupata (*Coprosma repens*). Weed species were also identified within this particular area and immediately adjacent.

Potential Effects

- Works will be required both within and outside the Waka Kotahi designation as part of the works to construct the new off ramp and shared path in this location.
- Any tree removal outside the designation in this location would be subject to an assessment against those rules pertaining to trees/vegetation within Chapter E26 of the AUP. (As outlined in Section 6.2 of this PEAA).

5.1.4 Shared Use Path (Chainage 13800 – 14300)

Existing Environment

- An area of native vegetation is growing along the western side of the existing Waka Kotahi designation in this location. Non-protected vegetation is also noted as overhanging the designated area from 38a Walmsley Road and 30 Hall Avenue (private property).
- The vegetation largely consists of mixed native regenerative species plantings. The plantings are dominated by native species, including Karo (*Pittosporum crassifolium*), Manuka (*Leptospermum ericoides*), Ti Kouka (*Cordyline australis*) and Harekeke (*Phormium sp.*), Ngaio (*Myoporum laetum*) and Taupata (*Coprosma repens*). The occasional Puriri (*Vitex lucens*) and Pohutukawa (*Metrosideros excelsa*) is also growing on the outer edge of the groupings, near the existing motorway shoulder.

Potential Effects

- Significant portions of this mass planted native vegetation will require removal in order to construct the new SUP in this location. Where possible, construction techniques should be of low impact, so as to retain vegetation where practical.

5.1.5 Shared Use Path (Chainage 14300 – 14650)

Existing Environment

- An area of native vegetation is growing along the western side of the existing NZTA designation in this location.
- The vegetation largely consists of mixed native regenerative species plantings. The plantings are dominated by Harakeke, native species, including Karo (*Pittosporum crassifolium*), Manuka (*Leptospermum ericoides*), Ti Kouka (*Cordyline australis*) and Harekeke (*Phormium sp.*), Ngaio (*Myoporum laetum*) and Taupata (*Coprosma repens*).

Potential Effects

- Significant portions of this mass planted native vegetation will require removal in order to construct the new SUP in this location. Where possible, construction techniques should be of low impact, so as to retain vegetation where practical.

5.1.6 New Bridge (Chainage 650 – 1150) (501094 4403 DRG RR 1105 - 1106 B)

Existing Environment

- Mangere Centre Reserve is a recreational reserve dominated by playing fields and areas of informal green space. A number of trees are growing on the boundary of the reserve, adjacent to the Waka Kotahi land. This particular area is dominated by exotic species, including Monterey Pine (*Pinus sp.*), Swamp Cypress (*Taxodium distichum*), and Willow (*Salix sp.*) Infrequent semi-mature Totara (*Podocarpus totara*) are also planted within the grouping. The vegetation in this area is tightly grouped and forms an avenue or informal row along the western boundary of the park.
- The reserve land is zoned 'Open Space' and therefore subject to tree protection under the AUP. All trees greater than 4 metres in height or 400mm in girth are protected within the Reserve. An assessment would be made against the relevant rules within Chapter E26 of the AUP. (As outlined in Section 6.2 of this PEAA)
- Vegetation within the Waka Kotahi designation is largely similar to the wider corridor. However, it is noted that an informal row of semi-mature native specimen trees including Puriri (*Vitex lucens*), Pohutukawa (*Metrosideros excelsa*) and Totara (*Podocarpus totara*) are planted near the footprint of the new bridge section, between Chainage 600 – 950. These trees are planted in the central vegetated section, between the northbound and southbound lanes.

Potential Effects

- A new bridge structure is proposed for construction, arising from the east to connect with the southern lanes of SH20. This new bridge structure will involve construction works within Mangere Centre Reserve, as well as within the Waka Kotahi designation. Associated cut and fill works along with the construction of new retained walls would be required. The following specific likely impacts coupled with perceived vegetation impact is outlined below:

Chainage 650 – 900

- A tightly grouped row of vegetation is noted as growing within the footprint of the proposed overpass. The vegetation within this area is protected, due to the subject trees meeting the threshold for protection under the AUP rules pertaining to trees in Open Space Zones.
- Vegetation within this area includes:
 - **36** Pine trees (Monterey Pine & other species) (*Pinus sp.*) (20-25 metres high, 1200-2500mm girth)
 - **15** Swamp Cypress (*Taxodium distichum*) (8-10 metres high, 800-1500mm girth)
 - **5** Weeping Willows (*Salix sp.*) (12- 8 metres high, 2500-3000mm girth)
 - **5** Totara (*Podocarpus totara*) (5-8 metres in height, 800-1200mm girth)
- It is considered that the vast majority of this vegetation would require removal to enable the construction of the bridge piers and associated infrastructure.
- As noted above, an informal row of Puriri (*Vitex lucens*) and Pohutukawa (*Metrosideros excelsa*) are planted near to footprint of the new bridge section, between Chainage 600 – 950. These trees are growing within the Waka Kotahi designated land. It is considered that the majority of these trees would require removal to facilitate the bridge construction.

Chainage 900 - 1000

- It is considered that protection vegetation would likely require removal or be impacted as part of the proposed retaining wall construction and lane works in this location.
- Vegetation within this area includes:
 - **8** Pine trees (Monterey Pine & other species) (*Pinus sp.*) (20-25 metres high, 1200-2500mm girth)
 - **12** Hybrid Poplars (*Populus sp.*) (10-18 metres high, 1200mm girth)
 - **2** Coastal Redwood (*Sequoia sempervirens*) (8-10m high, 1000-2000mm girth)
- It is considered the majority of vegetation in this area would require removal or works within their respective protected root zones as part of the bridge pier construction works.

Chainage 1000- 1171

Existing Environment

- 161R Robertson Road is a heritage site covered by a Historic Heritage overlay, with a Notable Plane tree (ID 1463) standing adjacent to the Waka Kotahi land. The site is also zoned as an 'Open Space' zone. All vegetation greater than 3 metres in height is also protected within the overlay area.
- Vegetation within the boundary of 161R Robertson Road includes:
 - **1** Notable London Plane tree (*Platanus x acerifolia*) (25 metres high, 4000mm + girth) (This tree is noted in the AUP as standing within 101R Robertson Road. However, this information is incorrect, as the tree actually stands within 161R Robertson Road).

- **6 Coastal Redwood (*Sequoia sempervirens*)** (8-10 metres high, 1000-2000mm girth).
- The reserve land is zoned 'Open Space' and therefore subject to tree protection under the AUP. All trees greater than 4 metres in height or 400mm in girth are protected within the Reserve. An assessment would be made against the relevant rules within Chapter E26 of the AUP.
- Vegetation is also growing within Waka Kotahi's land at this location. The vegetation is identified as predominately native mass planting. The plantings are dominated by regenerative native species, including Karo (*Pittosporum crassifolium*), Manuka (*Leptospermum ericoides*), Ti Kouka (*Cordyline australis*) and Harekeke (*Phormium sp.*), Ngaio (*Myoporum laetum*) and Taupata (*Coprosma repens*). The occasional Puriri (*Vitex lucens*) and Pohutukawa (*Metrosideros excelsa*).

Potential Effects

- It is considered that works within the vicinity of those trees growing within 161R would be restricted to works within their respective protected root zones. As such, any works would be subject to those rules pertaining to trees in Chapters D17, & E26 of the AUP.
- It is assessed that the removal of the vast majority of the native mass planted vegetation within the Waka Kotahi designated land would be required to construct the new retaining walls (eastern side).

5.1.7 Proposed Works Adjacent to David Lange Reserve (501094 4403 DRG RR 1105 B) (south east area, Chainage 350 of new overbridge)

Existing Environment

- A grouping of largely exotic vegetation is located within David Lange Park adjacent to NZ Transport Agency land. The grouping is dominated by Eucalyptus (*Eucalyptus sp.*) with the occasional Totara (*Podocarpus totara*). David Lange Park is zoned 'Open Space' and as such all trees within the park over 4 metres in height or 400mm in girth are subject to protection.

Potential Effects

- Works are proposed in order to realign the existing SUP facility within the designation. These works will be undertaken within the root zones of the grouping of Eucalyptus (*Eucalyptus sp.*) and Totara (*Podocarpus totara*) growing within the park land.
- It is envisaged that the final design of the SUP will require arborist approval so as to not adversely impact this tree grouping.

5.1.8 Bader Drive Bridge Works (501094 4403 DRG RR 1106 B)

Existing Environment

- A grouping of mixed native and exotic vegetation is growing on AT land to the west and east of the Bader Drive Bridge in this location. A grouping of Monkey Apple (*Syzygium smithii*) and Pohutukawa (*Metrosideros excelsa*) are growing on the north east side of the bridge, within 161R Robertson Road. These trees stand adjacent to the Bader Drive Road Reserve. Two Pohutukawa (*Metrosideros excelsa*) are also growing on the southern side of Road Reserve, to the northeast of the bridge.

- To the south west, a row of Pohutukawa (*Metrosideros excelsa*) stand on Road Reserve (AT Land) with a grouping of Butia Palm (*Butia capitata*) also located in this area.

Potential Effects

- A new SUP is proposed on both the northern and southern sides of the existing bridge. The new facility would likely impact those trees growing both within Road Reserve and on the boundary of 161R Robertson Road. The following specific vegetation will likely be impacted:

Northeast

- 4 Monkey Apple (*Syzygium smithii*) (8-10 metres high, 600-1000mm girth), which stand on the boundary of road reserve and 161R Robertson Road.
- 4 Pohutukawa (*Metrosideros excelsa*) (8 metre high, 1000-1500mm girth). This row of trees is located within 161R Robertson Road, and also overhangs AT Land. Potential works within the protected root zone as part of the cycleway work.
- 2 Pohutukawa (*Metrosideros excelsa*) (8 metre high, 1000-1500mm girth). Standing on Road Reserve on the southern side of Bader Drive. Will likely require removal to construct the new SUP.

Southwest

- 5 Pohutukawa (*Metrosideros excelsa*) (8m high, 1000-1500mm girth). This row of trees is located within Road Reserve on the southeast side of the Bader Drive Bridge. Potential works proposed within the protected root zone as part of the construction of the new shared path
- 7 Butia Palm (*Butia capitata*) (4m high, 1000-1200mm girth). This row of palms is located on the southeast side of Bader Drive. Possible removal/works in the vicinity of some palms to facilitate the new cycleway connection
- These trees all stand on either Open Space zoned Land or Road Reserve and, as such, are afforded protection under those AUP rules pertaining to trees in such zones AUP (protection of trees over 4 metres in height or 400mm in girth) (Section E26).

5.1.9 Shared Pathway & Bund Works (Chainage 1350 – 2100)

Existing Environment

- An area of native vegetation is growing along both the eastern and western sides of the existing Waka Kotahi designation in this location.
- The vegetation largely consists of mixed native regenerative species plantings. The plantings are dominated by native species, including Karo (*Pittosporum crassifolium*), Manuka (*Leptospermum ericoides*), Ti Kouka (*Cordyline australis*) and Harekeke (*Phormium sp.*), Ngaio (*Myoporum laetum*) and Taupata (*Coprosma repens*). The occasional Puriri (*Vitex lucens*) and Pohutukawa (*Metrosideros excelsa*) is also growing on the outer edge of the groupings, near the existing motorway shoulder.

Potential Effects

- Significant portions of this mass planted native vegetation will require removal in order to construct the new SUP on the western side of the existing motorway.
- On the eastern side, the removal of the existing noise bund is proposed. This will require the removal of the vast majority vegetation on the bank section directly adjacent to the existing motorway shoulder, from Chainage 1350 to 1700.

5.1.10 Works within Imrie Reserve and Jean Batten School (Chainage 2000 – 2400)

Existing Environment

- Imrie Reserve and Jean Batten School are located to the west of the Transport Agency land. The reserve land is largely open green space with two main areas of vegetation to the north and south. The main areas are identified as below:
 - A grouping of semi-mature native trees growing in the northeast of the reserve.
 - A stand of Cottonwood Poplars (*Populus nigra*) in the southeast near the boundary with Jean Batten School. The trees are growing within the reserve land and also border Waka Kotahi's land to the east.
 - Various specimen trees are growing along the boundary of Imrie Reserve adjacent to the Waka Kotahi land.

Potential Effects

- Works are proposed within Imrie Reserve as part of the creation of two new shared path connections. This will include works within the protected root zone of some of the grouping of Poplar trees in the southeast portion of the reserve. It is also anticipated that one (1) dead tree within the reserve near the designation boundary will need to be removed. It is anticipated that works will be required within the protected root zones of 4 of the 24 Cottonwood Poplar trees (*Populus nigra*) growing within the reserve
- An additional connection is also proposed in the northeast portion of Imrie Reserve. It is considered that while the northern grouping of native vegetation is located in the vicinity of the pathway, this vegetation can be retained and protected during construction
- Retaining wall construction would be proposed within Transport agency land along the northern boundary of Imrie Reserve. This works are likely to impact the various specimen trees within the reserve with earthworks including cut and fill likely as part of this portion of works
- Those trees standing on Open Space zoned Land are afforded protection under those AUP rules pertaining to trees in such zones (protection of trees over 4 metres in height or 400mm in girth) (Section E26)

5.1.11 Works within the rootzone/ tree removal required for batter works within Reserve (479R Massey Road) (Chainage 2350 – 2400)

Existing Environment

- A small reserve (Open Space zoned land) is located to the east of the existing Massey Road off ramp. The reserve stands adjacent to NZ Transport Agency land with a mixture of native

and exotic vegetation growing along the western boundary. Three semi-mature Claret Ash (*Fraxinus oxycarpa* 'raywoodii') trees are growing with the central portion of the reserve.

Potential Effects

- Earthworks are proposed within the vicinity of the row of mixed vegetation growing along the boundary with NZ Transport Agency land, within the reserve. It is likely that tree removal would be required to facilitate such earthworks. The following vegetation is considered to be affected;
 - **3** Phoenix Palms (*Phoenix canariensis*) (8-9 metres high, 1000-2000mm girth) (weed species)
 - **9** Karaka (*Corynocarpus laevigatus*) 6-8 metres high, 600-900mm girth
 - Various Taupata (*Coprosma repens*) and weed species
 - **3** Claret Ash (*Fraxinus oxycarpa* 'raywoodii') 8-10 metres high (located in the northern central portion of the reserve, away from the main works area)
- It is considered that the Phoenix Palms, Karaka, and Taupata would require removal in order to facilitate any new earthworks. These trees all stand Open Space zoned land and, as such, are afforded protection under those AUP rules pertaining to trees in such zones. (protection of trees over 4 metres in height or 400mm in girth) (Section E26)

5.1.12 Shared Pathway & Grade Changes (Chainage 2550 –3850)

Existing Environment

- An area of native vegetation is growing along both the eastern and western sides of the existing Waka Kotahi designation in this location.
- The vegetation largely consists of mixed native regenerative species plantings. The plantings are dominated by native species, including Karo (*Pittosporum crassifolium*), Manuka (*Leptospermum ericoides*), Ti Kouka (*Cordyline australis*) and Harekeke (*Phormium sp.*), Ngaio (*Myoporum laetum*) and Taupata (*Coprosma repens*). Continuous groupings of 8-10 metres high Ngaio (*Myoporum laetum*) are consistent along both the western and eastern groupings. The occasional Puriri (*Vitex lucens*) and Pohutukawa (*Metrosideros excelsa*) is also growing on the outer edge of the groupings, near the existing motorway shoulder.

Potential Effects

- Significant portions of this mass planted native vegetation will require removal in order to construct the new SUP on the western side. Where possible, construction techniques should be of low impact, so as to retain vegetation where practical.
- Extensive re-profiling on the western side will require the removal of areas of this native mass planted vegetation along the entire section.

5.1.13 Proposed SUP – Selfs Road (Chainage 3900 – 4450)(Northern side)

Existing Environment

- A number of trees are noted as growing within road reserve along the northern side of Selfs Road, adjacent to Aorere College. Street trees are also growing within Road Reserve on Portage Road. Additional semi-mature trees are growing within Aorere College adjacent to the sports field on the western boundary.

Potential Effects

- A new SUP is proposed along both the northern and southern sides of Selfs Road. The following vegetation is identified on Portage & Selfs Roads and is likely to be impacted by the proposed facility;
 - **3** Box Alder (*Acer negundo*) (4-5m high, 600-800mm girth)
 - **9** She-Oak (*Casuarina cunninghamiana*) (8-10m high, 600-1000mm girth) (Chainage 3900 – 4100)
 - A row of **14** mature trees growing on Road Reserve, adjacent to Aorere College. Species include Deodar Cedar (*Cedrus deodara*), Pohutukawa (*Metrosideros excelsa*), Alder (*Alnus glutinosa*) and Banksia (*Banksia integrifolia*)
 - **1** Claret Ash (*Fraxinus oxycarpa* 'raywoodii') growing within Road Reserve, adjacent to 1 Caringbah Drive
 - **1** Melia (*Melia azedarach*) growing on AT land, adjacent to 18 Selfs Road
 - **2** Golden Elm (*Ulmus glabra* 'lutescens') growing on AT land, adjacent to 20 Selfs Road & 4 Catkin Crescent
- In order to construct the SUP along the northeast side of Selfs Road, all **30** trees would require removal. Therefore, it is recommended that the option of a single facility on the southwestern side of Selfs Road be explored, with the potential for the existing northeast footpath facility to be upgraded without the removal of existing trees.
- Due to the footprint of the proposed new facility, replacement planting opportunities within AT land will be slim, further cementing the recommendation of retention where possible. It is noted that a small section of the facility is also proposed on Portage Road, which will potentially impact the **3** Box Alder growing in that location.

5.1.14 Proposed Walking and Cycling Facility (SUP) – Selfs Road (Chainage 3900 – 4450)(Southern side)

Existing Environment

- Six large trees are located within private property at 8 Selfs Road. The trees are prominent species and include significant Puriri (*Vitex lucens*) and Macrocarpa (*Cupressus macrocarpa*).

Potential Effects

- A new SUP is also proposed on the southern side of Selfs Road, in order to emulate the proposed facility on the north. Work will be required within the root zones of **6** privately owned, large, significant trees growing within this private property.

- Any works within the root zones of such trees should be supervised by an arborist in accordance with best practice.

5.1.15 Proposed SUP connection at Pah Road (Chainage 5000)

Existing Environment

- A single Willow myrtle (*Agonis flexuosa*) tree is growing within Road Reserve at the end of Pah Road, adjacent to Waka Kotahi's land.

Potential Effects

- The removal of 1 Willow myrtle (*Agonis flexuosa*) (8 metre high, 1200mm girth) will be required to enable the construction of the shared path in this location.
- The removal of this particular tree could be adequately mitigated through replacement trees in the area of AT land to the north, currently devoid of any street tree planting.

5.1.16 Works within designation – Puhinui Interchange (Chainage 4700 – 5750)

Existing Environment

- An area of largely native regenerative type native planting is located both within the Waka Kotahi designated land and Manukau Memorial Gardens. The impacted vegetation includes a number of semi-mature Pohutukawa growing within Manukau Memorial Gardens, along with three exotic trees, being 2 Hybrid Poplars (*Populus sp.*) and 1 Monterey Pine (*Pinus radiata*).
- A number of large Australian Blackwood (*Acacia melanoxylon*) trees are noted as growing on both the eastern and western sides of this section of the proposed works. These trees are both overhanging from the Manukau Memorial Site as was as growing within the NZTA designated land (largely on the eastern side).
- A Notable Flowering Gum (ID 1526) is growing to the east of the existing SH20 overbridge on the corner of Vision Place and Puhinui Road.

Potential Effects

- The removal of the native and exotic vegetation adjacent to the Manukau Memorial Gardens would be required to facilitate the new Gardens site (within the new 2019 Minor Alteration to design designation). It is recommended that new revegetation planting should be undertaken within the Manukau Memorial Gardens to replace this area, in terms of planted volumes and of similar species types.
- Crossover of works will be required between 20Connect and A2B as part of the new roading, cycleway and pedestrian facility. Works would be required within the protected root zone of a Notable Flowering Gum tree (ID 1526) to form the new SUP as part of the short term Puhinui Road and Lambie Drive Improvements. However, this tree stands within the footprint of the new 20Connect widening works and would require removal in order to facilitate the new corridor configuration as currently proposed.

5.2 Impacted Tree Summary – 20 Connect

Location	Potential Removal (estimated tree numbers)	Recommended Mitigation/Incorporation
Mahunga Drive (Chainage 12250 – 12300)	The true impacts at this location are yet to be determined. However, it is likely some tree removal will be required to facilitate the proposed retaining walls	Remaining vegetation to be protected and worked around where possible. Relocate Pohutukawas elsewhere within the designation if possible
Mahunga Drive to Tarata Creek Bridge (Chainage 12300 – 13500)	Vegetation removal required to facilitate the new SUP and undertake grade changes. Mass planting removals will be required, largely for the entire length of the SUP and western grade changes.	Mitigation planting with the same existing typology recommenced
Tarata Creek Bridge Works (Chainage 13500 -13550)	The exact extent of removals is yet to be determined. However, it is anticipated that a strip of existing vegetation will require removal to facilitate the works in this location	The remaining vegetation outside the footprint of the SUP/Bridge Structure should be retained and protected. Mitigation planting should be undertaken with the same species typology as that which exists, being native mass plantings
Shared Pathway (Chainage 13800 – 14600)	The exact extent of removals is yet to be determined. However, it is anticipated that a strip of existing vegetation will require removal to facilitate the works in this location	The remaining vegetation outside the footprint of the SUP Structure should be retained and protected. Mitigation planting should be undertaken with the same species typology as that which exists, being native mass plantings
Shared Pathway (Chainage 14300 – 14650)	The exact extent of removals is yet to be determined. However, it is anticipated that a strip of existing vegetation will require removal to facilitate the works in this location	Mitigation planting should be undertaken with the same species typology as that which exists, with native plantings preferred

Location	Potential Removal (estimated tree numbers)	Recommended Mitigation/Incorporation
New Bridge (Chainage 650 – 1150)(501094 4403 DRG RR 1105 - 1106 B)	As below	As below
Chainage 650 – 900	36 Pine Trees 15 Swamp Cypress 5 Willow 5 Totara Total = 61	Where trees are located outside the works area, these should be retained and protected during the project. Replacement planting with native species both within the Open Space Zone Land and NZTA designated land recommended
Chainage 900 - 1000	8 Pine trees 12 Hybrid Poplars 2 Coastal Redwood Total = 22	Where trees are located outside the works area, these should be retained and protected during the project. Replacement planting with native species both within the Open Space Zone Land and NZTA designated land recommended
Chainage 1000- 1171	Extensive works will be required within this area to facilitate the new retaining walls. Vegetation removal within the Waka Kotahi designation will be required in order to construct the new retaining walls and new south bound lanes. I	1 Notable Plane Tree 6 Coastal Redwood Where trees are located outside the works area, these should be retained and protected during the project. Replacement planting with native species both within the Open Space Zone land and the Waka Kotahi designated land recommended
Shared Pathway & Bund Works (Chainage 1350 – 2100)	The removal of vegetation will be required to facilitate the removal of the noise bund on the eastern side. Extensive removals will also be required for the entire length,	Native replacement planting is recommended to replace that which is existing, in line with the

Location	Potential Removal (estimated tree numbers)	Recommended Mitigation/Incorporation
	within the Waka Kotahi land on the western side, as part of the construction of the new SUP.	existing species typology, with native plantings preferred
Proposed Works Adjacent to David Lange Reserve (501094 4403 DRG RR 1105 B) (south east area, Chainage 350 of new overbridge)		Works within the root zones of Eucalyptus/Totara overhanging from David Lange Reserve
Bader Drive Bridge Works (501094 4403 DRG RR 1106 B)	2 Pohutukawa (Southeast side of Bader Drive for the new SUP). Approximately 5-7 Butia Palms growing on the southwest side of Bader Drive (Road Reserve).	4 Monkey Apple 4 Pohutukawa (north) 5 Pohutukawa (south), these trees stand within Road Reserve the Open Space zoned land. Replacement planting of all trees growing within Road Reserve and Open Space zoned land.
Works within Imrie Reserve and Jean Batten School (Chainage 2000 – 2400)	Removal of 1 Dead tree	Works within the root zone of 4 of the 24 Cottonwood Poplars (southeast) end.
Reserve (479R Massey Road) (Chainage 2350 – 2400)	3 Phoenix Palms 9 Karaka Various Taupata (12 trees and 1 tree group)	Protection of 3 Claret Ash growing on the northeast side of the reserve. Replacement planting where practical for trees to be removed, with native species.
SUP – Selfs Road (Chainage 3900 – 4450)	3 Box Alder 9 She-Oak 14 Mixed exotic Road Reserve trees 1 Claret Ash 1 Melia 2 Golden Elm	6 Private Trees growing within 8 Selfs Road would have works undertaken within their respective root zones as part of the SUP construction (southern side). Replacement planting with new native trees within Road Reserve.

Location	Potential Removal (estimated tree numbers)	Recommended Mitigation/Incorporation
	30 Trees growing on Road Reserve	
Proposed SUP connection at Pah Road (Chainage 5000)	1 Willow Myrtle growing on Road Reserve	Replacement planting with new native trees within Road Reserve
Works within designation – Puhinui Interchange (Chainage 4600 – 5750)	Mixed grouping of native vegetation growing within the NZ Transport Agency designation and Manukau Memorial Gardens. 3 Exotic trees (2 Hybrid Poplar and 1 Pine). Notable Flowering Gum tree will require removal to facilitate the interface between A2B and 20 Connect connections as currently proposed.	Mitigation planting should be undertaken with the same species typology as that which exists, with native plantings preferred
Total	38-40 Street trees, 95 Trees & 1 Group on Open Space Zoned Land, 3 Trees & extensive removals within NZTA designated land, largely comprising mass native plantings	1 Notable tree, 10 Trees & 2 Groupings on Open Space Zoned Land, 13 Trees & 2 Groupings on Road Reserve, 6 Private trees Mitigation planting should be undertaken with the same species typology as that which exists, with native plantings preferred

5.3 Potential for Transplanting of trees proposed for removal as part of 20Connect

For the most part, the majority of vegetation proposed for removal is not worthy of transplant, due to it being tightly spaced and of a form and age that would deem it uneconomical in terms of the wider project.

However, where individual tree specimens are identified, separated from mass plantings, localised tree relocation may be possible. However, successful transplant depends of a number of factors including, but not limited to, the following conditions:

- Location of services;
- Ability to gain an appropriate root ball;

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- Suitability and viability of a receiving environment; and
- Economics of the uplift and storage of the tree until which time a new location is available.

It is not deemed appropriate or indeed economical to undertake a full assessment in terms of the viability of tree transplanting as part of the business case, in the case of the 20Connect portion of the proposal.

6.0 Recommendations

6.1 Mitigation

- The removal of all trees growing on Open Space land or AT land will need to be adequately mitigated at a minimum replacement ratio of 1:1 so as any impacts would be minor/less than minor in terms of the required assessment against the relevant AUP rules. However, it is suggested that, where practical, mitigation is provided at ratio of at least 2:1, with 1:1 provided where streetscape restrictions dictate reduced numbers.
- It is considered that retention and incorporation of trees should be first and foremost consideration - with tree removal being as a last resort.
- Additional mass planted areas may be a way for mitigation to be provided intensively (similar to that provided on the AMETI 2a project).
- Additional mitigation opportunities should be explored in adjacent Open Space zones where localised replacement planting cannot be provided.
- As the proposal currently sits, the removal of the Notable Flowering Gum tree (ID 1526) will be required to facilitate the additional traffic lanes. All It is recommended that design alterations be considered to retain this tree if possible.
- All trees to be retained and worked around should be assessed as to the actual impacts at the time of detailed design.

6.2 Consent Considerations

- As stated throughout this assessment, all vegetation over 4 metres in height or 400mm in girth is protected on AT land or Open Space zoned land, as per the AUP rules below:

Tree Removal

- Rule E26.4.3.1 (A91): Alteration or removal of trees less than 4m in height and/or 400mm or more in girth – **Restricted Discretionary Activity**
- Rule E26.4.3.1 (A92): Alteration or removal of trees 4 metre or more in height and/or 400mm or more in girth – **Restricted Discretionary Activity**
- Rule E26.4.3.1 (A74): Pest Plant removal – **Permitted Activity**
- Rule E26.4.3.1 (A89): Tree Removal of Notable Trees – **Discretionary Activity**

Works within the protected root zone

- Rule E26.4.3.1 (A87): Works within the protected root zone in road and public open spaces that comply with Standard E26.4.5.2 – **Permitted Activity**
- Rule E26.4.3.1 (A88) Works within the protected root zone not meeting the permitted standards – **Restricted Discretionary Activity**
- Rule E26.4.3.1 (A84) Works within the protected root zone of Notable trees not meeting the permitted standards – **Restricted Discretionary Activity**
- Protection applies to any vegetation outside the designation areas, within riparian or coastal zones, as per the rules below:
 - Rule E26.3.3.1 (A76): Vegetation alteration or removal in accordance with Standard E26.3.5.1 & E26.3.5.1 – **Permitted Activity**
 - Rule E26.3.3.1 (A77): Vegetation alteration or removal not in accordance with Standard E26.3.5.1 & E26.3.5.4 – **Restricted Discretionary Activity**
- Any removal of trees greater than 3 metres in height or 300mm in girth growing within 161R Robertson Road is also subject to the following rule:
 - Rule D17.4.2. (A26): Removal of trees greater than 3 metres in height or greater than 300mm in girth – **Discretionary Activity**

6.3 Further Assessments Required

- Further assessments will be required to determine whether existing street trees can be retained as part of the new alignments. This is particularly the case on:
 - The entire length of Puhinui Road (northern side)
 - Davies Avenue (eastern and central western sides)
 - Ronwood Ave (northern and southern berms)
 - Te Irirangi Drive (northeast and southwest berms)

6.4 Conclusion

This Preliminary Arboriculture Environmental Assessment (PEAA) provides a high level review of the anticipated arboricultural impacts arising from the preferred options for the 20Connect and A2B SSBC. It is anticipated that further input will be required as part of the detailed design phase, as well as additional reporting being required as part of the Resource Consent process.

This report is based on information provided as of 31/10/19 and does in no way serve as an endorsement of the two projects at this stage.

Please contact me if you require any further information of analysis of the information provided.



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[REDACTED]

Peers Brown Miller Ltd

Approved by:

Title	Name	Qualification	Signature	Date
Author	[REDACTED]	DipArb	[REDACTED]	31.10.19 03.03.20
Reviewer		CertArb		31.10.19 03.03.20
Aurecon Consistency Review		BPlan (Hons),		19.11.19
Aurecon Consistency Verifier		MSc City & Regional Planning BA (Hons)		09.03.20

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Southwest Gateway - 20Connect and A2B: Preliminary Environmental Assessment

Prepared by [REDACTED]

Reviewed by [REDACTED] *CFG Heritage*

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
0	25/10/2019	Issued for client review	[REDACTED] Director	[REDACTED]
		Aurecon consistency review	[REDACTED] Aurecon New Zealand	
			[REDACTED] Aurecon New Zealand	
1	28/02/2020	Revised following client review	[REDACTED] Director	[REDACTED]

1. INTRODUCTION

The Southwest Gateway Programme is an overarching collection of transport projects being progressed by investment partners comprising the New Zealand Transport Agency (NZ Transport Agency), Auckland Transport (AT) and Auckland International Airport (AIAL) (collectively referred to as 'the Project Partners').

The purpose of the programme is to create a well-connected, efficient transport system that provides choice and reliability for how people and freight travel through southwest and southeast Auckland, including to, and from, the Auckland Airport. The two of the cornerstone projects of the programme are:

- 20Connect - the NZ Transport Agency component comprising the State Highway (SH) network in the south west of Auckland (SH20, SH20A and SH20B); and
- Airport to Botany (A2B) - the AT component comprising high frequency public transport provision between Botany and the Airport.

1.1 Purpose of the Report

The purpose of this report is to provide a Preliminary Environmental Assessment (PEA) of the potential issues and constraints with respect to archaeological and heritage impacts relating to the preferred options for the two business cases.

1.2 Description of the Preferred Options

Airport to Botany Preferred Option

The Airport to Botany Rapid Transit will deliver a frequent rapid transit system between Auckland Airport, Manukau and Botany. The Project will consist of the following elements:

- A dedicated Rapid Transit corridor from Auckland International Airport to Botany via:
 - Te Irirangi Drive (entire length)
 - Great South Road (between Te Irirangi Drive and Ronwood Ave intersections)
 - Ronwood Ave (From Te Irirangi Drive to Davies Ave intersections)
 - Davies Ave (entire length)
 - Manukau Station Road (from Lambie Drive to Davies Ave intersection)
 - Lambie Drive (From Manukau Station Road intersection to Puhinui Road)
 - Puhinui Road (from Lambie Drive to SH20 interchange)
 - State Highway 20B (Covered in the 20Connect project)
- Improved walking and cycling facilities along the roads above

A2B - Botany Station

At the time of writing, the preferred option for Botany Station has not been developed. For the purpose of this PEA, the study area is shown below (Figure 1) and a high-level assessment has been undertaken.

20Connect Preferred Option

20Connect will make additional infrastructure changes to local highways to improve journey time reliability, network resilience and safety. These changes are:

- New SH20A/SH20 and SH20B/SH20 southbound ramps
- Widening of SH20 between Manukau Harbour Crossing and SH20A (online at grade)
- Widening of SH20 between SH20A and SH20B (online at grade)
- Widening of SH20B to four lanes (including over Pukaki Bridge) – online at-grade
- Walking and cycling facilities along SH20 and SH20B.



Figure 1 High level concept of proposed Botany Station Transport hub



Figure 2 Route of 20Connect and A2B and other related transport projects

1.3 Study Area

The proposed routes cover a broad portion of South Auckland, from the Mangere Inlet, through Manukau and up to Botany. Although the routes cover several different environments as

discussed in the existing environment sections below, the study area for this project is restricted to a 200m buffer around the proposed works as discussed within the methodology section below.

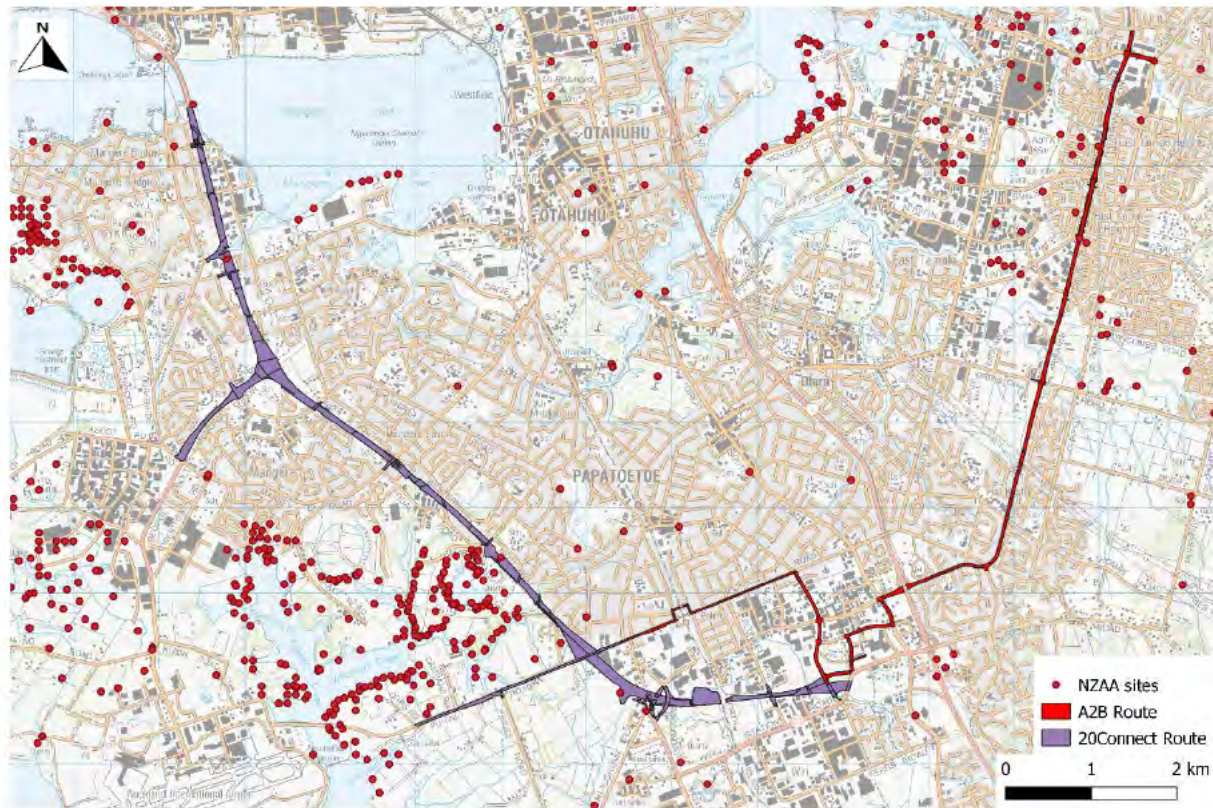


Figure 3 Extent of works described in this PEA, with recorded archaeological sites in the vicinity

2. METHODOLOGY

2.1 Method

This PEA has been prepared at the Single Stage Business Case (SSBC) stage and is based on knowledge developed during the long-list and short-list review of the Study area, as well as additional desktop research following the preferred options selection. Additional research consisted of a literature review and analysis of publicly available historic records.

2.2 Information Used

The following information has been referred to in this PEA:

- 20Connect GA drawings (dated 2 August 2019)
- A2B GA drawings (dated 8 October 2019)
- The 20Connect Short term Archaeological Assessment (dated 6 June 2019).
- The 20Connect and A2B Multi Criteria Analysis (MCA) scoring sheets
- New Zealand Archaeological Association (NZAA) site records within 200 m of the current designations (This distance is used due to the possible inaccuracy of archaeological sites recorded prior to 1990, which could exist within the proposed area of works).
- Auckland Council Cultural Heritage Inventory (CHI) (accessed 14 October 2019)
- Auckland Unitary Plan - Operative in Part (AUP (OiP))(accessed 14 October 2019)

- *Self Family Trust v Auckland Council* [2018] NZEnvC 49
- *Retrolens* (<http://www.retrolens.nz>) (Accessed 15 October 2019)
- Archaeological reports as referred to in the bibliography at the end of this report.

2.3 Assumptions

The following assumptions have been considered as part of this assessment:

General

- It is noted that there are interfacing projects such as the Auckland Airport Precinct Improvements (AIAL), Auckland Manukau Eastern Transport Initiative (AMETI) Eastern Busway, City Centre to Mangere (CC2M) Light Rail, Supporting Growth (South Auckland), Airport Taskforce, Southern Connections. These interfacing projects have been referred to but are not explicitly assessed as part of the scope of the Southwest Gateway projects.
- The Construction Method is not available at the time of writing. As such generic construction methods need to be considered.
- The construction and operational timeframe is not available at the time of writing.

Archaeological and heritage assumptions

- That the Auckland Council ACCHI and AAUP(OiP) is up to date.
- That works will remain within the extents shown in the general arrangements provided by Aurecon. Additional works such as laydown areas may require further assessment as these are not indicated on the general arrangements and possible locations are currently unknown.

2.4 Limitations

- Archaeological sites have been recorded since the 1950s and the quality of site information is variable. Sites were initially recorded on 100 yd grid references, which were converted to 100 m grid references as the map data became metricated in the 1980s. This has led to sites potentially having only a 200 m accuracy.
- Although Heritage Listed trees are included in this PEA, these will require assessment by a suitably qualified arborist.
- Although Heritage Listed structures are included in this PEA, these will require assessment by a built heritage specialist to meet consenting requirements and to determine if they are protected by the HNZPT Act 2014.
- This is not a full archaeological assessment of effects for these projects. To ascertain the effects that these projects may have on archaeological or heritage sites, recorded or not would require more detail, and most likely a fieldwork (site walkover and where necessary non-intrusive investigation) component.

3. ASSESSMENT OF PREFERRED OPTION

The following preliminary assessment of effects has been carried out to determine the potential impact on archaeological sites or significant 20th century heritage items within the proposed 20Connect and A2B corridors. It is assumed that any portion of archaeological sites or significant 20th century heritage items within the proposed extent of works as indicated on the General Arrangement Plans provided by Aurecon will be destroyed and those immediately adjacent the works may be damaged in some capacity.

3.1 Airport to Botany Preferred Option

Existing Environment

The Airport to Botany section covers works from the Puhinui interchange to Botany, via Manukau. This route (approximately 13km) covers a range of environments which have had both Pre-European Maori and 19th century European settlement associated with them. This landscape can be generalised as being gently rolling hills at about 20 m ASL, intersected by a number of waterways with maunga interspersed throughout.

The eastern side of the Pakuranga Creek is a large lava field associated with Te Puke o Tara and Matanginui, known collectively as the East Tamaki Volcanic Field (Rickard, 1985). These maunga have since been quarried away, with Matanginui at the location of the Greenmont Landfill on Smales Road, and Te Puke o Tara approximately 1km south at Hampton Park. This area was well researched by Rickard and others in the 1980s prior to urban development in the area, where an extensive stone field system was recorded with growing structures, walls and other related horticultural areas were observed. Unfortunately, much of this has been destroyed through the urban development of this part of Auckland in the interim. Fine-grained mapping and recording do not appear to exist for this once vast gardening area.

There is also evidence of historic settlement within the area, although much of what remains now is isolated homesteads and some heritage trees.

There are four recorded archaeological sites, eight CHI items and one HHEP recorded within 200m of the preferred options area. These sites and items appear in three different locations; namely Puhinui Road, Great South Road and Te Irirangi Drive and are discussed below.

Puhinui Road

In a one kilometre section of Puhinui Road between the interchange and the train station there are seven recorded CHI items and one HHEP within 200m of proposed works which are described below.

A. Flowering Gum Tree (CHI item 19196)

This tree is located on the northern side of the road in an area that will accommodate a shared use path (SUP). This tree would require assessment from a suitably qualified arborist to ascertain the effects that the project may have on it and to guide design if the tree is to be retained¹.

B. Gardeners Cottage (CHI item 22166)

This gardener's cottage is associated with Cambria Park House and was built at some point prior to 1912. The cottage (item 22166) is within the road reserve just outside of HHEP 1469, and the route of the SUP on the southern side of the road is indicated as passing through the building. The current condition of the cottage is unknown, but according to the CHI, it had been affected by fire early in 2019. This building will require assessment by a built heritage specialist to determine its age, and if it is pre-1900, any modification or destruction will require an authority under section 44 of the Heritage New Zealand Pouhere Taonga Act 2014.

C. Cambria Park House (CHI item 12484) and HHEP 1469

Cambria Park House and its associated HHEP are outside the proposed extent of the preferred options area, with the southern extent of works abutting the property

¹ Reference the Preliminary Environmental Arboricultural Assessment prepared by Peers Brown Miller

boundary (Lot 1 DP 184348). Although the Gardener's Cottage and other associated heritage items may exist within the extent of the works, these would not require assessment using D.17 rules.

D. WWII Cambria Park Military base (CHI items 15944 and 17015)

These two CHI items can be essentially considered as one, representing the US military temporary camp at Cambria Park that existed between 1942 and 1945. The close proximity of Puhinui Station allowed ease of troop and equipment movement for the camp.

The camp is recorded in the CHI on the western side of the Puhinui interchange (CHI item 17015), but this location is incorrect. The marker on Puhinui Road (CHI item 15944) represents the entrance to the camp off of Puhinui Road. The indicative extent of the camp (Figure 5) is based on aerial photography from 1939 and the Whites Aviation image showing most of the camp from 1944 (*Source: Auckland Council Footprints Archive (item 02151)*

Figure 4).

There is unlikely to be any physical evidence of the camp remaining within the proposed extent of works, but the marker (CHI item 15944) may require relocation to allow for the installation of the RTC.

E. Puhinui Station Footbridge (CHI item 19381)

This footbridge was recorded in the CHI in 2010 but appears to have been removed and replaced in the interim. This item is outside of the scope of works for this project.



Source: Auckland Council Footprints Archive (item 02151)

Figure 4 1944 south west orientated aerial of Cambria Park Military Camp



Figure 5 Location of Cambria Park Military Camp and other CHI items along Puhinui Road

Great South Road

The route would utilise approximately 380 m of Great South Road between Ronwood Avenue and Te Irirangi Drive. The Great South Road began construction in 1861 by the colonial government to improve supply lines through the swampy and thickly forested areas south of Auckland to aid in the invasion of the Waikato. There is one CHI item recorded in this section, Mile Post 13 (CHI item 20284).

A. Mile Post 13 (CHI item 20284)

This location has been tentatively recorded from a 1930s Automobile Association map which marked the remaining 1860s markers between Auckland and Drury. This marker would have been a triangular wooden post but is no longer visible. This post, and any other material related to the 19th Century Great South Road would be afforded protection under the Heritage New Zealand Pouhere Taonga Act (2014) if still existing within the road reserve. Although no pre-1900 archaeological sites are identified along this section of the Great South Road, it cannot be completely ruled out that unrecorded archaeological material will not be uncovered, especially where works are likely to extend outside of current road reserves.



Figure 6 Corner of Great South Road and Te Irirangi Drive where Milepost 13 was located

Te Irirangi Drive

There are four recorded archaeological sites and one HHEP identified within 200m of Te Irirangi Drive, all north of Accent Drive. These sites are described below:

A. R11/1973 - Midden

This site was recorded in 1996 as a small 2 x 3m midden containing cockle (*Austrovenus stutchburyi*) and pipi (*Paphies australis*) eroding out of the southern bank of a small tributary. At the time, it was recorded as being under threat by the construction of Te Irirangi Drive but no further investigation or site update has been done. The tributary appears to be in the vicinity of the proposed Dannemora underpass works. The condition or possible impacts from this project are unknown.

B. R11/2088 – Wooden Artefact

This site was initially identified c.2000 but does not appear to have been recorded until 2011. It consisted of a single broken wooden spear that was found while undertaking earthworks for a housing development west of Te Irirangi Drive. No other associated material was encountered during works. As this site is a findspot², it is not likely that any associated archaeological features will have any impact on this project.

C. R11/2152 – Historic Fence

This site was recorded in 2001 from a survey plan (DP 16841) from 1923 that showed stone walls, ditch, bank and hawthorn boundary markers. An archaeological

² A findspot is an archaeological term denoting a location at which a single artefact, normally without any contextual information has been recovered.

investigation was undertaken in the same year but no evidence of these features was identified. This site has been recorded as destroyed and will therefore not be affected by the preferred option.

D. R11/2429 – Historic Homestead and HHEP 1342

This site and its HHEP represents an 1850s homestead that is still standing at 12 William Woods Avenue. It is outside of the extent of the preferred options area and associated features are unlikely to be within the extent of works.



Figure 7 Northern portion of Te Irirangi Drive showing the four NZAA sites within 200m of the current designation

Botany Station

The works at Botany Station is within area that was extensively modified in 1995-1996 which would have likely obliterated any archaeological features that may have existed.

- No archaeological or heritage items are recorded within the identified extent of works; and
- The area has been heavily modified with waterways diverted and a retention pond immediately south of Guys Road.

There are no foreseeable operational effects on the archaeological sites or heritage items within the A2B route.

3.2 20Connect Preferred Option

Existing Environment

20Connect comprises of SH20, SH20A and SH20B; from Mangere Inlet to Wiri Station Road. It encompasses several different environments, including some highly significant archaeological landscapes.

In the northern portion of 20Connect, the preferred option route passes to the east of Te Pane o Mataaho / Mangere Mountain and its associated gardens. The western portion of these gardens are well documented in the vicinity of Ihumatao and Ambury Farm Park (Bulmer, 1981; Lilburn, 1982; Campbell et al., 2013) but this is mainly due to these being the portions of Mangere which had not been subjected to industrial and urban development.

Directly south of the Portage Road overbridge is Nga Kapua Kohu Ora / Crater Hill. Nga Kapua Kohu Ora / Crater Hill is a heritage landscape of outstanding archaeological and heritage value and significance at a local, regional and national level. It is part of the volcanic cones (tupuna maunga) landscape which is of international significance.

There are 14 recorded archaeological sites within 200 m of the road reserve which are associated with this landscape and it is likely that archaeological material exists on both sides of the motorway that would be affected by works. Although Nga Kapua Kohu Ora / Crater Hill is not currently listed in the AUP, a recent environment court ruling (*Self Family Trust v Auckland Council* [2018] NZEnvC 49) confirmed the significance of this landscape and prevented development of the land.

The westernmost portion of works on SH20B is approximately 500m from several sites which have been attributed to the Te Akitai Waiohau settlement of Papahinau (Sullivan 1973; Foster and Sewell 1995). This settlement was described by Sullivan (1973) as being a significant settlement, stretching from Otaimako in the south to the Waokauri in the north (Sullivan, 1973:49). It is likely that further associated features such as gardening areas were beyond this main settlement.

There are 23 recorded archaeological sites and an additional 2 CHI items within 200m of the proposed 20Connect works. For ease of discussion, this route has been broken up into five segments; North of SH20A, SH20A, SH20A to SH20B, SH20B and South of SH20B. See Figures 8-10 for the segments described above.

North of SH20A

There are two recorded archaeological sites within the proposed extent of works. One of these (R11/2172) has been deemed to not be an archaeological site but remains in the database, and the second (R11/1764) was likely destroyed during initial construction of SH20 but cannot be confirmed through desktop research.

Although there are no known archaeological constraints in this section, it cannot be completely ruled out that archaeological features may be impacted by these works, especially near to water ways or the esplanade reserve, including site R11/1764 which may still have remnant features.



Figure 8 Map showing three of the discussed sections of 20Connect with associated NZAA Sites, CHI Items and HHEP

SH20A

There is a single CHI item (14174) near to the SH20A extent of works which was a dairy factory next to Mangere Central School. There is little information on this building or its original location.

Although there are no known archaeological constraints in this section of the 20Connect preferred option, it cannot be completely ruled out that archaeological features may be impacted by these works, especially where historic structures may have been.

SH20AtoSH20B

There are 14 recorded archaeological sites within 200m of this section, mainly concentrated around Nga Kapua Kohu Ora / Crater Hill. This section of construction has been limited to the current road cutting to mitigate any possible impact on Nga Kapua Kohu Ora / Crater Hill.

Although there are no known archaeological constraints in this section of the 20Connect preferred option, it cannot be completely ruled out that archaeological features may be impacted by these works, especially near to where it intersects Waokauri Creek.

In addition to these sites, there is a c.1900 homestead at Mangere Centre Park (CHI item 19645), with an associated HHEP (2625) within 200m of the proposed extent of works. Currently the works are indicated as occurring within the current designation near this HHEP and therefore, they should not impact the property.



Figure 9 Map showing four of the discussed sections of 20Connect with associated NZAA Sites, CHI Items and HHEP

SH20B

There are four recorded archaeological sites within 200m of this section. This section has been subject to an archaeological survey as part of the SH20B/Puhinui Road Short Term Improvements project (Cruickshank 2019) and although no archaeological sites were identified as being affected by the short term works, works outside of the areas assessed (Cruickshank 2019) would require further survey to better assess the effects.

It should be noted also that the location for CHI item 17015, 'Cambria Park' which is currently at the western side of the Puhinui Interchange is in the incorrect location and should be further east on Puhinui Road. This is discussed in more detail above in the A2B section of this report.

South of SH20B

There are two recorded archaeological sites within 200m of this section, the first (R12/2457) is located in the vicinity of a retention pond (Puhinui Pond) constructed for SH20. It was recorded prior to the pond's construction when it was a market garden and recorded as a heavily disturbed midden. It is likely that there were associated features in the vicinity but the extent of these is unknown. It is possible that some related features may be affected by the stormwater or pond upgrades.

The second site (R11/1796) is for a stone wall which was originally recorded as being a pre-European Maori gardening wall. It was revisited by Russell Foster in 1996, who thought it was probably a European stone wall, rather than Maori in origin. This entire area has been extensively modified and any remnants of the wall would have been destroyed. This site will not be affected by the preferred option works.

Although there are no known archaeological constraints in this section, it cannot be completely ruled out that archaeological features may be impacted by the preferred option works, especially near to where it intersects Puhinui stream.

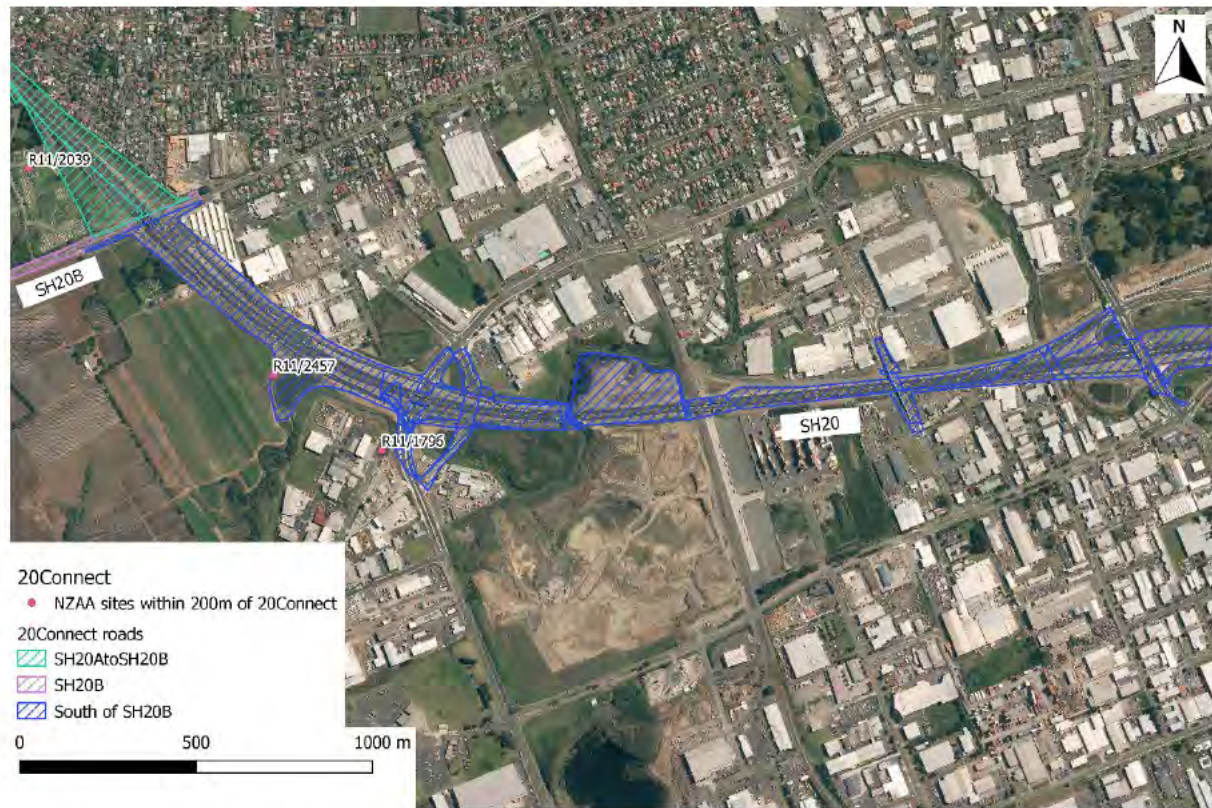


Figure 10 Map showing extent of 'South of SH20B' works

There are no foreseeable operational effects on the archaeological sites or heritage items within the 20Connect route.

4. RECOMMENDATION

4.1 Mitigation

Design information is limited and areas where laydowns or additional works may be located is not identified. The following mitigation is based purely on what can be observed in the provided general arrangement drawings. Further assessment of potential effects on heritage would need to be undertaken once the designs are finalised.

Airport to Botany

Further investigation into potential effects on the Gardener's Cottage (CHI 22166) and R11/1973 will be required, including if the cottage is pre-1900, and would therefore be protected by the HNZPT Act 2014.

20Connect

Works in the vicinity of Kapua Kohu Ora/Crater Hill are kept within the previously modified portions of the road. No laydowns or stormwater detention or retention to be planned for anywhere outside of the current road corridor, including within the designation.

Further investigation into potential effects on R11/1764, Mangere Dairy Factory (CHI 14174) and Offline SH20B works will be required.

4.2 Consent Considerations

The proposed works do not appear to encroach into any HHEP, so no assessment under D.17 Historic Heritage Overlay in the AUP (OiP) will be required. If the plans change and HHEP 2625 associated with the Mangere Homestead (CHI 19645) or HHEP 1469 associated with Cambria Park House (CHI 12484) are to be affected, this will require additional assessment.

4.3 Further Assessments Required

A targeted field assessment of proposed route, with emphasis on recorded archaeological sites R11/1764 and R11/1973; Mangere Dairy Factory (CHI 14174), the Gardeners Cottage (CHI 22166) and Offline SH20B works. A built heritage assessment by a suitably qualified specialist would be recommended for the structures identified in this PEA.

4.4 Archaeological Approvals

Works would likely require an authority to destroy or modify under section 44 of the HNZPT Act 2014 for the entire project but will require further assessment to determine if any recorded sites are within the extent of works. This will also rely on the results of a built heritage assessment of the Gardeners Cottage (CHI 22166), as to whether it is pre-1900 in construction.

Airport to Botany

An Archaeological Authority could be sought on a precautionary basis because of proximity to scheduled items like Cambria Cottage at 252 Puhinui Road which may be pre-1900 – however this section of the RTN is a highly modified urban environment with significantly lower risk profile than the combined 20Connect section.

20Connect

An archaeological authority under the Heritage New Zealand Pouhere Taonga Act 2014 to ensure that any archaeological site(s) that are encountered during construction works can be either modified or destroyed is recommended, particularly for the potential impact on Ngā Kapua Kohuora / Crater Hill and Pukaki Bridge.

5. REFERENCES

- Baquie, B., Z. Burnett, S. Macready and R. Clough. 2018. *Park and Ride South, 454 Puhinui Road, Wiri, Auckland: Archaeological Assessment*. Unpublished Clough and Associates Ltd report to Auckland International Airport Ltd.
- Bulmer, S. 1981. *Archaeological sites in the Auckland Regional Parks: a summary*. Unpublished report for New Zealand Historic Places Trust.
- Campbell, M., J. Harris, W. Maguire and S. Hawkins. 2013. *The Tawhiao Cottage*. Unpublished CFG Heritage Ltd report to The New Zealand Historic Places Trust and Auckland Council.
- Lilburn, K. 1982. *Ambury Farm Park archaeological investigation, Stage 1: N42/1143, 1137 & 1251*. Unpublished report to New Zealand Historic Places Trust.
- Rickard, V. 1985. *Archaeological site survey of part of the East Tamaki Volcanic Field: The Stevenson Block*. Unpublished report to the New Zealand Historic Places Trust.



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**SOUTHWEST GATEWAY PROGRAMME
PRELIMINARY ASSESSMENT OF ACOUSTIC EFFECTS**

Rp 001 20181241 | 27 February 2020

Project: **SOUTHWEST GATEWAY PROGRAMME**

Prepared for: **Aurecon Ltd**
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Attention:



Report No.: **Rp 001 20181241**

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APPENDIX B TRAFFIC NOISE EFFECTS – INDICATIVE LOCATIONS

APPENDIX C NZ TRANSPORT AGENCY MODEL CONSENT CONDITIONS

1.0 INTRODUCTION

The Southwest Gateway Programme is an overarching collection of transport projects being progressed by investment partners comprising the New Zealand Transport Agency (NZ Transport Agency), Auckland Transport (AT) and Auckland International Airport (AIAL) (collectively referred to as 'the Project Partners').

The purpose of the programme is to create a well-connected, efficient transport system that provides choice and reliability for people and freight travelling through southwest and southeast Auckland, including to and from the Auckland Airport. The two cornerstone projects of the programme are:

- 20Connect - the NZ Transport Agency component comprising the State Highway (SH) network in the south west of Auckland (SH20, SH20A and SH20B); and
- Airport to Botany (A2B) - the AT component comprising high frequency public transport provision between Botany and the Airport.

1.1 Purpose of the Report

The purpose of this report is to provide a Preliminary Environmental Assessment (PEA) of the potential issues and constraints with respect to construction noise and vibration, and traffic noise impacts relating to the preferred options for the two business cases.

1.2 Description of the Preferred Options

1.2.1 Airport to Botany Preferred Option

The Airport to Botany Rapid Transit will deliver a frequent rapid transit system between Auckland Airport, Manukau and Botany. The Project will consist of the following elements:

- A dedicated Rapid Transit corridor from Auckland International Airport to Botany via:
 - Te Irirangi Drive (entire length)
 - Great South Road (between Te Irirangi Drive and Ronwood Ave intersections)
 - Ronwood Ave (From Te Irirangi Drive to Davies Ave intersections)
 - Davies Ave (entire length)
 - Manukau Station Road (from Lambie Drive to Davies Ave intersection)
 - Lambie Drive (From Manukau Station Road intersection to Puhinui Road)
 - Puhinui Road (from Lambie Drive to SH20 interchange)
 - State Highway 20B (Covered in the 20Connect project)
- Improved walking and cycling facilities along the roads above

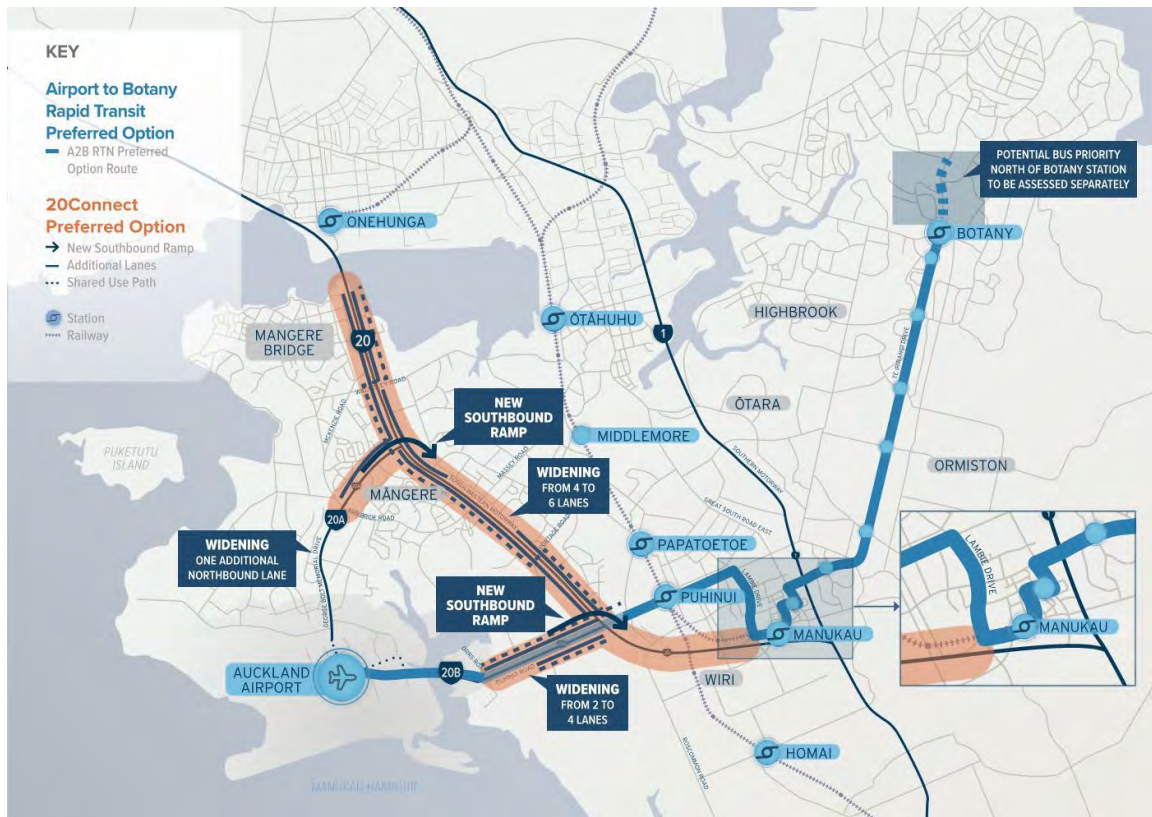
1.2.2 20Connect Preferred Option

20Connect will make additional infrastructure changes to local highways to improve journey time reliability, network resilience and safety. These changes are:

- New SH20A/SH20 and SH20B/SH20 southbound ramps
- Widening of SH20 between Manukau Harbour Crossing and SH20A (online at grade)
- Widening of SH20 between SH20A and SH20B (online at grade)
- Widening of SH20B to four lanes (including over Pukaki Bridge) (online at-grade)
- Walking and cycling facilities along SH20 and SH20B

Not all widening involves additional surfaced area. For some areas, widening will involve the repurposing of the existing shoulder.

Figure 1-1: Assessment area and preferred alignment corridors



1.3 Airport to Botany - Study Areas and Existing Environment

1.3.1 Existing Environment

The majority of the project areas are already subjected to elevated traffic noise because of their urban and metropolitan nature.

With the exception of the north extent of Te Irirangi Drive, in all of the urban areas discussed above, traffic noise levels for houses set one row back from the road may be 10 -15 dB lower, due to screening by the intervening buildings and the further setback distances from the road. However, this would not impact the aircraft noise levels they would receive and so the ambient noise environment may not be as reduced as otherwise would be the case.

The study area and existing environment for A2B has been defined in the following sections.

1.3.2 Botany Station

Predominantly commercial in character, with sites to the east zoned Business Metropolitan Centre and to the west Business – Mixed Use. There are a number of multi-storey residential buildings south west of the town centre, in a Residential – Terraced Housing and Apartment Buildings zone. Te Irirangi Drive is somewhat disconnected from these developments, with limited entry and exit points, but controls the ambient noise environment in the area.

At the time of writing, the preferred option for Botany Station has not been developed. For the purpose of this PEA, the study area is shown below, and a high-level assessment has been undertaken.



Figure 1-2: Botany Station study area

1.3.3 Te Irirangi Drive

This road is a major arterial road with traffic volumes around 27,000 vehicles per day.¹ The road dominates the existing noise environment. The road is bordered by residential zones (Terraced Housing and Apartment Buildings, Mixed Housing Urban and Mixed Housing Suburban). A retirement village () various hotels/motels, childcare centres ()

and a school () also border the road. Rongomai Park and several smaller commercial areas servicing the local area with shops are also located close by. South of Ormiston Road, the Aircraft Noise Overlays indicate effects from the airport approach, which also affect the ambient noise levels.

Along Te Irirangi Drive ambient noise levels at the row of houses immediately adjacent to the road could be typically 60 – 70 dB $L_{Aeq(24h)}$, based on road traffic noise predictions and noise levels surveys adjacent to similarly trafficked roads. At night the noise levels may drop by 5 – 10 decibels assuming a normal diurnal variation of traffic volume for a busy urban road.

The background noise levels (L_{A90}) could be generally 10 decibels below the ambient noise level based on noise level surveys of similar roads in Auckland.

1.3.4 Manukau Town Centre

This area is affected by traffic noise from the local roads and aircraft noise from the Auckland International Airport approach. Predominantly a business area, there is an apartment building on Ronwood Avenue, and a Manukau Institute of Technology (MIT) campus on the corner of Manukau Station Road and Davies Avenue. The MIT building is in the Aircraft Noise Notification Area (ANNA), so no special design would have been required in terms of sound insulation. The apartment building is within the Moderate Aircraft Noise Area (MANA) and some mitigation would have been incorporated in the design.

Noise levels in Manukau town centre may vary because of the metropolitan nature of the area, but would be similar in magnitude to Te Irirangi Drive at 65 – 70 dB $L_{Aeq(24h)}$ based on noise predictions for relevant traffic volumes. However, the distance between the road and any noise sensitive receivers (apartments) may be slightly greater. In addition, the apartments are in the MANA (Medium Aircraft Noise Area) and therefore already incorporate sound insulation provisions in the façade design.

¹ Auckland Council traffic counts <https://data-atgis.opendata.arcgis.com/datasets/average-daily-traffic-counts?geometry=174.903%2C-36.937%2C174.913%2C-36.936>. <https://data-atgis.opendata.arcgis.com/datasets/average-daily-traffic-counts?geometry=174.839%2C-36.989%2C174.879%2C-36.983>

Background noise levels would not decrease as much (typically only 5 decibels) because of the other activity that occurs in the town centre. Manukau town centre is also subject to moderate levels of aircraft noise at 55 dB $L_{Aeq(24h)}$.

1.3.5 Lambie Drive

Lambie Drive has traffic volumes of around 20,000 vehicles per day¹ and is a major arterial road. Towards the northern end in proximity to Puhinui Road is a small area of Mixed Housing Suburban. There are further non-residential zones to the south (Light Industry and General Business) comprising mainly large format retail and other commercial activity. Within this zone is the Counties Manukau DHB building. Also located in this area is the Open Space zone of Hayman Park.

The main contributors to noise in this area is traffic using the roading network, and aircraft noise because most of Lambie Drive lies within the High Aircraft Noise Area (HANA) and as such noise levels in the vicinity are elevated. It is possible that some of the commercial activity would generate high noise levels.

Ambient noise levels along Lambie Drive at the row of houses immediately adjacent to the road could be typically 60 – 70 dB $L_{Aeq(24h)}$ based on traffic noise predictions. At night the noise levels may drop by 5 – 10 decibels assuming normal diurnal variation of traffic volumes on busy urban and suburban roads.

The background noise levels (L_{A90}) could be generally 10 decibels below the ambient noise level, based on noise level surveys in comparable environments. Lambie Drive is also subject to high levels of aircraft noise at 60 dB $L_{Aeq(24h)}$.

1.3.6 Puhinui Road

Like Lambie Drive, Puhinui Road is affected by high levels of aircraft noise, particularly at the western end. Puhinui Road itself is a major road through an urban area to the east of SH20. The majority of the north side of Puhinui Road is zoned Mixed Housing Suburban. To the south, is land zoned Residential Single Housing and light industry. This Single Housing zoning is likely to be a direct consequence of being inside the HANA where further subdivision is prohibited because of the high levels of aircraft noise.

Puhinui School and Te Kohanga Reo O Te Rangimaria are located in this area. The Te Kohanga Reo is slightly setback from the road but is in close proximity to the bridge by the Puhinui Railway Station.

Ambient noise levels along Puhinui Road at the row of houses immediately adjacent to the road could be typically 60 – 70 dB $L_{Aeq(24h)}$ based on measurements and noise level predictions adjacent to Puhinui Road. At night the noise levels may drop by 5 – 10 decibels depending on location.

The background noise levels (L_{A90}) could be generally 10 decibels below the ambient noise level according to measured noise levels in the area. Puhinui Road is also subject to high levels of aircraft noise at 60 dB $L_{Aeq(24h)}$.

Overall traffic on Puhinui Road and aircraft noise are the main noise sources affecting this area.

1.4 20Connect - Study Areas and Existing Environment

1.4.1 Existing Environment

Adjacent to most of the State highways (SH20A and SH20) ambient noise levels at the row of houses immediately adjacent to the road could be typically 60 – 75 dB $L_{Aeq(24h)}$. At night the noise levels may drop by 5 – 10 decibels. These levels are based on noise level surveys in the vicinity of SH20 and have been confirmed with noise level predictions for the traffic volume on the current road.

The background noise levels (L_{A90}) could be generally 5-10 decibels below the ambient noise level.

Noise levels along SH20B would typically be 60-65 dB $L_{Aeq(24h)}$ at the adjacent noise sensitive receivers, because they tend to be a little further set back from the road, and the speed and traffic volumes are lower. The area around SH20B is also subject to high levels of aircraft noise at 60 - 65 dB $L_{Aeq(24h)}$, which adds to the overall noise level experienced.

The study area and existing environment for 20Connect has been defined in the following sections.

1.4.2 SH20A

Where the project extends along SH20A, existing noise levels are already high. In general houses are set back a little further from the State highway network than in the Airport to Botany study areas. Other noise sensitive activities in the area are [REDACTED]. There is also open space in the form of Williams Park and Mangere Centre Park.

The new off ramp from SH20A connecting to SH20 will move traffic closer to Te Kura Kaupapa Maori o Mangere.

1.4.3 SH20

In general noise levels in this area are dominated by traffic using SH20, which has high traffic volumes. There are houses located along the entire extent of the route, as well as industry to the east of SH20 at Mahunga Drive. [REDACTED]

[REDACTED] The residential zoning comprises the following zones; Single House, Mixed Housing Suburban and Terrace Housing. [REDACTED] is located at the northern end of the study area adjacent to SH20.

1.4.4 SH20B

To the west of SH20, Puhinui Road becomes SH20B and the surrounding environment also changes. The key change is that in this area there are significantly less noise sensitive activities as the area is largely undeveloped. The zoning is mainly light industrial but with a future urban zone to the north closer to the airport. New activities sensitive to aircraft noise are prohibited² inside the High Aircraft Noise Area (HANA), so the assumption is that no noise sensitive activity would establish adjacent to SH20B. There are a small number of existing noise sensitive activities in this area. The Manukau Memorial Gardens are also located adjacent to the SH20B and SH20.

The ambient noise levels in this area are controlled primarily by aircraft, with some contribution from SH20B.

2.0 METHODOLOGY

2.1 Method

This PEA has been prepared at the Single Stage Business Case (SSBC) and is based on knowledge developed during the long-list and short-list review, as well as additional desktop research following the preferred options.

This PEA has been reviewed technically by Marshall Day Acoustics, and by Aurecon for consistency. A review schedule is provided at the beginning of this assessment.

2.2 Information Used

The following information has been used to produce this PEA:

- Site visit on 20 October 2019, travelling across the entire alignment

² Auckland Unitary Plan Operative in Part, Table D24.4.4

- General arrangement drawing sets for A2B (drawing numbers 502334-7000-DRG-RR-0101-C to 0117-C, dated 8 October 2019) and 20Connect (drawing numbers 501094-4403-DRG-RR-1101-B to 1121-B, dated 2 August 2019), as provided by Aurecon

2.3 Assumptions

The following assumptions have been considered as part of this assessment:

2.3.1 General

- It is noted that there are interfacing projects such as the Auckland Airport Precinct Improvements (AIAL), Auckland Manukau Eastern Transport Initiative (AMETI) Eastern Busway, City Centre to Mangere (CC2M) Light Rail, Supporting Growth (South Auckland), Airport Taskforce, Southern Connections. These interfacing projects have been referred to but are not explicitly assessed as part of the scope of the Southwest Gateway projects.
- The Construction Method is not available at the time of writing. As such generic construction methods are considered.
- The construction and operational timeframes are not available at the time of writing.

2.3.2 Acoustic Assumptions

- Construction noise and vibration will be assessed against the following rules and guidelines:
 - o Auckland Unitary Plan (AUP) rule E25.6.29 Construction noise levels for work within the road (including the amendments of Plan Change 14)
 - o AUP rule E25.6.30(1) Vibration
 - o NZ Transport Agency State highway construction and maintenance noise and vibration guide V1.1 Aug 2019
 - o NZS6803:1999 Acoustics – Construction Noise
 - o DIN4150-3:2016 Vibration in Buildings – Part 3: Effects on structures
 - o Generally, assessment criteria will be; for daytime construction noise 75 dB L_{Aeq} and 90 dB L_{AFmax} , and for construction vibration 5 mm/s PPV in order to avoid cosmetic building damage
- Traffic noise will be assessed against the following rules and guidelines:
 - o AUP rule E25.6.33 Noise levels for traffic from new and altered roads
 - o NZ Transport Agency Guide to assessing road-traffic noise using NZS 6806 for state highway asset improvement projects V1.0, Aug 2016
 - o NZS6806:2010 Acoustics – Road-traffic noise – New and altered roads
 - o Subjective perception of noise level change based on accepted research³
 - o Generally, assessment criteria will be those set out in NZS6806 for altered roads, i.e. Category A up to 64 dB L_{Aeq} , Category B between 64 and 67 dB L_{Aeq} , and Category C above 67 dB L_{Aeq}
- Existing noise mitigation structures consented as part of other consents (e.g. MHX, Walmsley off ramp, Kirkbride Road, SH20) need to be retained. This also applies to noise bunds planned to be removed near Bader Drive. Where any of these structures are removed to enable the construction of this Project, they will need to be reassessed to ensure that they remain effective in their amended location, and reinstated as soon as practicable.

³ For instance, LTNZ Research Report No. 292: Road traffic noise: determining the influence of New Zealand Road surfaces on noise levels and community annoyance, Table 18

- All Rapid Transport to frequent this Project would be electric as advised by Aurecon. We have assumed that noise effects from any of the possible modes would be minimal. We have based our assumption on measurements undertaken by MDA on similar transport networks in Wellington and Melbourne, at varying speeds. At all speeds, the contribution of the electric vehicle fleet was insignificant compared with non-electric vehicles using the transport system.
- We understand that, as additional lanes are included in the 20Connect project (SH20B, SH20A, SH20), a small increase in general traffic volumes is forecast beyond general growth. However, the rapid transit components would reduce the rate of increase along shared corridors.⁴ Therefore, we have assumed that any traffic volume changes would result in negligible changes in traffic noise levels.⁵
- We have assumed that there would be no change in general traffic volumes on the existing local road as a direct consequence of this Project. However, traffic modelling has not been used to inform this PEA.
- Vibration from traffic on the road will be negligible. Any new well-constructed and smooth road surface causes little perceptible vibration at distances of 2 metres or more.

2.4 Limitations

- We do not currently have detailed information on the construction methodology, timing or staging of the works. The assessment is based on construction details of similar projects.
- We have no detailed information on the exact type of rapid transport, but assume that the mode would be bus to start with then move to light rail.
- We have no detailed information on change of traffic volumes until the design year 10 to 20 years after opening of the system, or other sufficiently detailed information to undertake a full assessment against NZS6806.

2.5 Construction Noise

Noise level predictions for construction projects consider the sound power levels of each item of equipment, assuming multiple items of equipment operating simultaneously. This approach is deliberately conservative in order to represent the reasonable worst-case noise levels that may infrequently occur.

Other than the variations in noise level due to the factors discussed above, there are numerous additional factors that affect construction noise generation. Some of these factors are variations among individual items of equipment, the state of equipment repair, exact locations of each item and operator idiosyncrasies. Generally, these factors cannot be accounted for as they cannot be reasonably quantified.

Construction noise levels can generally be predicted based on experience with similar projects and in similar circumstances. Common “activity sound power levels” are shown in Table 2-1 below. From these activity sound power levels, we can then determine the distance at which the typical duration⁶ 75 dB L_{Aeq} day-time noise criterion can be complied with, without mitigation by noise barriers.

⁴ Based on email from Peter Theiler, Traffic engineer at Aurecon, dated 18 November 2019

⁵ A doubling in traffic volume results in a 3 decibel noise level increase, generally the smallest change perceptible by the human hearing. Any lesser traffic volume changes would be imperceptible and therefore negligible.

⁶ Typical duration means any construction work affecting any receiver up to 20 weeks. While the overall project construction will exceed this time, each individual dwelling is likely to only experience construction noise levels for part of that time.

Table 2-1: Activity Sound Power Levels and Compliance Distance

Activity	Activity Sound Power Level	Distance at which compliance with day-time limit (75 dB L _{Aeq}) is achieved <u>without noise barriers</u>
	dB L _{WA}	metres
Earthworks	118	65
Vibro-piling	120	80
Typical retaining wall construction	107	20
Pavement construction	110	40
Staging area/construction yard	100	10

Many buildings would be within close proximity of the works. Some of these buildings would currently receive significant acoustic screening from intervening buildings, of which a number may need to be removed as part of this Project. Other dwellings receive screening from existing noise barriers (bunds or fences) that were installed as part of the SH20 projects. We have assumed that these barriers remain unchanged, or will be reinstated as soon as practicable if they were to be removed for construction purposes. There are some buildings that would receive little screening from construction noise.

As part of the assessment of traffic noise, new noise barriers would likely be recommended along part of the route, particularly along the State highways. It is recommended that these noise barriers should be constructed as early as possible in the construction period to ensure that noise from construction works are reduced as far as practicable.

Based on the predicted noise levels, an effects envelope can be developed, i.e. distances at which compliance with the daytime and/or night-time noise criteria can be achieved with the existing and potential noise barriers in place.

The following activities are significant when addressing envelope of effects. These are the activities we consider having the greatest impact on construction noise.

- Piling and construction of retaining walls may generate high noise levels at nearby dwellings due to the proximity of these works to dwellings and the likely direct line-of-sight between dwellings and machinery.
- Earthworks may generate noise levels above 75 dB L_{Aeq} up to 65 metres from operations where direct line-of-sight occurs between dwellings and earthworks. Typically, noise levels would be much lower than this at such distances due to acoustic screening provided by intervening dwellings or topography.
- Construction of structures and pavements is less noisy than earthworks. These activities have the potential to comply with a noise limit of 75 dB L_{Aeq} at distances greater than 14 metres.
- Night-time works will likely be required where motorway traffic would be interrupted, e.g. where motorway closures would be required to install bridges. These works will need to be addressed separately, and well managed, if residential or other noise sensitive receives are in the vicinity. It is unlikely that night-time noise limits higher than 45 dB L_{Aeq} would be applicable as the traffic volumes on SH20, 20A and 20B are not sufficiently high to cause a consistently elevated night-time noise level.

2.6 Construction Vibration

Vibration prediction is less reliable than noise prediction due to issues with accurate modelling of ground conditions that are non-homogeneous and complex in three-dimensions, and consequently

difficult to quantify on site. As a result, safe distances have been based on vibration measurements⁷ previously performed for high vibration sources such as vibropiling and vibratory rollers, and based on vibration prediction tools as contained in Hassan (2006)⁸.

There is a risk that the Project criteria may be exceeded at dwellings close to retaining wall construction where vibropiling may be used, and where vibratory rollers are used for the compaction of new or widened traffic lanes.

Vibration is assessed twofold:

- Category B: to avoid cosmetic building damage (5 mm/s PPV),⁹ and
- Category A: to manage amenity effects (1mm/s PPV).⁴

The risk categories in Table 2-2 relate to the risk of exceeding the Category A and B vibration criteria at various distances from the vibration inducing works. The “all other buildings” zone has been calculated under the worst-case assumption that all of these buildings are light weight structures. The risk categories are defined as follows:

- High Risk Predicted to exceed Category B Project criteria as well as Category A criteria
- Medium Risk Predicted to exceed Category A criteria, but comply with the Category B criteria
- Low Risk Predicted to comply with Category A and B Project criteria

Where the amenity criteria are predicted to be exceeded, this should trigger the need for consultation with affected receivers.

Table 2-2: Activity and risk zones

Equipment	Risk Zones		
	Occupied Dwellings (Residential)	Other Occupied Buildings (Commercial)	All Other Buildings
Vibratory Roller	High: <15m	High: <15m	High: <5m
	Med: 15-40m	Med: 15-25m	Med: 5-15m
	Low: >40m	Low: >25m	Low: >15m
Vibropiling	High: <10m	High: <10m	High: <5m
	Med: 10-45m	Med: 10-20m	Med: 5-10m
	Low: >45m	Low: >20m	Low: >10m

2.7 Traffic Noise

The propagation of road traffic noise is affected by multiple factors, amongst them terrain elevation, ground condition, atmospheric conditions and road parameters, including road surface, traffic speed, vehicle types and gradient. Because of the multiple factors and their interaction, computer noise modelling is generally a vital tool in predicting traffic noise impacts in the vicinity of major roads and for the determination of mitigation measures.

However, as this Project is only in the preliminary assessment phase, no traffic noise predictions are able to be undertaken. Based on the proposed location of the RTN, cycle and foot paths, and any

⁷ Measurements performed at State highway 18, MacKays to Peka Peka, AMETI and other projects

⁸ Hassan, O., “Train Induced Groundborne Vibration and Noise in Buildings”, Multi-Science Publishing Co Ltd, ISBN 0906522 439, 2006.

⁹ As set out in the NZ Transport Agency State highway construction and maintenance noise and vibration guide V1.1 Aug 2019

required road widening to accommodate the Project, we have determined the areas where there may be changes to traffic noise levels. We have then set out the areas where mitigation should be investigated during the next Project phase, and we discuss potential mitigation options based on the receiving environment.

While the traffic noise assessment would generally be two-pronged – in accordance with NZS6806 and taking into consideration the change in noise level – we have only assessed indicative outcomes based on these two assessment paths.

We have provided figures in APPENDIX B showing the indicative noise effects and mitigation options per area.

3.0 ASSESSMENT OF PREFERRED OPTION

3.1 Airport to Botany Preferred Option

3.1.1 Construction

The Airport to Botany part of the alignment extends over nearly 16 km and passes through a multitude of land uses. These include residential, business, commercial and open space sites. In order to split construction effects into areas, we have determined five construction areas as described in Table 3-1 below. These construction areas are for the purpose of assessing noise and vibration only and do not constitute construction staging for the project.

The main construction activities that would cause high noise and/or vibration levels in each area are set out as follows.

Table 3-1: Construction activities per area

Construction area	Main construction activities that cause noise and/or vibration
Area 1: Te Irirangi Drive (Botany Station to Great South Road)	• Earthwork cut and fill at several locations to provide for footpaths and cycle paths, including some “bicycle streets”, on both sides of the road • Construction of rapid transport system • Replacement or widening of Otara Stream bridge • Replacement of SH1 bridge • Construction of retaining walls in close proximity to buildings • Replacement of Transpower pylons • Potential removal of some buildings where project encroaches on existing properties • Construction of station platforms • Construction of raised crossings at residential side streets • Pavement and intersection works
Area 2: Manukau Town Centre	• Construct footpaths and cycle paths on both sides of the road • Construction of rapid transport system • Construction of station platforms • Construction of raised crossings at side streets • Pavement and intersection works
Area 3: Lambie Drive (from Manukau Town Centre to Puhinui Road)	• Construct footpaths and cycle paths on both sides of the road • Construction of rapid transport system • Construction of station platforms • Construction of raised crossings at side streets • Pavement and intersection works

Construction area	Main construction activities that cause noise and/or vibration
Area 4: Puhinui Road (Lambie Drive to SH20, excluding Puhinui Station)	• Construct footpaths and cycle paths on both sides of the road • Construction of rapid transport system in the centre of the road (road widening required to accommodate) • Removal of several buildings where project encroaches on existing properties. This would leave a large number of dwellings exposed that are currently shielded. • Construction of station platforms • Construction of raised crossings at side streets • Pavement and intersection works
Area 5: Puhinui Station	• Construction of bridge across rail corridor at Puhinui Train Station • Bridge widening at Bridge Street across rail corridor (assumed to be undertaken by 3. and 4. main widening projects) • Construct footpaths and cycle paths on both sides of the Bridge Street route (i.e. Puhinui Road bridge for rapid transport only)

3.1.2 Operation

Along Te Irirangi Drive (from the northern project extents to approximately Penion Drive), the existing road configuration is such that the RTN may be able to be accommodated within the existing road corridor without causing the general traffic lanes to encroach on the adjacent houses. Because of this, and the assumptions we have made with respect to a fully electric RTN fleet, and no increase in general traffic volumes, we conclude that the noise levels would not change. Therefore, for this area, there would be no material change to the noise environment and therefore no noise related effects as a result of the project.

Where general traffic lanes are pushed out and the RTN is accommodated in the middle of the road corridor, and if no houses are taken, then noise levels are predicted to increase to a slight extent. This occurs in some parts of Te Irirangi Drive to the south and some parts of Puhinui Road (to the west of Bridge Street) and Lambie Drive.

The extent of this increase may cause consideration of mitigation in accordance with NZS 6806. We consider that this is likely because of the already elevated noise levels for these houses. The type of mitigation that is most typically recommended in these circumstances is acoustic screening along the boundary.

The extent of this type of fencing would not likely exceed 2m in height, and would either require gaps for access, or to be constructed on the boundary of any dedicated accessway.

Where general traffic lanes are pushed out and the RTN is accommodated in the middle of the road corridor and houses may be required to be removed for space reasons, then noise levels are predicted to increase to a moderate to significant extent for the next row of houses. This is because the screening provided by the first row of houses would no longer be present. This occurs in several places along Puhinui Road.

The extent of this increase would require consideration of mitigation in accordance with NZS 6806. We consider that this is likely because of the significant change in noise levels for these houses. The type of mitigation that is most typically recommended in these circumstances is acoustic screening along the boundary.

We do note, however, that it may be the case that mitigation for these houses is not deemed a requirement under NZS6806, because although the change in noise level may be high, the absolute noise level may be low enough that the Category A criteria of NZS 6806 is not exceeded

The extent of fencing would in any case not likely exceed 2m in height, and would most likely be possible to be constructed on the boundary.

In circumstances where barriers are not possible or impractical, and where noise levels are predicted to be high (Category C of NZS 6806), it is possible that building modification mitigation may be warranted and should be investigated.

The operation of the Shared Use Path (SUP) will not generate noticeable noise levels adjacent to major local roads and State highways. Any use of the paths are limited to cyclists and pedestrians, and will be of a transient nature. SUP use is not considered to cause adverse noise effects and is therefore not further discussed.

3.1.3 Botany Station

Botany Station is generally commercial in use and zoning. For that reason, we make the following comments in relation to acoustic effects:

- Construction
 - o Businesses and other nearby buildings would need to be assessed for construction effects
 - o Effects are unlikely to be significant, and would be similar to general road works in the area (e.g. resurfacing)
 - o Communication and consultation are paramount in managing construction noise and vibration effects
 - o Night-time works may be suitable to reduce or avoid construction noise and vibration effects as businesses may not be occupied at night
- Operation
 - o Commercial premises are not considered noise sensitive; they are generally noise generators in their own right
 - o Therefore, it is unlikely that any mitigation would be required in this area

3.2 20Connect Preferred Option

3.2.1 Construction

The 20Connect part of the alignment extends over more than 14 km of State highway, combining SH20, SH20A and SH20B. The fact that the Project would be beside existing State highways, means that the area is already significantly impacted by traffic noise and therefore, construction effects may be less noticeable. The areas adjacent to SH20B are currently rural in nature, with some of the intermittent dwellings potentially being removed for the construction of this Project. In addition, this area is within the HANA, which means that residential or other noise sensitive use is precluded.

Land use adjacent to the State highways ranges from residential, business, commercial to open space. We have determined the potential construction activities by construction area, determining five areas as described in Table 3-2 below. The construction areas are provided for the purpose of assessing the potential construction noise and vibration effects only and do not constitute construction staging for the project.

The main construction activities that would cause high noise and/or vibration levels in each area are set out as follows.

Table 3-2: Construction activities per area

Construction area	Main construction activities that cause noise and/or vibration
Area 1: SH20 (Manukau Harbour to SH20A)	• Earthwork cut and fill at several locations to provide for Shared Use Path (SUP) east of SH20 to Walmsley Road and west of SH20 from Walmsley Road • Earthwork cut and fills to provide for the RTN west of SH20 up until Rimu Road, at Coronation Road onramp and Walmsley Road onramp • Remarking of road to allow for additional traffic lane either way (replacing the current bus shoulders) • Construction of new bridges at Tararata Creek, Walmsley Road, Hall Ave footbridge – night works may be required • Construction of retaining walls in close proximity to buildings • Pavement works • Potential for existing noise barriers/bunds to be affected by Project – will need to be reviewed and replaced
Area 2: SH20 (SH20A to SH20B)	• Earthwork cut and fill at several locations to provide for SUP south of SH20 from SH20A to Portage Road and north of SH20 from Portage Road to SH20B • Earthwork cut and fills to provide for the RTN at SH20B onramp • Removal of noise bunds at Ilford Cres and Bader Drive – reinstatement in the form of noise barriers would be required • Construction of new bridges at SH20A to SH20 RTN connection, SUP bridge over SH20 to SH20A ramp, Bader Drive, Portage Road, SH20B to SH20 RTN connection – night works may be required • Construction of retaining walls in close proximity to buildings • Construction of noise barriers in close proximity to buildings • Pavement works
Area 3: SH20 (SH20B to Lambie Dr)	• Earthwork cut and fills to provide for the RTN at Roscommon Rd onramp • Upgrades to existing bridges at Puhinui Creek, NIMT, Roscommon Road and Lambie Drive • Construction of retaining walls
Area 4: SH20A	• Earthworks required to construct the SUP north of SH20A • Replacement of Killington Crescent footbridge – may require night-time works • Replacement of Bader Drive bridge – may require night-time works
Area 5: SH20B	• Earthworks required to construct RTN and SUP south of SH20B • Potential removal of existing buildings (to be confirmed during detailed design) • Significant earthworks to fill in gully adjacent to Manukau Memorial Gardens and construct new SH20B to SH20 ramp • Realignment of road in the vicinity of Manukau Memorial Gardens • Construction of new Waokauri Creek bridge • Construction of new intersection with Campana Road • Construction of retaining walls in the vicinity of Campana Road

3.2.2 Road traffic

The Project works along SH20 are generally limited in scope. Not all works proposed will generate noticeable noise level changes. For instance, the RTN lanes proposed to be added in the vicinity of some on and off ramps are unlikely to generate noise in addition to the overall traffic noise on the State highways and ramps.

Specific changes to the road alignment in the vicinity of PPFs are as follows:

Table 3-3: Traffic noise effects per area

Road	Road changes	Potential noise effects
SH20 nbd	Repurposing of existing shoulder as additional general traffic lane from Portage Road to Massey Road offramp	Negligible
	Realignment of Massey Road offramp, bringing it closer to dwellings in Tidal Road and Colin Street.	Noticeable, mitigation likely required. Ramp would be lower than dwellings. Barriers can be placed on the retaining wall.
	Repurposing of existing shoulder as additional general traffic lane from Massey Road onramp to Bader Drive	Negligible
	Road widening (new traffic lanes) moving significantly closer to dwellings in Hall Ave and Umu Place, from Hall Ave to Walmsley Road	Noticeable, mitigation likely required. Barriers likely.
	Realignment of Coronation Road off and on ramps, moving slightly closer to dwellings in Walmsley Road and Patiti Parade	Just noticeable. Barriers likely
	Repurposing of existing shoulder as additional general traffic lane from Coronation Road on ramp	Negligible
	Repurposing of existing bus lane to additional general traffic lane from Rimu Road to Coronation Road – no additional traffic lane will be formed	Negligible
SH20 sbd	Repurposing of existing shoulder and existing bus lane as additional general traffic lane – no additional traffic lane will be formed	Negligible
	Realignment of Walmsley Road offramp, bringing it closer to dwellings in Kingfisher Place and Waterview Road	Noticeable, mitigation likely required. Barriers likely.
	Realignment of Massey Road off and on ramp, bringing traffic significantly closer to dwellings in Steven Street, Geoffrey Place and Ensor Place.	Noticeable, mitigation likely required. Ramp would be lower than dwellings. Barriers can be placed on the retaining wall.
	Road widening between Geoffrey Place and Henwood Road	Just noticeable. Barriers likely
	Repurposing of existing shoulder as additional general traffic lane up to Skipton Street	Negligible
	Additional traffic lane formed in the centre of the road, existing traffic lanes and shoulder unchanged in location	Negligible
	Slight realignment of Puhinui Road off ramp in the vicinity of Hillside Road	Just noticeable. Barriers likely

Road	Road changes	Potential noise effects
SH20A	• New Ramp connecting SH20A northbound with SH20 southbound • Slight northbound widening, however, there are no dwellings in the vicinity	• n/a • n/a
SH20B	• Significant eastbound widening/new roadway, which removes all existing dwellings in the vicinity • Westbound widening in the vicinity of the Manukau Memorial Gardens (MMG) • Construction of a local road between Campana and Orrs Roads, in close proximity to one dwelling	• n/a • Consultation with MMG ongoing • Barrier likely between SH20B and new local road.

Significant areas along SH20 and SH20A already have noise barriers or bunds in place from previous projects. We have assumed that these would be retained or, where they are compromised because of this Project, be replaced or upgraded to a similar or better performance.

Overall, we consider that traffic noise effects can be managed to be generally negligible, and that barriers can be installed for previously unprotected areas to reduce the overall traffic noise level at dwellings.

4.0 RECOMMENDATION

4.1 Mitigation

4.1.1 Construction

The most effective way to control construction noise is through good on-site management and communication between managers and other staff. Such management and mitigation is most appropriately set out in a Construction Noise and Vibration Management Plan (CNVMP), which would be used to manage works on site and how the construction contractor interacts with the neighbouring affected parties. The CNVMP should include information set out in NZS6803:1999 in Section 8 and Annex E, and the NZTA's State highway construction and maintenance noise and vibration guide.

General mitigation measures that should be implemented are given below.

- Training of personnel with regard to quiet and low vibration operating procedures shall be given
- Maintenance of equipment to ensure noise and vibration levels remain as low as practicable
- Noise barriers, temporary or otherwise, are considered where necessary. Where operational noise barriers are proposed, these should be implemented at the start of the construction period to reduce construction noise effects as far as practicable
- Enclosures of noisy stationary equipment should be implemented if necessary and where practicable
- Low noise and vibration plant should be selected wherever practical. Noisy plant shall have noise mitigation measures (such as silencers or enclosures) fitted. Where practicable, plant that generates low levels of vibration shall be used in preference to vibration intensive plant (e.g. using auger piling methods rather than vibropiling where ground conditions permit)
- Night-time operation shall only occur when noise limits can be complied with or where all practicable measures have been implemented to reduce noise emissions as per the CNVMP. Where compliance cannot be achieved, a Site Specific Construction Noise and Vibration Management Plan (SSCNVMP) would be required.

- Tonal reversing alarms shall be deactivated or replaced with a suitable alternative such as a visual or broadband alarm if required for night-time works. This approach has been successfully implemented on many Transport Agency projects
- Temporary resident relocation where all practicable noise mitigation measures have been implemented and noise levels are predicted to exceed the Project construction noise limits. Such a measure shall be considered generally as a last resort
- Public liaison and communication to ensure potentially affected dwellings are reasonably informed. A contractor environmental manager or appointed representative shall be available for residents to contact. Guidance contained in acoustics.nzta.govt.nz should be referred to where relevant
- Monitoring of building condition prior to construction and in response to complaints
- Monitoring of vibration levels received by buildings during the first use of high-vibration activities in their vicinity and in response to complaints; and
- Using low-vibration techniques and managing the timing of activities where practicable to avoid disturbance

4.1.2 Traffic

There are three general methods that can be used to control traffic noise generation or propagation. These are:

- Selecting noise reducing road surface material;
- Installing traffic noise barriers; or
- Upgrading building envelopes, e.g. by upgrading glazing, insulation or seals around doors and windows, and installing alternative ventilation options so that windows can remain closed.

Road surface material has been assumed to be smooth for the entire alignment, i.e. dense asphalt for AT roads, and OGPA for State highways. This means that the best practicable mitigation is already implemented.

Barriers are the most common form of noise mitigation after the choice of road surface material. While barriers are effective and recommended adjacent to State highways due to the limited access, they are more difficult to implement along urban and suburban roads, where property access would need to be maintained. Nevertheless, where it is practicable, providing barriers and fences (with driveway gates or gaps for access) for residential sites should be considered.

Building modification mitigation should be investigated where the relevant external noise criteria at PPFs cannot be achieved subsequent to installing “external” structural mitigation in the road corridor (i.e. where PPFs receive noise levels within Category C of NZS 6806).

The improvements required would vary from building to building. While some buildings have already been designed to achieve suitable internal noise environments, other building structures may not provide sufficient attenuation. Therefore, a case-by-case assessment is required for those buildings identified to fall within Category C.

Any insulation or other building envelope improvements have to be implemented concurrently with achieving appropriate ventilation and thermal comfort.

The best practicable mitigation option for traffic noise would need to be determined at the detailed design stage, with the input from other specialists in the team taking account of issues such as urban design, structural and stormwater consideration.

Overall, we consider that a combination of all three mitigation options set out above should be considered, with focus on road surface and barriers.

4.2 Condition Considerations

The NZ Transport Agency model conditions used for many other large-scale roading projects would be appropriate to be used for this Project also. We consider that they could be applied to both the A2B and 20Connect parts of the overall project. These conditions would generally satisfy the AUP requirements set out in Section 2.3

The model conditions for traffic noise and construction noise and vibration can be found in the NZ Transport Agency documentation here:

<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwi2isGRsNHIAhXh8XMBHS3sCZAQFjAAegQIABAC&url=https%3A%2F%2Fnzta.govt.nz%2Fassets%2FHighways-Information-Portal%2FTechnical-disciplines%2FConsent-and-compliance%2FModel-Consent-Conditions-Draft-V2-June-15.docx&usg=AOvVaw36Tpci5ufKK3q6yfmQB5cz>

We have attached the model conditions in Appendix C.

We also consider that, if the works are to be implemented as one project, the conditions should be consistent across the entire project. Only if the Project is to be implemented in parts (e.g. State highways and AT roads separately), then tailored conditions for either could be used.

Overall, the conditions applied to NZ Transport Agency projects such as the Southern Corridor Improvement project (Manukau to Papakura) would be suitable, and preferable to conditions such as those applied to Auckland Transport projects such as AMETI, particularly when addressing construction noise and vibration effects. The conditions applied to some of Auckland Transport's projects such as AMETI are focused on compliance with a certain limit, rather than implementation of the BPO and management of effects in a more responsive way. Compliance with a predetermined construction noise limit, while providing certainty for Council reviewers, does not encourage the contractor to engage and improve practices beyond such limit. Therefore, we recommend the conditions used by the NZTA as they focus more on the management of effects through management plans, including consultation and communication with affected parties.

4.3 Further Assessments Required

Noise and vibration effects from construction and traffic on the roads will need to be assessed in detail once additional information is available.

Monitoring of existing noise and vibration levels is recommended, in order to gain an understanding of the ambient environment and to verify computer noise predictions.

Construction noise and vibration should be assessed once the staging, timing and contractor are known. In order to undertake a meaningful assessment of construction noise and vibration effect, more detail is required.

Traffic noise is recommended to be assessed based on the methodology set out in NZS 6806. This involves the prediction of existing and future traffic noise levels, design of several mitigation options, and a Project team meeting for determination of the best practicable mitigation options.

In addition, an assessment of traffic noise effects (by determining the change in noise level) and potentially an assessment of the number of people highly annoyed (for the preferred mitigation option only) would be undertaken to provide a complete assessment.

APPENDIX A GLOSSARY OF TERMINOLOGY

Noise	A sound that is unwanted by, or distracting to, the receiver.
Ambient	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
SPL or L_p	<u>Sound Pressure Level</u> A logarithmic ratio of a sound pressure measured at distance, relative to the threshold of hearing (20 μ Pa RMS) and expressed in decibels.
SWL or L_w	<u>Sound Power Level</u> A logarithmic ratio of the acoustic power output of a source relative to 10^{-12} watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.
dB	<u>Decibel</u> The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of $P_r=20 \mu\text{Pa}$ i.e. $\text{dB} = 20 \times \log(P/P_r)$
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
$L_{Aeq}(t)$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
$L_{A90}(t)$	The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
NZS 6801:2008	New Zealand Standard NZS 6801:2008 <i>"Acoustics – Measurement of environmental sound"</i>
NZS 6802:2008	New Zealand Standard NZS 6802:2008 <i>"Acoustics – Environmental Noise"</i>
NZS 6803:1999	New Zealand Standard NZS 6803: 1999 <i>"Acoustics - Construction Noise"</i>
NZS 6806:2010	New Zealand Standard NZS 6806:2010 <i>"Acoustics - Road-traffic noise - New and altered roads"</i>

APPENDIX B TRAFFIC NOISE EFFECTS – INDICATIVE LOCATIONS

Traffic noise effects and mitigation



Significant noise level increase (e.g. where front row of dwellings may need to be removed)



Moderate noise level increase (e.g. the road moves noticeably closer)



Small to negligible noise level increase (e.g. where the road changes only slightly)

APPENDIX C NZ TRANSPORT AGENCY MODEL CONSENT CONDITIONS

C1 Construction Noise and Vibration

- CNV1 The objective of the Construction Noise and Vibration Management Plan (CNVMP), required by condition MP1, is to provide a framework for the development and implementation of measures to avoid, remedy or mitigate adverse construction noise and vibration effects, and to minimise any exceedance of the criteria set out in Conditions CNV4 and CNV5. The CNVMP must be prepared in accordance with the NZ Transport Agency *State highway construction and maintenance noise and vibration guide* (version 1.0, 2013).
- CNV2 If measured or predicted noise and vibration from a construction activity exceeds the criteria in Conditions CNV4 or CNV5, a Schedule to the CNVMP for that activity must be prepared in accordance with the NZ Transport Agency *State highway construction and maintenance noise and vibration guide* (version 1.0, 2013). The Schedule must be provided to the Manager at least five working days, where practicable, in advance of the activity proceeding. A schedule must establish the best practicable option for noise mitigation to be implemented for the construction activity.
- CNV3 The CNVMP must identify which mitigation measures required by Conditions ON1 to ON14 would also attenuate construction noise. Where practicable, those measures identified in the CNVMP must be implemented prior to commencing major construction works that generate noise, which would be attenuated.
- CNV4 Construction noise must be measured and assessed in accordance with NZS 6803:1999 *Acoustics - Construction Noise*. The construction noise criteria in Table CNV1 must be complied with, as far as practicable.

Table CNV1 Construction noise criteria

Day	Time	L _{Aeq} (15min)	L _{AFmax}
Occupied PPFs (as defined in NZS 6806:2010)			
Weekdays	0630h - 0730h	60 dB	75 dB
	0730h - 1800h	75 dB	90 dB
	1800h - 2000h	70 dB	85 dB
	2000h - 0630h	45 dB	75 dB
Saturday	0630h - 0730h	45 dB	75 dB
	0730h - 1800h	75 dB	90 dB
	1800h - 2000h	45 dB	75 dB
	2000h - 0630h	45 dB	75 dB
Sundays and Public Holidays	0630h - 0730h	45 dB	75 dB
	0730h - 1800h	75 dB	90 dB
	1800h - 2000h	45 dB	75 dB
	2000h - 0630h	45 dB	75 dB
Commercial and industrial receivers			
All	0730h – 1800h	75 dB	
	1800h – 0730h	80 dB	

Advice Note: There may be occasions when it is not practicable for construction activity to achieve the guideline criteria in the standard. In such circumstances, mitigation that is consistent with the best practicable option shall be adopted.

- CNV5 Construction vibration must 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*. The Category A construction vibration criteria in Table CNV2 must be complied with as far as practicable. If measured or predicted vibration from construction activities exceeds the Category A criteria, a suitably qualified person must assess and manage construction vibration during those activities. If measured or predicted vibration from construction activities exceeds the Category B criteria those activities must only proceed if vibration effects on affected buildings are assessed, monitored and mitigated by a suitably qualified person.

Table CNV2 Construction vibration criteria

Receiver	Details	Category A	Category B
Occupied PPFs	Night-time 2000h - 0630h	0.3mm/s ppv	1mm/s ppv
	Daytime 0630h - 2000h	1mm/s ppv	5mm/s ppv
Other occupied buildings	Daytime 0630h - 2000h	2mm/s ppv	5mm/s ppv
All other buildings	Vibration - transient	5mm/s ppv	BS 5228-2* Table B2
	Vibration - continuous		BS 5228-2* 50% of table B2 values

*BS 5228-2:2009 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration'

Advice Note: There may be occasions when it is not practicable for construction activity to achieve the guideline criteria in the standard. In such circumstances, mitigation that is consistent with the best practicable option shall be adopted.

C2 Traffic Noise

- ON1 For the purposes of Conditions ON2 to ON14:
- a) BPO – means the Best Practicable Option;
 - b) Building-Modification Mitigation – has the same meaning as in NZS 6806;
 - c) Habitable Space – has the same meaning as in NZS 6806;
 - d) Noise Assessment – Means the Road-traffic Noise Assessment Report submitted with the [NoR];
 - e) Noise Criteria Categories – means the groups of preference for sound levels established in accordance with NZS 6806 when determining the BPO for noise mitigation (i.e. Categories A, B and C);
 - f) NZS 6806 – means New Zealand Standard NZS 6806:2010 Acoustics – Road-traffic noise – New and altered roads;
 - g) P40 – means NZ Transport Agency NZTA P40:2014 Specification for noise mitigation;
 - h) PPFs – means only the premises and facilities identified in green, orange or red in the Noise Assessment; and
 - i) Structural Mitigation – has the same meaning as in NZS 6806.

Structural Mitigation (noise barriers and low-noise road surfaces)

- ON2 The road-traffic noise mitigation measures identified as the ‘Selected Options’ in the Noise Assessment must be implemented to achieve the Noise Criteria Categories indicated in the Noise Assessment (‘Identified Categories’), where practicable and subject to Conditions ON3 to ON14.
- ON3 Prior to construction of the Project, a suitably qualified acoustics specialist must undertake the detailed design of the Structural Mitigation measures in the Selected Options (the ‘Detailed Mitigation Options’), which, subject to Condition ON4, must include at least:
- a) Noise barriers with location, length and height in general accordance with the Noise Assessment; and
 - b) Low-noise road surfaces with location in general accordance with the Noise Assessment.
- ON4 If it is not practicable to implement a particular Structural Mitigation measure in the location or of the length or height included in the Selected Options, a changed design can be included in the Detailed Mitigation Options if either:
- a) the changed design would result in the same Identified Category or Category B at all relevant PPFs, and a suitably qualified person certifies to the Manager that the changed Structural Mitigation would be consistent with adopting the BPO in accordance with NZS 6806; or
 - b) the changed design would result in the Identified Category changing from Category A or B to Category C at any relevant PPF, and the Manager confirms that the changed Structural Mitigation would be consistent with adopting the BPO in accordance with NZS 6806.
- ON5 Prior to construction of the Project, a Noise Mitigation Plan written in accordance with NZTA P40 Noise Specification 2014 must be provided to the Manager.
- ON6 The Detailed Mitigation Options must be implemented prior to completion of construction of the Project, with the exception of any low-noise road surfaces, which must be implemented within twelve months of completion of construction.

- ON7 Within twelve months of completion of construction of the Project, a post-construction review report written in accordance with NZTA P40 Noise Specification 2014 must be provided to the Manager.
- ON8 The Detailed Mitigation Options must be maintained so they retain their noise reduction performance as far as practicable.

Building-Modification Mitigation

- ON9 Prior to construction of the Project, a suitably qualified acoustics specialist must 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').
- ON10 Prior to construction of the Project in the vicinity of each Category C Building, the Requiring Authority must 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 twelve months of the date of the Requiring Authority's letter, the Requiring Authority must instruct a suitably qualified acoustics specialist to visit the building and assess the noise reduction performance of the existing building envelope.
- ON11 For each Category C Building identified, the Requiring Authority is deemed to have complied with Condition ON10 if:
- a) The Requiring Authority's acoustics specialist has visited the building; 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 twelve months of the date of the Requiring Authority's letter sent in accordance with Condition ON10 (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.
- ON12 Subject to Condition ON11, within six months of the assessment required by Condition ON10, the Requiring Authority must write to the owner of each Category C Building advising:
- a) If Building-Modification Mitigation is required to achieve 40 dB $L_{Aeq(24h)}$ 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.
- ON13 Once an agreement on Building-Modification Mitigation is reached between the Requiring Authority and the owner of a Category C Building, the mitigation must be implemented, including any third party authorisations required, in a reasonable and practical timeframe agreed between the Requiring Authority and the owner.

- ON14 Subject to Condition ON11, where Building-Modification Mitigation is required, the Requiring Authority is deemed to have complied with Condition ON13 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 ON12 (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.

Appendix F

Overarching Planning Technical Note (Other Environmental Considerations)

Technical Note

To	Auckland Transport	From	
Copy		Reference	502334-7000-TEC-NN-0049/ 501094/412PO6/018PEA
Date	21/02/2020	Pages (including this page)	15
Subject	Overarching Planning Technical Note (A2B and 20 Connect)		

1 Introduction

The Southwest Gateway Programme is an overarching collection of transport projects being progressed by investment partners comprising Waka Kotahi NZ Transport Agency (the Transport Agency), Auckland Transport (AT) and Auckland International Airport (AIAL) (collectively referred to as 'the Project Partners').

The purpose of the programme is to create a well-connected, efficient transport system that provides choice and reliability for how people and freight travel through southwest and southeast Auckland, including to, and from, the Auckland Airport. Two of the cornerstone projects of the programme are:

- **Airport to Botany (A2B)** - the AT component comprising high frequency public transport provision between Botany and the Airport; and
- **20Connect** - the Transport Agency component comprising the State Highway (SH) network in the south west of Auckland (SH20, SH20A and SH20B).

Preliminary advice regarding potential environmental effects and mitigation opportunities was obtained from technical specialists as part of the options assessment stage (long list, short list and optioneering) with high-level technical notes prepared to support the MCA assessments.

Preliminary environmental assessments (PEA) have been produced for those environmental disciplines where potential issues for the preferred A2B and 20Connect options were highlighted during the technical considerations undertaken to support the Short List and optioneering exercises. PEAs prepared are in relation to arboriculture, archaeology, ecology, landscape, visual and urban design, and noise and vibration. The PEAs are provided as appendices to the Consenting Strategy.

This technical note has been prepared to summarise the conclusions reached in respect of the remaining discipline areas (Air Quality, Coastal, Contaminated Land, Social, Stormwater) that did not warrant the preparation of a PEA, collating the earlier advice provided regarding the options which contributed to the preferred option selection.

1.1 Description of the Preferred Options

Airport to Botany

- A dedicated Rapid Transit Corridor from Auckland International Airport to Botany via:
 - Te Irirangi Drive (entire length)
 - Great South Road (between Te Irirangi Drive and Ronwood Ave intersections)
 - Ronwood Ave (From Te Irirangi Drive to Davies Ave intersections)
 - Davies Ave (entire length)
 - Manukau Station Road (from Lambie Drive to Davies Ave intersection)

- Lambie Drive (From Manukau Station Road intersection to Puhinui Road)
- Puhinui Road (from Lambie Drive to SH20 interchange)
- State Highway 20B
- Improved walking and cycling facilities along the roads above

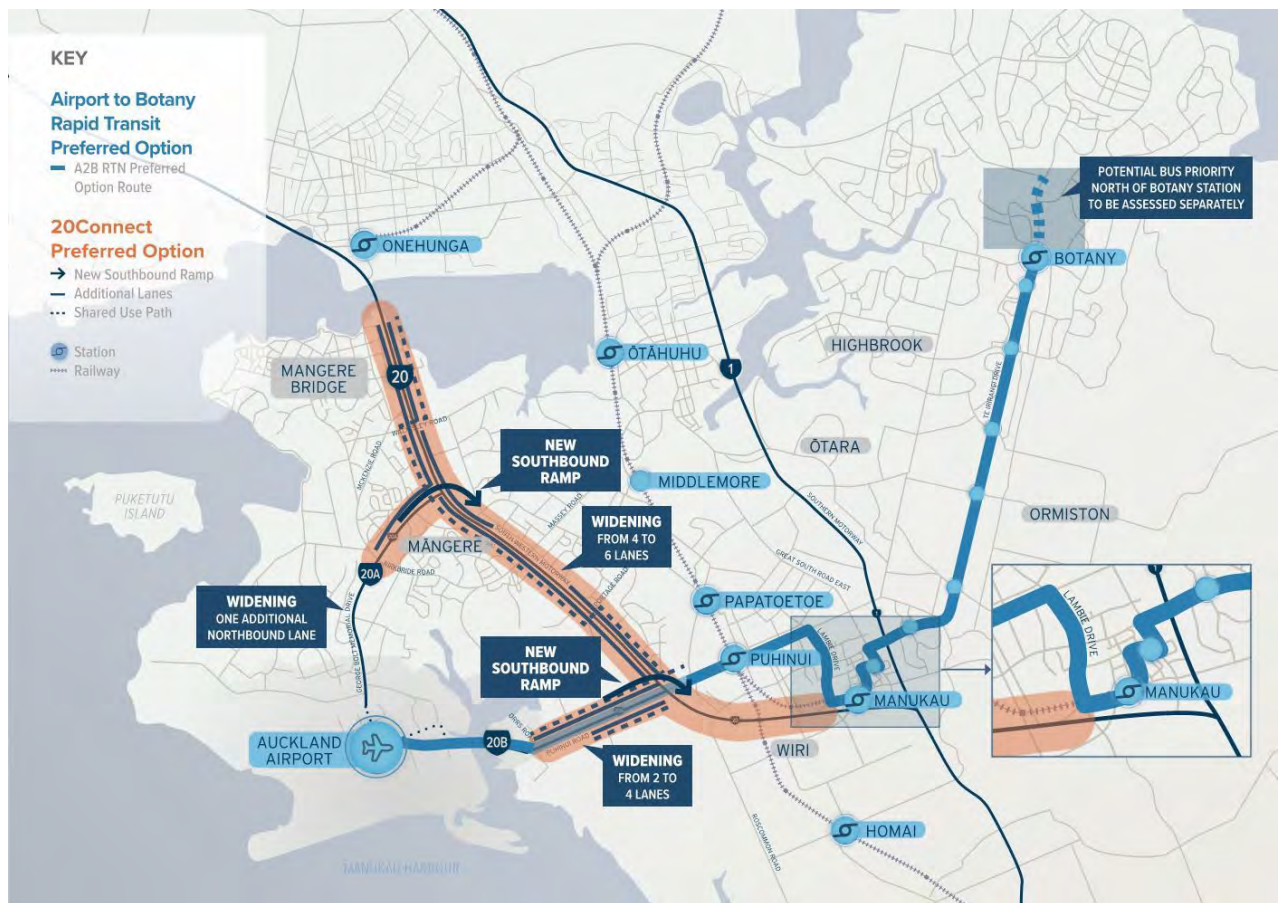


Figure 1: Preferred Options

20Connect (SH20, SH20A and SH20B)

20Connect will deliver additional state highway infrastructure changes to improve journey time reliability, network resilience and safety.

Key project elements in this section consist of the following:

- New two-lane SH20A/SH20 system interchange ramp (and Bader Drive eastbound off-ramp removed and associated lane reconfiguration);
- Widening of SH20:
 - Between Manukau Harbour Crossing and SH20A (online at grade);
 - Between SH20A and SH20B (online at grade); and

- Walking and cycling facilities along SH20, SH20A and SH20B.

1.2 Information sources

The short list commentary extracted in relation to the preferred option builds on the technical discipline feedback presented in the Long List technical notes concerning the options, which ultimately form the preferred option. The following documents have been summarised to inform this memorandum:

- A2B / 20 Connect Joint Consenting Strategy (A2B & 20Connect) 501094-4401-REP-NN-0013
- Technical notes: Multi-Criteria Analysis (MCA) Long List

A2B

- Airport to Botany Long-List Options: Multi-Criteria Analysis Scoring Sheet: Contaminated Land. Aurecon NZ Ltd, *dated 30/08/2018*
- Airport to Botany Long-List Options: Multi-Criteria Analysis Scoring Sheet: Social. Aurecon NZ Ltd, *dated 27/08/2018*
- Airport to Botany Long-List Options: Multi-Criteria Analysis Scoring Sheet: Stormwater and water quality. Aurecon NZ Ltd, *dated 17/09/2018*

20Connect

- 20 Connect Long-List Options: Multi-Criteria Analysis Scoring Sheet: [Contaminated land]. Aurecon NZ Ltd, *dated 23/08/2018*
- 20 Connect Long-List Options: Multi-Criteria Analysis Scoring Sheet: Social. Aurecon NZ Ltd, *dated 16/08/2018*
- 20 Connect Long-List Options: Multi-Criteria Analysis Scoring Sheet: Coastal Processes. NIWA, *dated 18/09/2018*
- 20 Connect Long-List Options: Multi-Criteria Analysis Scoring Sheet: Stormwater. Aurecon NZ Ltd, *n.d.*

- Technical notes: MCA Short List

A2B

- Airport to Botany Short List Options: Multi-Criteria Analysis Scoring Sheet: Site Contamination. Aurecon NZ Ltd, *dated 06/12/2018*
- Airport to Botany Short List Options: Multi-Criteria Analysis Scoring Sheet: Social. Aurecon NZ Ltd, *dated 06/11/2018*
- Airport to Botany Short List Options: MCA Scoring Sheet: Stormwater and water quality. Aurecon NZ Ltd, *dated 19/12/2019*.

20Connect

- 20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Contaminated Land. Aurecon NZ Ltd, *dated 29/11/2018*
- 20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Social. Aurecon NZ Ltd, *dated 28/11/2018*
- 20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Coastal Processes & Sea-Level Rise. NIWA, *dated 14/12/2018*

- 20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Stormwater. Aurecon NZ Ltd, *dated 29/11/2018*
- Contaminated Land Review
 - A2B Contaminated Land Review. A2B Project Team, *dated 23/05/2019* (502334-7000-TEC-KF-0039)
 - 20Connect Contaminated Land Review. 20Connect Project Team, *dated 24/09/2019* (501094-5501-TEC-KK-0001)
- State Highway 20B Short Term Improvements: Detailed Site Investigation Report. Aurecon NZ Ltd, *dated 28/06/2019* (504330-0000-REP-KK-0025)

2 Contaminated land

2.1 A2B (Botany to Puhinui Interchange)

The following summary for A2B contaminated land was sourced from the A2B Short List Options: MCA Scoring Sheet for Site Contamination, authored by Aurecon on 6th December 2018, which was ultimately informed by the A2B Long List Options for contaminated land authored by Aurecon on 30th August 2018. In addition to this, Aurecon was commissioned to undertake a Contaminated Land Review which provided a more detailed overview of the preferred option route, the findings of which are contained in the technical note produced by the A2B Project Team Project Team on 23rd May 2019 (reference no. 502334-7000-TEC-KF-0039).

Based on a review of current and historical land uses a number of potential ground contamination issues have been identified. These include:

- A former municipal landfill is located on Smales Road (Greenmount Landfill), however it is located greater than 200 m from the preferred option and is not expected to be intersected under the proposed upgrade works;
- There is potential for farm dump, demolition waste from historical farm structures and wastes from agrichemical storage, preparation and use to be present throughout the preferred option given most of the preferred option is former production land;
- Five potential gully infill locations have been identified along the preferred option. These are located along Te Irirangi Drive where historical streams cross the alignment. In addition, uncontrolled fill may have occurred prior to road construction. As historical filling is assumed to have been carried out for the purposes of road construction, it may have occurred in a controlled manner with uncontaminated material. Uncontrolled filling may, however, have occurred prior to road construction, and / or unsuitable materials may have been included in the engineered fill material used in the gullies or for the motorway construction;
- Five discharge consents for contaminated sites have been identified in the information provided by Auckland Council adjacent to the preferred option and there is the potential that contamination may have migrated off site. If works are all shallow, groundwater is less likely to be encountered, however, if works encounter potentially contaminated groundwater, considerations need to be taken around managing groundwater to protect health and safety and the environment;
- An orchard has been identified along Puhinui Road as a horticultural area which may have resulted in soil contamination through pesticide storage, formulation and use;

- There is potential that asbestos may present throughout the preferred option where widening of the road may encounter asbestos from building materials resulting from poor demolition practices, or material deterioration;
- Acid sulphate soils (ASS) are associated with organic soils within the Tauranga Group formation which underlies most of the proposed alignment. ASS may be encountered during works, dependant on the specific locations of organic soils within the subsurface environment, which cannot be determined without intrusive investigation;
- Six service stations have been identified along the preferred option, along with a number of car yards. Shallow excavations outside the areas of the car yards / service stations are less likely to be impacted than excavations within these sites;
- Sports fields, turf grass and golf courses may have been subject to pesticide use. Sport fields have been identified at Rongomai Reserve (adjacent to Te Irirangi Drive) and 79 Ormiston Road is identified as being the site of a turf grass specialist. Auckland council records identify a 4ha golf course and ornamental gardens at 640 Great South Road. If land used for sports fields, turf grass or golf courses will be disturbed, these sites will need further assessment prior to works taking place.

In summary, there are a number of potential ground contamination issues that may impact the project. Where the works remain within the existing road corridor these are anticipated to be low risk, typically avoiding the areas of potential contamination. Where road widening is required, there is potential that potentially contaminated areas will be intersected.

It is recommended that full Preliminary Site Investigations (PSIs) be undertaken to, support the required statutory approvals, and to inform any site management procedures. It is anticipated the extent of these PSIs would coincide with the nominated consenting strategy for respective sections of the project. Depending on the findings of the PSIs, Detailed Site Investigations (DSIs) may be required either as a condition of consent or to inform site management procedures. Depending on the findings of the PSIs and DSIs, a Contaminated Site Management Plan (CSMP) may be required for the construction phase of the Project.

Based on the information provided to date from the technical notes and Contaminated Land Review, any contaminated land issues encountered are anticipated to be business as usual, with minimal risk posed to project delay or costs.

2.2 20Connect (SH20 and SH20A, excluding SH20B)

The following summary for 20Connect and A2B/20Connect contaminated land was sourced from the A2B Short List Options: MCA Scoring Sheet for Site Contamination, authored by Aurecon on 29th November 2018, which was ultimately informed by the A2B Long List Options for contaminated land authored by Aurecon on 23rd August 2018.

In addition to this, Aurecon was commissioned to undertake a Contaminated Land Review which provided a more detailed overview of the preferred option route, the findings of which are contained in the technical note produced by the 20Connect Project Team Project Team on 24th September 2019 (reference no. 501094-5501-TEC-KK-0001)

Based on a review of current and historical land uses a number of potential ground contamination issues have been identified. These include:

- Contaminated land is likely to be disturbed across most of SH20, while other areas are less affected. Cut to fill exercises may result in contamination of currently clean areas;

- The demolition of residential properties along SH20, if required, should consider the presence of asbestos containing material in construction products and in waste disposed to areas now used as gardens;
- Closed landfills are located adjacent to the preferred option at 56 Tanners Road, 54 Miro Road and 156 Roscommon Road. These are not anticipated to be disturbed during the proposed upgrade works. Furthermore, their age reduces any landfill gas risks;
- Farm dump, demolition waste from historical farm structures and wastes from agrichemical storage, preparation and use may be present on former horticultural/agricultural land along most of the alignment. Although exact locations cannot be reliably identified, such sites can be managed during construction through capping, or through excavating waste material and backfilling with alternate material if waste is unsuitable to remain in ground from an environmental or geotechnical perspective.
- Historical fill material is present and has been identified at three main gully infill locations along the preferred option; namely adjacent to Aorere Park, north of Manukau Memorial Gardens and near Cavendish Drive. As filling is assumed to have been carried out for the purposes of road construction, it may have occurred in a controlled manner with uncontaminated material;
- Horticultural areas are identified within areas of production land throughout much of the preferred option, which can result in soil contamination through pesticide storage, formulation and use.

It is recommended a combined PSI and DSI be undertaken to better understand the nature and extent of contaminants within project extents, which are likely to be present from historic building demolition likely containing asbestos to construct the state highway. Depending on the realised consenting strategy, it may be practical to prepare respective investigation deliverables to coincide with the extent of the consented area. Depending on the findings of the PSIs and DSIs, a Contaminated Site Management Plan (CSMP) may be required for the construction phase of the Project.

2.3 A2B/20Connect (SH20B)

Site contamination risk along the SH20B preferred option is associated with historical infilling and farm dumps, and the presence of underground petroleum hydrocarbon distribution pipelines. These risks were managed in association with short-term development works, therefore, the site contamination risk profile along the SH20B preferred option is not further considered in detail within this memorandum. However, it is important to note the following:

- During options assessment, acid sulphate soils were identified as potentially present, particularly along the SH20B corridor. Exposure of this soil type to air during earthworks (including bridge construction/improvements and piling activities) may trigger acidic earth discharge and acidification of groundwater resulting in longer term acid discharges to and from groundwater. If present, there is also the risk of acid soils weakening concrete structures. However, ground investigations and testing undertaken during the short term SH20B improvements project did not identify the presence of acid sulphate soils so while the risk is not completely removed, it has significantly reduced since the undertaking of the MCA process.
- Manukau Memorial Gardens (MMG) are adjacent to the route which may result in soil contamination through burial practices. The cemetery is not anticipated to be intersected under the proposed upgrade works. However, there is potential to encounter contamination (including leachate) at the periphery of the MMG and at the corner of Prices Road and SH20B (due to unknown historic activities).
- There is the potential for ongoing discharge of contaminated groundwater from 21 Diversey Lane to have migrated from offsite sources in other areas of the alignment. If works will encounter potentially

contaminated groundwater, considerations need to be taken around managing groundwater to protect health and safety and the environment which, including the treatment of dewatering discharge, and the disposal of dewatering discharge to trade waste or to wastewater.

- Construction over the existing fuel pipeline or potential relocation may be a source of contamination.
- Construction activities in close proximity to the jet fuel pipeline (owned by Wiri Oil Services Limited) and/or liquid fuel pipeline (NZ Refining Company Limited) have the potential to result in significant environmental impacts (contaminant discharge) if managed incorrectly. Works in these environments are risk factors for the health and safety of construction workers.

The 'SH20B Short Term Improvements Detailed Site Investigation (DSI)' was completed on 28th June 2019 to support the SH20B / Puhinui Road short term improvement consenting process. It provides a good indication of the shallow ground conditions as they pertain to potentially contaminated land within the SH20B corridor and therefore, is relevant to the preferred option. The DSI provides the following additional information:

- Environmental sample results reported are generally within background ranges of trace elements in Auckland soils, and it is likely that the majority of excess soils can be disposed of as cleanfill.
- There was no detection of asbestos within the samples that were collected and no exceedances of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESC) Tier 1 human health criteria for commercial/industrial receptors or the criteria for high density residential
- The DSI concludes that based on the data collected, the types and concentrations of contaminants identified indicate that the risk to human health is negligible and to the environment is low.

3 Social

The following summary is sourced from 'Airport to Botany Short List Options: Multi-Criteria Analysis Scoring Sheet: Social' authored by Aurecon on 6th November 2018. The technical note provided an assessment of the short-list options for the Airport to Botany Single Stage Business Case and was designed to contribute to the MCA assessment which was undertaken for the short-list options.

3.1 A2B (Botany to Puhinui Interchange)

The potential social effects considered for A2B include accessibility and community. Accessibility is defined as the extent and degree of effects on the community concerning accessibility to/from facilities, services, properties and businesses. Community is defined as the extent and degree of change to groups and activities, including sense of community and known aspirations and plans and sensitive construction receivers.

The following provides a summary of the existing social environment and potential social effects of A2B between Botany Station and Puhinui Interchange, as provided as part of the MCA assessment of long and short list options.

3.1.1 Existing environment

Botany Town Centre to Puhinui Interchange

Key social infrastructure that services both the local community and the wider Auckland area between Botany Town Centre and the Puhinui Interchange are:

- Puhinui Railway Station;

- Manukau Town Centre, including Hayman Park, Westfield Manukau City, Manukau Institute of Technology (MIT) Manukau Campus, Manukau Railway Station);
- Auckland University of Technology (AUT) South Campus;
- Manukau Sports Bowl and Velodrome;
- Botany Junction Centre (Ormiston Road and Te Irirangi Drive Interchange);
- Botany Town Centre (including Pak N Save, Briscoes and the Hub);
- Clover Park Community House, which hosts community events;
- Open space areas (Hayman Park and Manukau Square)

Botany Town Centre

Botany Town Centre is an important local centre for the surrounding suburbs of Dannemora, Huntington Park, Northpark, Golflands and East Tamaki Heights. Social infrastructure in the town centre includes the Botany Library, Botany Downs Secondary College, St Columba Presbyterian Church, Eastview Baptist Church and International Baptist Church. Logan Carr Reserve and Kellaway Reserve are located to the east of the town centre. A stormwater pond and surrounding reserve is located to the west of the town centre.

Botany Town Centre is bounded by major roads (Te Irirangi Drive to the north and east, and Chapel Road to the south). Residential dwellings are located to the north and west. A large at-grade carpark surrounds the existing Botany Town Centre. Existing public transport connections to and from the town centre are limited.

“A private developer, AMP Capital, is managing a redevelopment of Botany Town Centre which is an existing retail and commercial mall. The redevelopment expanded on the existing gross lettable area to 62,700sqm and is due for completion in early 2020. The project would generate additional jobs in the retail sector.

AT are delivering the AMETI busway which will link to Botany Town Centre.

One of the key outcomes in the Howick Local Board Plan (Auckland Council, 2017) is for ‘involved and connected communities’. Botany is identified as a new, developing area in the plan.

Manukau Town Centre

Manukau Town Centre is located within the Otara-Papatoetoe Local Board area. Compared with New Zealand, the local board area is characterised by a young population and a high proportion of couples with children. Residents predominantly work as labourers, machinery operators and drivers and professionals, suggesting that many people travel out of the area for employment. Many do so currently by using a private motor vehicle. The local board area is ethnically diverse with a high proportion of Pacific peoples, followed by Asian and European.

Various development plans for the Manukau area relate to the social effects study area. These identify the aspirations of the community and acknowledge that it is an area which will experience a lot of change. For example:

- Panuku Development Auckland Manukau indicates that a new 9,000m² technology centre hub is proposed for completion by mid-2020. Located opposite the current MIT campus, bordered by Manukau Station Road, Lambie Drive and Wiri Station Road it will provide for more than 1,200 students.

- Transform Manukau (Renewal of Manukau Central) – High Level Project Plan April 2016, Panuku Development Auckland (accessed June 2019) covers a large 600ha Transform Manukau project area and includes the study area. Challenges identified for the area include the scale of the motorway network creating barriers and impacting connectivity within the area. It indicates that the Manukau Sports Bowl site is likely to be subject to land use change in the future.
- Otara Papatoetoe Greenways – Local Paths Plan 2017 outlines the proposed accessibility aims of the Otara Papatoetoe Local Board Plan. The Greenways – Local Paths plan includes the construction of a footbridge over Great South Road Manukau to provide for walking and cycling as well as greenway routes on both Great South Road and Diorella Drive.

3.1.2 Potential effects

The social assessment notes that design information to inform the assessment of potential impact on certain individuals or groups, such as women, disabled people, older or younger people, and parents with prams should be considered at the detailed design phase.

Construction

- During construction, sensitive receivers and businesses along the proposed routes may experience temporary adverse social effects associated with changes to vehicle access and noise and vibration. These effects would be temporary and could be managed through Stakeholder and Communication Plans and Construction Management Plans.

Operation

It is anticipated that the provision of the Rapid Transit Network (RTN) will improve accessibility and community.

- Positive social effects are anticipated due to an increase in mode choices between Botany and Auckland Airport, which allows for improved accessibility choice and as a result, improved social wellbeing.
- Additional traffic lanes required to accommodate the RTN in the central median may require property acquisition and as such result in uncertainty for property owners and changes to the existing noise and vibration environment.
- Changes to existing vehicle movements to accommodate the RTN at intersections would require adaptation from surrounding businesses. These effects would be temporary and could be managed through Stakeholder and Communication Plans.

3.2 20Connect (SH20 and SH20A, excluding SH20B)

The following summary is sourced from the '20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Social' authored by Aurecon on 28th November 2018 which provided an assessment of the short-list options for 20Connect and was designed to contribute to the MCA assessment which was undertaken for the short-list options.

The potential social effects considered for this section of 20Connect include accessibility, health and safety, and community. In relation to the state highway improvements they primarily relate to disruption arising from construction, property acquisition, altered site access and proximity to the larger transport corridor.

3.2.1 Existing environment

There are several social, cultural and recreational activities and social/community infrastructure located within the study area. These include marae, parks, schools, early childhood centres, retirement villages and rest homes, hospitals and healthcare services (including doctors, pharmacies, physiotherapists, dentists and other medical practices), cemeteries and other social and recreational infrastructure. Such activities and infrastructure are located within the open space, residential and commercial land throughout the study area, and each varies in size, age-group targets, language and cultures, values and religious beliefs, and level of service.

3.2.2 Potential effects

Construction

- There is likely to be community and individual frustration during construction as a result of delays and construction effects;
- Construction related health and amenity considerations including the appropriate management of effects such as noise, dust, vibration, change to routes and appropriate traffic management.

Operation

- The additional lanes of state highway will improve accessibility to and around the airport and surrounding area. Additionally, the inclusion of the Shared Used Pathway (SUP) will provide accessibility by way of a different mode;
- The additional lanes and southern ramp connection from SH20A to SH20 provide an element of resilience to the transport network;
- The SUP provides positive effect on human health by providing modal choice and recreational resource (addition to Mangere Bridge to Clover Park circuit and the Te Araroa Trail);
- The project components cannot all fit within the extent of the existing designation(s), and therefore, numerous properties are expected to be directly impacted and will require property acquisition (both residential/commercial and open space, some full and some partial). The loss of residential properties, parks and businesses could adversely change a community's sense of place as well as the loss or reduced functionality of community services and facilities. This adverse effect has the potential to be quite significant;
- Social infrastructure may be directly impacted as a result of the works, particularly at the SH20 / 20A interchange environment.

3.3 A2B/20Connect (SH20B)

The potential social effects considered for the RTN aspect of this corridor relate to accessibility and community. In relation to the state highway improvements they primarily relate to disruption arising from construction, property acquisition, altered site access and proximity to the larger transport corridor.

3.3.1 Existing Environment

The SH20B corridor is located within the Puhinui Precinct which predominately provides for light industrial and airport related activities and some large lot residential development. The primary purpose of the Puhinui Precinct is to enable a transition from rural to urban development. SH20B and Puhinui Road are surrounded to the north and south by pasture land, horticulture activities and scattered

residences. To the east lies SH20 with residential and industrial properties located further east. To the west is Pukaki Creek and associated bridge with the operational Auckland Airport beyond.

Other significant land uses include the Manukau Memorial Gardens (MMG) located at 361 Puhinui Road, strawberry fields and associated shops, and Black Bridge Big Tree Nurseries located at 436 Puhinui Road. SH20B provides an important connection for people accessing Auckland Airport and some nearby local social infrastructure, including Auckland Airport's 'viewing platform'. Although at the time of writing there are no cycling facilities, it is a known route for experienced road bike riders.

3.3.2 Potential Effects

The combined corridor improvements may generate the following social impacts:

Construction

- Disruption to businesses, residents and recreational users accessing properties along SH20B where site access is altered;
- Potential impact on proposed developments (e.g. Southern Gateway) requires consideration;

Operation

- Impact on Manukau Memorial Gardens users / visitors, which is a particularly sensitive environment including the cemetery, chapel and crematorium facilities.

4 Air quality

The State Highway improvements along this corridor are required to enable the RTN, as opposed to building additional state highway capacity. Accordingly, they are not considered to undermine the potential air quality benefits anticipated in relation to the RTN and associated modal shift.

Construction

- Adverse effects resulting from discharges to air from construction activities (e.g. dust) are anticipated, however, these can be managed through appropriate construction management measures.

Operation

- For all three parts of the programme it is assumed that a fully electric RTN fleet will operate and will therefore not generate any adverse operational air quality effects;
- There is the potential to reduce the number of private vehicles travelling along the route as a result of additional modal choices, thus improving air quality;
- It is considered that the cumulative increase in traffic volumes (as a result of additional lanes) would likely result in overall minor increases in emissions.

5 Coastal

5.1 A2B (Botany to Puhinui Interchange)

The A2B project area does not contain any coastal environments and therefore there are no anticipated construction or operational effects to discuss.

5.2 20Connect (SH20 and SH20A, excluding SH20B)

NIWA prepared the technical note for the '20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Coastal Processes & Sea-Level Rise' (14th December 2018). The assessment was designed to contribute to the MCA assessment undertaken for the short-list options.

The Coastal Marine Area (CMA) bounds the study area to the north and to the west, including both the Manukau Harbour and Māngere Inlet. Also relevant to SH20 and SH20A is the Tararata Creek which is classified as part of the CMA and subject to the coastal inundation control layer in the Auckland Unitary Plan (AUP).

Coastal areas of the Manukau Harbour are identified as marine Significant Ecological Areas (SEAs) (M1 and M2) within the AUP, valued for its habitat, particularly as a feeding ground for international migratory wading birds. It is considered that sea-level rise and climate change aspects can be managed via the design of the new bridges and culverts required as part of the preferred option.

Construction effects

- While there would be an additional upper tidal-arm crossing to the east of SH20 (in upper eastern Waokauri Creek opposite end of Daphne Road) for the SUP and RTN construction runoff of sediment and creek-bed disturbances should be manageable. This is primarily because direct (flowing) tidal connection to these upper arms only occurs at high spring tides (other than catchment runoff during rainfall events).
- The extra southbound and northbound lanes on SH20 over Tararata Creek (Mangere Inlet) are widened bridged sections on both sides. Provided there is minimal disturbance of the CMA and avoidance of piers in the main tidal channel, the effects on coastal processes and turbidity should be manageable through effective sediment & erosion control measures.

Geomorphology/sedimentation & tidal flows:

- There is no substantial change for the preferred option on the effects on geomorphology of the upper tidal inlets and tidal flows over the operational life for any of CMA crossings (excluding Pukaki Creek bridges considered separately). This is even with the addition of the SUP south of SH20B and, the RTC and the SUP alongside SH20 at the far eastern end of Waokauri Creek.

Sea-level rise and coastal climate change:

- For the SH20 Tararata Creek crossing, particularly the northbound lane, it is assumed that the area to the west and south of Tararata Creek bridge is within the CSI layer in the AUP. If an adaptable design is problematic, then the effects may be considered as significant adverse.

5.3 A2B/20Connect (SH20B)

Construction effects on CMA:

- Only minor construction effects will arise in modifying the existing SH20B between Orrs Road and east towards the MMG in order to convert it to a local service road and upgrade culverts. Therefore, this effect will be minor on the more active seaward side of the tidal creek system at spring high tides in the three tributaries of the Waokauri Creek. Adverse effects are minor/moderate on the assumption that erosion/sediment control measures can minimise sediment runoff and seabed disturbances on the upper tide range environment.

Sea-level rise and coastal climate change:

- Sea-level rise and climate change aspects can be managed through the design of the new bridges and culverts across the Waokauri Creek crossings for the new carriageways south of the existing

SH20B. The present SH20B section traversing the three Waokauri Creek crossings will become a local service road with only minor works and culvert upgrades proposed on the northern side of SH20B. Therefore, the adverse effects are considered to be minor/moderate as the proposed works are minimal to the north of SH20B, where the direct tidal creek connections to the main estuary occur, provided the existing bridge and culvert sizes provide sufficient waterways for conveying the tidal flow for the higher SLR scenarios.

- Sea-level rise and storm-tide aspects will need to be considered in designing the levels of the SUP alongside Otaimako Creek, but again can be mitigated through the design.

In summary, design development needs to have regard to climate change and coastal processes and will require the with the input of a coastal engineer. The statutory approval process will also require an assessment of effects on coastal processes. As part of the Construction Management Plan, as bespoke Coastal Management Plan (CMP) for the CMA is likely to be required.

6 Stormwater

6.1 A2B (Botany to Puhinui Interchange)

Aurecon provided preliminary guidance on the potential impacts of stormwater in November 2018 for 20Connect and December 2018 for A2B. The following information is sourced from the Aurecon prepared technical note entitled 'Airport to Botany Short List Options: Multi-Criteria Analysis Scoring Sheet: Stormwater and water quality' (19th December 2018). The desktop analysis assessment was designed to contribute to the MCA assessment which was undertaken for the short list options. At the time of writing, this is the most recent stormwater assessment for the preferred option.

In summary, this preliminary technical review found that segments of the local road network do not currently receive stormwater treatment. There is likely to be existing treatment of stormwater elsewhere within the Puhinui catchment which could be used to treat the additional volume of stormwater that would be generated by the Project. The requirement for additional areas of impervious surfaces will increase the quantity of stormwater runoff.

Stormwater treatment

- There is limited space near sag points to provide centralised devices (such as wetlands) and longitudinal devices (such as swales)
- Within the Manukau Town Centre, there are limited opportunities to provide stormwater management devices given the highly constrained environment. There is also existing downstream flooding near Puhinui Creek.
- There are specific water quality requirements applicable to development of new or redevelopment of existing impervious surface area for high use roads (more than 5,000 vehicles per day) where the existing road corridor is constrained off-setting within the same catchment may form part of the mitigation approach:
- There shall be treatment of the new road area and any existing road area directed to same point by a water quality device designed in accordance with GD01/ TP 10 for the relevant contaminants; or
- An equivalent area of high use road within same catchment shall be treated by a water quality device designed in accordance with GD01/TP 10 for the relevant contaminants;
- In addition, there is likely to be a minor to moderate adverse effect on water quality due to limited opportunities to provide centralised devices. A combination of proprietary devices, tree pits, rain gardens and road side swales could be used to provide treatment along the alignment.

Stormwater Management Area Flow (SMAF) and Quantity

- Retention is subject to site-geology and groundwater, as there is limited opportunity to re-use stormwater onsite
- West of Great South Road, the project area is located within SMAF (Flow 1) and there are limited opportunities within the highly built up urban environment to provide stormwater treatment and management devices for the additional hardstand surface areas proposed.
- Relevant to this section of A2B is the network discharge consent (DIS60069613) [NDC] held by Auckland Council for the diversion and discharge consent for all the existing and future stormwater discharge from the public network.
- This covers the Auckland region-wide network and was granted (subject to conditions) by consent order 30 October 2019. If the proposed development can comply with the NDC requirements, then this will remove the requirement to obtain a separate private discharge consent.
- General performance requirements are that there shall be:
 - No new/additional habitable floor affected by flooding in 1% AEP event and no increase in frequency of existing flooding;
 - No significant increase in risk to the operation and structural integrity of other infrastructure in 1% AEP event;
 - No increase in inundation that affects a building on a property in 10% AEP; and
 - No loss in overland flow path capacity, unless provided by other means.
- Where these requirements cannot be met, a Stormwater Management Plan (SMP) that includes supporting information to justify an alternative as the Best Practicable Option (BPO) is required.
- The stormwater design will need to ensure Auckland Council's ongoing ability to comply with this NDC.

Flooding

- There is very limited space along Ronwood Avenue to provide any peak flow attenuation which may result in the increased flooding of the immediate downstream receiving environment. This is considered to be an unmitigable adverse effect.
- Lastly there are specific flooding requirements relating to the 10% AEP event that apply. For Projects with areas of 5,000m² or more of new impervious area they are to:
 - Ensure that there is sufficient capacity within the pipe network downstream of the connection point (at maximum probable development of the contributing catchment) to cater for the additional stormwater runoff associated with the new impervious area in a 10% AEP event; or
 - Attenuate stormwater flows and volume such that there is no increase in peak flow in a 10% AEP event from the total road impervious area draining to the pipe network downstream of the connection point to that prior to the new impervious area; or
 - Demonstrate that flows in excess of the pipe capacity in a 10% AEP event downstream of the connection point will not increase flooding of any other property and will not create a nuisance or hazard.

6.2 20Connect (SH20 and SH20A, excluding SH20B)

The stormwater considerations summary for both 20Connect and A2B/20Connect was sourced from the technical note '20 Connect Short List Options: Multi-Criteria Analysis Scoring Sheet: Stormwater', completed by Aurecon, 29th November 2018. The assessment contributed to the MCA assessment undertaken for the short-list options and was a desktop analysis only. At the time of writing, this is the most recent stormwater assessment for the preferred option.

It should be noted that the SH20 flyovers will be constructed over an existing pond at the Bader Drive Northbound onramp on SH20A. This will require reconstruction of the pond further north, and considerable re-routing of networks discharging within the pond.

Stormwater treatment

- SH20 and SH20A are classified as High Use Roads under the AUP as they carry more than 5000 vehicles per day. As required by E9.6.2.2 of the AUP, redevelopment of an existing High Use Road requires stormwater treatment.
- The SH20 and SH20A improvements will result in an increase in impervious area which in turn results in increased volumes of stormwater discharge. Stormwater treatment is to be provided for both existing and new High Use Road areas.
- This will require treatment to ensure adequate quality before reaching the receiving environment which is ultimately the CMA. There is currently little to no stormwater treatment in place and new treatment will be added to cater for new and existing impervious areas resulting in a net positive effect.

Stormwater Management Area Flow (SMAF) and Quantity

- SH20 is adjacent to a SMAF control area which will require additional consideration of flow rates and runoff volumes.
- Discharges are likely directed to the Transport Agency stormwater ponds within the network, subject to capacity.

Flooding

- There are several areas within the project that indicate flooding inundation during the 1%AEP rainfall event.
- The vast majority of flooding identified appears to be related to wider catchment issues, which are unlikely to be resolved through changes to cross culvert drainage infrastructure alone. In most instances, a catchment wide solution, working in collaboration with AC, Healthy Waters and the Transport Agency will be required to mitigate existing flooding issues.
- Upgrades are proposed to stormwater infrastructure near Rimu Road which is identified as a Flood Prone Area. Upgrades to outfall pipes running through to Te Puea Marae Reserve are anticipated to be challenging given the physical constraints of maintaining minimal fall between the highway and outfall location and the required consultation process with affected parties, such as the Iwi.
- In addition, there are two notable areas where outfalls are proposed that will discharge to flood prone areas. The first is at the downstream end of the proposed SH20/SH20A wetland and the second location is downstream of the Henwood and Geoffrey culverts.
- There are overland flow paths that run along Bader Drive and connect into a flood prone area. Additional RTC will increase impervious area and increase runoff within a possibly capacity constrained network.

- Retention prior to discharge is not expected to be a requirement, however this will require confirmation from AC in the future. Consultation will be required with AC and Mana Whenua.
- During construction, potential adverse effects resulting from mobilisation of sediment would require adequate consideration (best practice erosion and sediment control methodologies).

6.3 A2B/20Connect (SH20B)

Stormwater treatment

- The proposed option provides new lanes on SH20B where no treatment is currently provided. Therefore, with appropriate mitigation such as bioretention swales, there could potentially be an improvement to water quality for the existing SH20B and existing SH20.
- The Project is anticipated to result in an overall increase in the volume of stormwater runoff generated during rainfall events due to the increase in impervious area. Unmitigated, the increase in runoff volume has the potential to increase downstream peak discharges during flood events, causing stream erosion and increased flood water levels. Without treatment, this would also have an adverse effect on water quality within the receiving environments

Stormwater Management Area Flow (SMAF) and Quantity

- SH20B is also classified as a High Use Road under the AUP. The entire corridor is within the AUP SMAF (Flow 1) area, which includes catchments that discharge to sensitive or high value streams that have relatively low levels of existing impervious area and will require flow control prior to discharge.
- The corridor between the Puhinui Interchange to Manukau Memorial Gardens (MMG) intersection includes two watersheds, with a high point located approximately in line with MMG's eastern boundary line. Both watersheds result in discharge to SMAF areas, and therefore require attenuation and treatment prior to discharge. The first watershed results in discharge to existing stormwater reticulation east of SH20B and the second results in discharge to Waokauri Creek.
- Given the project area is located within the SMAF 1, it will require hydrology mitigation in the form of detention and retention. Retention is required to be provided for the 90th and 95th percentile rainfall events to manage the flow of stormwater discharge and to avoid deteriorating the downstream receiving environment.

Flooding

- It is noted that the Project has the potential to increase flood elevations where extensions and upgrades to existing culverts conveying the flow of stormwater are proposed. The proposed works should look to avoid placing fill within the existing identified overland flow paths or ensure that the overall drainage pattern is maintained.
- All proposed pipe outfalls should contain erosion protection measures designed in accordance with the recommendations of "HEC-14" and the "NZTA P46 8.1 Erosion protection" guidance requirements.

7 Conclusion

Based on the assessments available including those prepared for during the optioneering, in relation to the remaining discipline areas (Air Quality, Coastal, Contaminated Land, Social, Stormwater) a range of positive and adverse effects are likely to be experienced from the construction and operation of the Project.

Key effects are detailed below:

- The contaminated land review for A2B concluded that where the works remain within the existing road corridor, these are anticipated to be low risk and will largely avoid area of potential contamination. Any contaminated land issues encountered are anticipated to be business as usual with minimal risk. A DSI completed for SH20B Short Term Improvement Works found that environmental samples in the vicinity were generally within background ranges of trace elements in Auckland soils and that there was no detection of asbestos within the samples. Therefore, the types and concentrations of contaminants identified indicate that the risk to human health is negligible and to the environment is low.
- The primary social effects identified for the preferred A2B and 20Connect options are impacts on accessibility and community. Construction was likely to result in community and individual frustration; however, this could be managed through various management plans such as Traffic Management Plans and Stakeholder and Communication Plans. Overall, the social effects of the preferred option are likely to be temporary, and operational effects are considered more positive.
- Air quality effects are largely negligible. Although there are anticipated adverse effects from discharges to air and dust during construction, these can be managed through appropriate construction management measures. Based on the assumption that there will be an increase in different modal use from the provision of an SUP the and the electric RTN fleet, it is likely that air quality results will be positive.
- The A2B preferred option is not within the coastal environment, however sections of the 20Connect preferred option are within the CMA. Only minor construction effects will arise in modifying the existing SH20B between Orrs Road and east towards the MMG in order to convert it to a local service road and upgrade culverts, on the assumption that erosion and sediment control measures can minimise sediment runoff and seabed disturbances on the upper tide range environment.
- There are opportunities to improve the quality of stormwater discharges as there is currently limited opportunities within the highly built up urban environment to provide stormwater treatment and management devices

Overall, positive effects are likely to be experienced as a result of the increase in modal choice, efficiency and connectivity provided by the preferred option.

7.1 Management Plans

The following management plans have been recommended by the technical specialists:

- Preliminary Site Investigations and Detailed Site Investigations for contaminated land and soil
- Contaminated Site Management Plan
- Stakeholder and Communication Plans
- Social Impact Management Plan
- Construction Management Plans
- Coastal Management Plan Stormwater Management Plan
- Operation and Maintenance Stormwater Management Plan

Approvals:

	Author	Reviewer
Name		
Signature		
Designation	Consultant	Associate, Environment and Planning

Appendix G

Requiring Authority Status

Under s45 of the LGA the functions of Auckland Transport are stated to be (emphasis added):

The functions of Auckland Transport are to—

- (a) prepare the regional land transport plan for Auckland in accordance with the Land Transport Management Act 2003; and*
- (b) manage and control the Auckland transport system in accordance with this Act, including by—*
 - (i) performing the statutory functions and exercising the statutory powers set out in section 46 as if Auckland Transport were a local authority or other statutory body, as the case may be; and*
 - (ii) acting as a requiring authority under section 167 of the Resource Management Act 1991 in accordance with section 47; and ...*

Further s47 outlines (emphasis added):

(1) Auckland Transport is deemed to be approved as a requiring authority, as a network utility operator, under section 167 of the Resource Management Act 1991 for the following purposes:

- (a) constructing or operating or proposing to construct or operate roads in relation to the Auckland transport system; and*
- (b) the carrying out of an activity or a proposed activity (other than an activity described in paragraph (a)) in relation to the Auckland transport system for which it or the Auckland Council has financial responsibility.*

(2) For the purposes of subsection (1), Part 8 of the Resource Management Act 1991 applies—

- (a) with any necessary modifications (and despite the fact that an activity described in subsection (1)(b) is not a network utility operation within the meaning of section 166 of that Act); but*
- (b) subject to subsection (3) and section 48(3).*

(3) If section 180(1) of the Resource Management Act 1991 applies to a project or work that is an activity described in subsection (1)(b), Auckland Transport may exercise the power under that section only by transferring the relevant designation to—

- (a) a Minister of the Crown; or*
- (b) the New Zealand Transport Agency; or*
- (c) the New Zealand Railways Corporation; or*
- (d) the Auckland Council.*

(4) The New Zealand Transport Agency and the New Zealand Railways Corporation are prohibited from further transferring any designation that they receive under subsection (3).

(5) In subsection (2), activity has the same meaning as in section 5(1) of the Land Transport Management Act 2003.

(6) This section is subject to section 48.

Appendix H

Objective and Policy Considerations

Objective and Policy Considerations

The following provides a high-level summary of the relevant provisions in the following statutory policy statements and plans:

- New Zealand Coastal Policy Statement (NZCPS);
- National Policy Statement for Freshwater Management (NPSFM);
- National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES_{soil}); and
- Auckland Unitary Plan Operative in Part, 15 November 2016 (AUP).

New Zealand Coastal Policy Statement (NZCPS)

The NZCPS sets out the statutory framework for achieving the purpose of the RMA in relation to the coastal environment of New Zealand. The Project requires the crossing of and/or interaction with the CMA at the northern extent of the Project (20 Connect), near Mangere Bridge and Tararata Creek and works will be required within the CMA. In addition, the project will increase impervious surface area resulting in increased volumes of stormwater discharge. This will require treatment to ensure adequate quality before entering the CMA for 20 Connect and along SH20B

There is potential for reclamation and effects on the CMA on both sides of the existing road bridge and SEA-M2-23a east of the Walmsely Road off ramp as well as loss of coastal vegetation. Permits will be required relating to the construction, occupation and use of the CMA (A124 / A133: F2).

Relevant Objectives and Policies of the CMA are:

- There is no work proposed to be undertaken within the seabed. Additionally, the quality of stormwater discharges will be improved with pre- treatment via the proposed stormwater management devices. As such, it is considered that the Project will maintain, and to an extent enhance, water quality and it is not expected that the Project will result in any adverse effects on any natural biological or physical processes that are minor or more than minor (Objective 1 and Policy 1);
- Any adverse effects of the works crossing or interacting with the CMA will be mitigated by the appropriate provision of erosion and sediment controls to avoid adverse effects on natural character (Objective 2 and Policy 13);
- Mana Whenua have been and should continue to be consulted with to ensure that the Project recognises the ongoing and enduring relationship of tangata whenua over their lands, rohe and resources (Objective 3 and Policy 2). Additionally, the Project corridor has been assessed by the Project archaeologist in regard to historic heritage identification and protection (Policy 17);
- The proposed works are considered to have a functional need to be located in proximity to and within the CMA (Policy 6 (2)(c));
- Objective 6 recognises that the protection of values of the coastal environment does not preclude use and development in appropriate places and forms. Further, the Project is considered in accordance with Policy 6 of the NZCPS given it is for the provision of infrastructure, promotes the efficient use of occupied space by being located adjacent to the existing transport infrastructure located within and adjacent to the CMA;
- The Project will support recreation through the provision of walking and cycling access to and along the coast by providing a safe, dedicated SUP over the CMA which allows the public to use and enjoy views of this space (Objective 4 and Policy 18 and Policy 19); and
- Anticipated effects from the construction of the works should be appropriately managed and mitigated as far as practicable through the implementation of erosion and sediment controls to limit sedimentation. Stormwater discharges are proposed to be treated to ensure a high level of TSS removal. Therefore, once operational,

long-term turbidity issues or surface water contaminant runoff effects on the CMA are anticipated to be negligible (Policy 22, Policy 23).

- Policy 15 requires the avoidance of significant adverse effects and the avoidance, remediation or mitigation of activities. As described above, the co-location of the structure adjacent existing infrastructure will help mitigate as far as practicable other adverse effects of the Project in relation to the natural character and landscape.

New Zealand Policy for Freshwater Management

The National Policy Statement for Freshwater Management (NPSFM) directs regional councils, in consultation with their communities, to set objectives for the state of fresh water bodies in their regions and to set limits on resource use to meet these objectives.

The NPSFM contains the following relevant objectives:

- Objective A1 relates to water quality and seeks to safeguard life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems as well as the health of people and their communities in sustainably managing the use and development of land, and the discharge of contaminants.
- Objective A2 relates to the quality of freshwater and seeks to protect the significant values of freshwater bodies and wetlands and improve the quality of fresh water bodies that have been degraded by human activities.
- Objective C1 relates to integrated management and seeks to improve integrated management of fresh water and the use and development of land in whole catchments, including the interactions between fresh water, land, associated ecosystems and the coastal environment.
- Objective D relates to tangata whenua roles and interests and seeks to provide for the involvement of iwi to ensure that tangata whenua values and interests are identified and reflected in the management of freshwater.

The Project involves discharge to freshwater environments and to land where it may enter freshwater environments. The proposed stormwater management approach for the Project is consistent with the purpose of the Freshwater NPS objectives and policies for the following reasons:

- The Project will look to improve the overall quality of freshwater through improved stormwater treatment which is in accordance with AC's GD01 document. This provides treatment that currently does not exist. (Objective A1 and A2).
- Appropriate erosion and sediment controls will be implemented during construction in accordance with AC's GD05.
- The integrated management of freshwater and the use of land and development should be considered in the proposed stormwater design for the Project (Objective C1).
- Engagement with Mana Whenua regarding the stormwater design should be undertaken and their feedback incorporated into the finalised design approach for stormwater management (Objective D1).

For the reasons above it is anticipated that the Project will be consistent with the objectives of the Freshwater NPS.

Auckland Unitary Plan – RPS Relevant Objectives and Policies

The Auckland Regional Policy Statement (RPS) is contained in Chapter B of the AUP and contains nine issues of regional significance for resource management in Auckland. The following provides a high-level summary of relevant objectives and policies under the Regional Policy Statement (RSP) in the AUP.

Infrastructure, Transport and Energy

- Objective B3.2.1 relates to achieving infrastructure which is resilient, efficient and effective to provide for economic growth and development whilst protecting the natural environment and ensuring the health, safety and wellbeing of the general public.
- Policies B3.2.2 relate to providing the efficient development and functionality of infrastructure; avoiding, remedying or mitigating adverse effects from the development of infrastructure on the environment, culture,

heritage and special character; and where infrastructure is required to be built in areas subject to natural hazards they are designed to mitigate that risk and where possible avoid it.

- Objective B3.3.1 relates to providing transport that is safe, functional and efficient for people in Auckland.
- Policies B3.3.2 relate to enabling the development of effective and safe transportation systems both now and into the future to help promote a more integrated system.

The SWG project aims to develop a transportation system that is integrated, functional, efficient and resilient for users and is considered to be in general accordance with the Infrastructure, transport and energy objectives and policies of the AUP.

Mana Whenua

- Objective B6.2.1 relates to recognising and providing for the principles of the Treaty of Waitangi, particularly the sustainable management of natural and physical resources and relationships with Mana Whenua.
- Policies B6.2.2 relate to the implementation of those Treaty Principles and the establishment of meaningful partnerships and relationships with Mana Whenua.
- Objectives B6.1.3 relate to the recognition of Mana Whenua values being incorporated into decision making and resource management and those values hold sufficient weight.
- Policies B6.3.2 relate to the identification, integration and implementation in resource management related aspects.
- Objectives B6.4.1 relate to supporting Māori economic, social and cultural wellbeing as well as recognising Mana Whenua occupy, develop and use their land within their ancestral rohe.
- Policies B6.4.2 relate to providing for Māori customary and commercial activities to support Māori economic, social and cultural wellbeing; to incorporate mātauranga and tikanga Māori into design and development; and to enable and Māori and Mana Whenua to develop and use their lands.
- Objectives B6.5.1 relate to the protection of Mana Whenua cultural heritage.
- Policies B6.5.2 relate to the identification and evaluation of cultural heritage values for places or areas that are associated with Mana Whenua; involving Mana Whenua in the decisions/planning relating to cultural heritage sites and; protecting cultural heritage sites through avoidance, remediation or mitigation.

The project has involved and will continue to involve Mana Whenua to appropriately address policies under B6 of the Auckland Regional Policy Statement. The Southern Table hui will involve ongoing engagement through the detailed design of the project. This will particularly focus on the incorporation of cultural identity into the network design, potential effects on taonga and the restoration of mauri to the affected area to achieve positive outcomes for Mana Whenua.

Natural Resources

- Objectives B7.2.1 relate to protecting indigenous biodiversity from the adverse effects of use and development.
- Policies B7.2.2 relate to the identification and evaluation of areas of indigenous biodiversity vegetation and habitats.
- Objectives B7.3.2 relate to the protection and enhancement of freshwater systems.
- Policies B7.3.2 relate to the integrated management of land use and freshwater systems as well as managing the freshwater systems in a way that protects and/or enhances them.
- Objectives B7.4.1 relate to protecting freshwater, coastal water and geothermal water and recognising and providing for Mana Whenua values, maturanga and tikanga that are associated with these different water types.
- Policies B7.4.2 relate to integrated management of the different types of water (i.e. wastewater and stormwater) and its infrastructure; giving effect to the National Policy Statement for Freshwater Management 2014; the effective management of water quality and quantity, sediment runoff, stormwater, wastewater and the allocation and use of freshwater and geothermal water.

- Objectives 7.5.1 relate to the effective management of the discharge to air from use and development.
- Policies 7.5.2 relate to the management of discharges to air through avoidance, control and mitigation to protect sensitive activities and flora and fauna whilst enabling certain activities which discharge contaminants to air in certain areas.

The Project involves development that will occur in significant ecological areas and this is particularly relevant to 20 Connect and SH20B. Appropriate measures will be required to be put in place to ensure that adverse effects will be avoided, remedied or mitigated.

Coastal Environment

- Objectives B8.2.1 relate to the protection, preservation, restoration and where possible enhancement of the coastal environment and its open spaces and associated.
- Policies B8.2.2 relate to the identification and evaluation of areas with outstanding natural character or high natural character and manage both use and effect to preserve, protect or enhance the natural character in coastal environments.
- Objective B8.3.1 relate to subdivision, use and development occurring in an appropriate location in the coastal environment which account for the risks of coastal hazards and conflicting activities, use the natural and physical resources of the coastal environment efficiently and avoids remedies or mitigates any adverse effects on values of the coastal environment.
- Policies B8.3.2 of relevance to the Project relate to the management of the use and development in the coastal marine environment to ensure it is appropriate and avoids, remedies or mitigates any adverse effects.
- Objectives B8.4.1 relate to maintaining and enhancing public access to the coastal marine area except where it is appropriate to restrict access to ensure health, safety and security reasons.
- Policies B8.4.2 relevant to the proposal relate to the management of public access to and along the coastal marine area to ensure it is maintained, protected and where possible enhanced as a result of use or development. Account is also to be taken for the effects on climate change and coastal processes following a development.

Puhinui Precinct Plan (I432)

I432.2. Objectives (precinct-wide)

- (1) A range of business and airport related activities are provided for in the precinct to ensure the efficient use and development of the land resource, and recognition of the precinct's proximity to Auckland International Airport.
- (2) Mana Whenua cultural, spiritual and historical values and their relationship associated with the Māori cultural landscape, including ancestral lands, water, sites, waahi tapu, and other taonga, in the Puhinui Precinct are identified, recognised, protected, and enhanced.
- (3) Subdivision, use and development is managed in an integrated manner to avoid where practicable, or otherwise remedy or mitigate, adverse effects on the natural coastal environment, and significant ecological areas within the Manukau Harbour, as well as its tributaries.
- (4) Subdivision, use and development is managed to maintain or enhance water quality within the Puhinui freshwater catchment and receiving coastal environment, including the integration of Mana Whenua values, mauri, matauranga and tikanga associated with fresh water and coastal water resources.
- (5) Subdivision, use and development is designed and located to avoid, or otherwise remedy or mitigate, adverse effects on those landscape features identified as Outstanding Natural Features, and areas with high levels of sensitivity to landscape modification in the Māori cultural landscape, which contribute to the ecological, geological, cultural, spiritual and amenity values of the precinct.
- (6) The location, scale and form of development is managed within the precinct to avoid, remedy or mitigate adverse effects on cultural, spiritual and landscape values and their relationship associated with the Māori cultural landscape, while recognising the operational requirements of Auckland International Airport.

- (7) A southern gateway connection to Auckland International Airport is developed, that provides improved connectivity and accessibility for all transport modes, and recognises and provides for the cultural significance of the Puhinui Peninsula to Mana Whenua.
- (8) Subdivision and development of land is staged to ensure adequate transport infrastructure capacity is in place prior to land use development.
- (9) Subdivision and development establishes a transport network that provides for the safe and efficient movement of all travel modes.
- (10) The timing and sequencing of integrated development provides for the efficient and effective provision of all infrastructure including transport networks, stormwater, wastewater drainage networks, water, power, gas and telecommunication supply networks.
- (11) Subdivision and/or development within the precinct facilitates a transport network that:
 - (a) integrates with, and avoids adverse effects on the safety and efficiency of, the surrounding transport network, including any upgrades to the surrounding network; and
 - (b) facilitates transport choices by providing for pedestrians, cyclists, public transport facilities, and vehicles; and
 - (c) avoids where practicable, or otherwise remedies or mitigates adverse effects on the environment, including effects on Mana Whenua values.
- (12) Development demonstrates the integration of green networks (such as natural freshwater and coastal systems, and ecological corridors) with open space and pedestrian networks while providing for improved access and connectivity.

I432.3. Policies (precinct-wide)

- (1) Manage development to require that activities in the Puhinui Precinct are those primarily associated with manufacturing, warehousing, transport, storage and distribution activities consistent with a Business - Light Industry Zone and airport related activities.
- (2) Recognise, protect and enhance the cultural, spiritual and historical values and relationships associated with the Māori cultural landscape at Puhinui. These values include but are not limited to:
 - (a) Pūkaki Marae and its connections within the Māori cultural landscape
 - (b) important sites, places and areas, wāhi tapu and other taonga
 - (c) views and connections between existing or historical cultural sites, places and areas
 - (d) coastal edge and waterways
 - (e) fresh water quality
 - (f) Mauri, particularly in relation to freshwater and coastal resources
 - (g) historical physical connections through landscape including Portage routes
- (3) Address potential adverse effects from subdivision, use or development on identified Māori cultural landscape values by:
 - (a) avoiding urban development within the cultural landscape areas most sensitive to development (sub-precinct H);
 - (b) encouraging development to reflect the whakapapa, ancestral names, history and stories of the area in reference to and use of the names of the various sites, places, areas, waahi tapu and other taonga of special significance and

value to Mana Whenua;

(c) protecting the visual integrity of the local viewshaft from Pūkaki Marae to Matukutureia to maintain a visual linkage and connection with Ngā Matukurua;

(d) requiring buildings to be set back from the coastal edge and identified intermittent and permanent streams and encouraging native landscaping within these areas;

(e) implementing an integrated stormwater management approach across the Puhinui precinct and incorporating mātauranga Māori alongside engineering methods, including retention and enhancement of intermittent and permanent streams and natural floodplains to provide natural attenuation and applying the SMAF Overlay to all sub-catchments draining to streams in addition to quality treatment;

(f) encouraging landowners to provide and enhance access for Mana Whenua to coastal areas and waterways of significance to Mana Whenua, particularly access to scheduled sites or features for karakia, monitoring, customary purposes and ahikā roa;

(g) incorporating mātauranga Māori and tikanga Māori in subdivision, use and development; and

(h) locating and designing development to take into account and reflect the relationship of the site within the context of the Māori cultural landscape at Puhinui.

- (4) Require subdivision and development to be undertaken in a manner which protects and enhances the ecological, amenity and Mana Whenua values (including mauri) of the Pūkaki and Waokauri Creeks and identified permanent and intermittent streams within the Puhinui Precinct.
- (5) Provide for appropriate public access to coastal areas and waterways and key public open space networks and pedestrian linkages.
- (6) Require the provision of transport infrastructure prior to undertaking development or subdivision.
- (7) Require all development to provide information on transport infrastructure on a network wide basis.
- (8) Require subdivision and/or development within the precinct to provide for a transport network that:
 - (a) Does not compromise the safe and efficient movement of pedestrians, cyclists, public transport and vehicles; and is
 - (b) Designed and constructed in accordance with the requirements of any relevant code of practice or engineering standards.
- (9) Require integrated and coordinated development of a southern gateway connection to Auckland International Airport, which recognises its significance as a cultural heritage route, having regard to the following matters:
 - (a) appropriate location and design of development, infrastructure, and landscaping within and alongside Puhinui Road to support the gateway objectives, desired character and to provide visual amenity along this transport route;

(b) integration of elements which reflect the cultural significance of the Puhinui area to Mana Whenua;

(c) improvements in connectivity and accessibility to the gateway and the surrounding transport network in the precinct, for all modes of transport;

(d) other operational requirements of the Auckland International Airport, existing designation, and future transport infrastructure requirements; and

(e) the need to avoid, or otherwise remedy or mitigate any adverse impacts of infrastructure development, on Mana Whenua values, including the Mana Whenua Management precinct, and coastal margins which are receiving environments.

- (10) Recognise and provide connections to Puhinui Reserve, Colin Dale Park and the wider open space network in land use development while ensuring adverse effects on the transport network are avoided.
- (11) Avoid, remedy or mitigate any significant adverse effects of subdivision and development, including reverse sensitivity effects, on the operation of Auckland International Airport.

Objectives and Policies (Sub-precincts A & B)

Objectives

- (1) Open space and passive recreation activities are provided for in sub-precinct A, appropriate to the coastal environment it adjoins and the cultural significance of this location.
- (2) The efficient use and development of the land, operational facilities and airport related activities in Sub-precinct B, is enabled while achieving the other objectives of the Puhinui Precinct.
- (3) The cultural, spiritual and landscape values are reflected in the subdivision and development design of Sub-precincts A and B.
- (4) Development areas are of appropriate scale and design, considering the built layout, form and frontages visible from the Puhinui Gateway, Pukaki Marae, and public open spaces.

Policies

- (1) Enable the provision for open space and passive recreation activities appropriate to the coastal environment where Sub-precinct A adjoins and the cultural significance of this location.
- (2) Provide for activities related to the operation and development of the airport and business land within Sub-precinct B.
- (3) Avoid uses and development which would adversely affect airport operations or pose any risk to safety.
- (4) Encourage development of appropriate scale and design considering the built layout and form of buildings, car parking and access, and landscape elements visible from the Puhinui Gateway, Pukaki Marae, and public open spaces.

Objectives and Policies (Sub-precinct D)

Objectives

- (1) Development areas achieve high-quality design outcomes in scale and design of the built form and streetscape, including frontages visible from the Puhinui Gateway, and public open spaces.

Policies

- (1) Encourage development that achieves a high standard of amenity in the built layout and form of buildings, car parking, access and landscape elements in publicly visible and accessible areas.

Objectives and Policies (Sub-precinct E)

Objectives and policies for sub-precinct D apply to sub-precinct E, and in addition:

Objectives

- (1) Business activities that are ancillary to the Business - Light Industry Zone promote the efficient use and development of the land in the precinct for land use extensive activities.
- (2) Land use activities provide for the convenience shopping and service needs of businesses and employees in the precinct.

Policies

- (1) Limit land use activities in sub-precinct E to those activities required to provide the convenience shopping and service needs of businesses and employees in the precinct

Objectives and Policies (Sub-precinct F)

Objectives

- (1) The location, scale and form of development within sub-precinct F avoids, or otherwise remedies or mitigates, adverse effects on neighbouring residential zones.
- (2) Development is located and designed in a manner which reflects the relationship of sub-precinct F within the context of the Puhinui Māori cultural landscape and the Crater Hill Outstanding Natural Feature.
- (3) Open space and connections to the coastal environment are provided for in subprecinct F on the subdivision of land, appropriate to the coastal environment it adjoins.

Policies

- (1) Maintain the amenity values of neighbouring residential zones and the values of the Crater Hill Outstanding Natural Feature through appropriate location, scale and design of subdivision and development.
- (2) Enable the provision for open space and connections to the coastal environment that sub-precinct F adjoins upon the subdivision of land.

Objectives and Policies (Sub-precinct G) [rcp/dp]

Objective

- (1) Development is located and designed in a manner which reflects the relationship of sub-precinct G within the context of the Puhinui Māori cultural landscape and the Pukaki Crater Outstanding Natural Feature.

Policy

- (1) Enable development that recognises the values of the Pukaki Crater Outstanding Natural Feature through appropriate design and location.

Objectives and Policies (Sub-precinct H)

Objectives

- (1) The productive capability of the land and soil resource is maintained and protected from inappropriate subdivision and development, in such a way that they retain their productive potential.
- (2) The rural character is maintained.
- (3) Development provides for coastal setbacks, planting and landscaping which protect and enhance the ecological, amenity and Mana Whenua values (including mauri) of the Waokauri Creek and its coastal margins adjoining subprecinct H.
- (4) Development is located and designed in a manner which reflects the relationship of sub-precinct H within the context of the Puhinui Māori cultural landscape and the Pukaki Crater Outstanding Natural Feature.

Policies

- (1) Require buildings, structures and activities in sub-precinct H to not compromise the future productive potential of the land and soil resource.

- (2) Require development to be compatible with the prevailing low intensity and the small scale of building development in the sub-precinct.
- (3) Require coastal and riparian yard setbacks, planting and landscaping in subprecinct H.
- (4) Avoid development that adversely affects the values of the Pukaki Crater Outstanding Natural Feature and Māori cultural landscape.

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