



PAPAKURA TO BOMBAY STAGE 2

ASSESSMENT OF ARBORICULTURAL EFFECTS

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If you have further queries, call our contact centre on 0800 699 000 or write to us:

NZ Transport Agency
Private Bag 6995
Wellington 6141

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Rev No	Date	Description	Author	Reviewer	Verifier	Approver
A	17/02/2024	Arboricultural Assessment	M.Paul	D.Ingoe		

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Abbreviations

Abbreviation	Term
AEE	Assessment of Effects on the Environment
AUPOP	Auckland Unitary Plan (Operative in Part 2016)
NoR	Notice of Requirement
NoR 1	Alteration to the SH1 Designation 6706
NoR 2	Alteration to the SH1 Designation 6700
NoR 3	Alteration to the SH1 Designation 6701
NoR 4	Shared User Path between Quarry Road and Bombay Interchange
NoR 5	Drury South Interchange Connections
NZTA	NZ Transport Agency Waka Kotahi
P2B project	SH1 Upgrades Project between Papakura to Bombay
PC	Plan Change
RMA	Resource Management Act 1991
SGA	Supporting Growth Alliance
SH1	State Highway 1 Motorway, the Southern Motorway
Southern IIG	Southern Iwi Integration Group
SUP	Shared Use Path

Glossary of Acronyms / Terms

Acronym/Term	Description
Auckland Council	Means the unitary authority that replaced eight councils in the Auckland Region as of 1 November 2010.
the Project	Stages 2 of the P2B project between Drury to Bombay
Project Area	Area of land that is within the proposed designation boundary.

Executive Summary

This Report has been prepared following site visits that were undertaken for the collection of suitable data to inform an Assessment of Arboricultural Effects of the Papakura to Bombay Stage 2 Project (the **Project**). The site visits and desktop review involved recording details of all Protected trees (as described further in this Report) within the Notices of Requirement (**NoRs**).

Protected trees were recorded singularly, or in groups where logical groupings could be made based on species, configuration and/or size. Sufficient information was gathered to allow an assessment of the existing environment and consideration of the future environment. Tree details are presented in table and in GIS mapping formats (contained in the Appendices of this Report).

The existing environment for the majority of the Project corridor is predominantly rural, with isolated portions of residential, future urban and business zoned land. Small areas of open space zoned land or historic heritage zoned areas are also present within the project areas. Tree cover associated with the existing rural/ semi-rural area typically include plantings of amenity trees adjoining road reserve, shelterbelts, informal plantings and riparian vegetation.

The future environment is likely to change over the next 10 – 15 years as intensification occurs along the corridor as a result of recent changes in national policy direction and changes to the Resource Management Act 1991 (**RMA**). This will likely result in a reduction of trees adjoining the corridor, on business and future residentially zoned land, which are not afforded any protection in the Auckland Unitary Plan: Operative in part (**AUP: OP**).

A summary of the trees or vegetation requiring removal for the Project is provided in the table in Appendix A of this report, with future discussion of the affected vegetation outlined in Sections 5 to 8 of this Report:

Summary of assessment of effects and recommendations

Effect	Assessment		Recommendation
	Pre-Mitigation	Post-Mitigation	
Construction			
Removal of trees to enable the Project	A total of thirty four (34) individual Notable trees are proposed for removal as part of the Project.		A verification assessment of the protected trees assessed as part of this report (Included in Appendix A) at the time of implementation is recommended to ensure the current conditions are still relevant. Any future tree removal, tree planting or mass planted vegetation should be added and/or assessed at that time, with this Report intended to provide a baseline survey. Given this, it is recommended that a TMP be prepared.
Effects on retained vegetation	Works are proposed within the protected root zones of retained vegetation at the edge of the corridor.		It is recommended that a TMP be prepared prior to construction to address future tree removals, plantings and growth of areas of vegetation beyond the scope of this Report.

Replacement of trees lost in order to construct the Project			<p>A detailed landscape plan with replacement planting is to be prepared as part of the Urban Landscape Design Management Plan (ULDMP) and detailed design. Specific conditions are recommended for the removal of Notable trees (NoR 4).</p> <p>It is recommended that arboricultural input be sought at the detailed design phase. The specific tree locations and/or tree species are to be reviewed and input provided in order to achieve the best outcome from a long term perspective.</p>
Operation			
Tree trimming or alteration		<p>Replacement trees may require maintenance to retain sight lines and the overhead and lateral clearances of general traffic lanes and the high quality walking and cycling facilities. This pruning can typically be undertaken under the permitted activity provisions within the relevant sections of the AUP, pertaining to the regular maintenance of public roading corridors.</p>	<p>New street trees or mass planted vegetation (trees specifically) are planted no closer to the future general traffic lanes than 1 m.</p>

1 INTRODUCTION

This Assessment of Arboricultural Effects Report (Report) has been prepared to inform the Assessment of Effects on the Environment (AEE) for five Notices of Requirement (NoR) being sought by New Zealand Transport Agency Waka Kotahi (referred herein as ‘NZTA’), under the Resource Management Act 1991 (RMA), for Stage 2 of the Papakura to Bombay Project (P2B project) or ‘the Project’.

1.1 Purpose and Scope of this Report

This Report considers the actual and potential effects associated with the construction and operation of the Project on the existing and likely future environment as it relates to the arboriculture effects and recommends measured that may be implemented to avoid remedy, and/or mitigate these effects.

This Report should be read alongside the AEE (**Appendix A**), which contains further details on the history and context of the Project. The AEE also contains a detailed description of works to be authorised within each of the five NoRs, and the typical construction methodologies that will be used to implement this work. These have been reviewed by the author of this Report and have been considered as part of this assessment of arboriculture effects. As such, they are not repeated here. Where a description of an activity is necessary to understand the potential effects, it has been included in this Report for clarity.

1.2 Report Structure

To provide a clear assessment of each NoR, this Report follows the structure set out in the AEE. That is, each notice has been separated out into its own section, and each section contains an assessment of the actual and potential effects for the specific NoR. Where appropriate, measures to avoid, remedy or mitigate effects are recommended.

Table 1-1 below describes the extent of each section, and where the description of effects can be found in this Report.

Table 1-1 Report structure

Sections	Section number
Description of the Project	2.0
Assessment Methodology	3.0
Statutory Context	4.0
Overall Stage 2 NoR	5.0
NoR 1-3 Alteration to SH1 Designation and NoR Shared User Path	6.0
NoR 5 Drury South Interchange Connections	7.0
Overall conclusion of the level of potential adverse arboriculture effects of the Stage 2 P2B project.	8.0

2 PROJECT DESCRIPTION

2.1 Papakura to Bombay Project

The P2B project is a NZTA led project to improve the transport capacity and functionality of the State Highway network and provide for long term growth in the South of Auckland. An indicative location plan of the P2B project area is illustrated in Figure 2-1.

Further discussion of the different stages of the P2B project is contained in the AEE (**Appendix A**) and Design Construction Report (**Appendix C**), which support this application.

For clarity and by way of summary we note that:

- The previous stages of the P2B project, were approved under the Covid 19 Recovery (Fast Track Consenting) Act 2020 (FTA), as part of the Papakura to Drury South project (P2DS), this includes: Stage 1B1 and Stage 1B2; and,
- Stage 1B1 of the P2DS, was approved by the Expert Consenting Panel (EPA) in November 2022, Stage 1B2 was approved by the EPA in July 2023, both applications altered the existing SH1 Designation 6706 (Takanini to Drury Interchange), which is the subject of NoR 1.

2.2 Stage 2

NZTA is seeking five NoRs for Stage 2 of the P2B project, which are summarised in Table 2-1 (below).

For clarity and by way of summary we note that:

- The Project area, which was formally known as Stages 2 and 3 under the P2B project, is now to be referred to as a single stage for route protection only, this is referred herein as 'Stage 2' or 'the Project';
- Stage 2 incorporates the remaining portion of the P2B project area south of Quarry Road to the existing Bombay/Mill Road Interchange; and,
- Stage 2 will protect land required for the future upgrades of the SH1 corridor.

NZTA is seeking to protect adequate land to authorise the following planned works:

- New interchange constructed at Drury South (one additional lane in both direction of the proposed interchange);
- Upgrades to existing Bombay Interchange (one additional lane in both directions);
- Upgrades to Ramarama Interchange;
- Continuation of a Shared User Path (SUP) from Quarry Road to Bombay Interchange; and,
- Stormwater management devices.

2.3 Statutory context

This assessment has been prepared to support the AEE and NoR process. If confirmed, the designations will authorise the District Plan land use components of the Project. Accordingly, when assessing the actual or potential effects on the environment of allowing the requirement in terms of Section 171 of the RMA, this assessment has been limited to matters that would trigger a District Plan consent requirement.

SH1 Papakura to Bombay project

October 2023

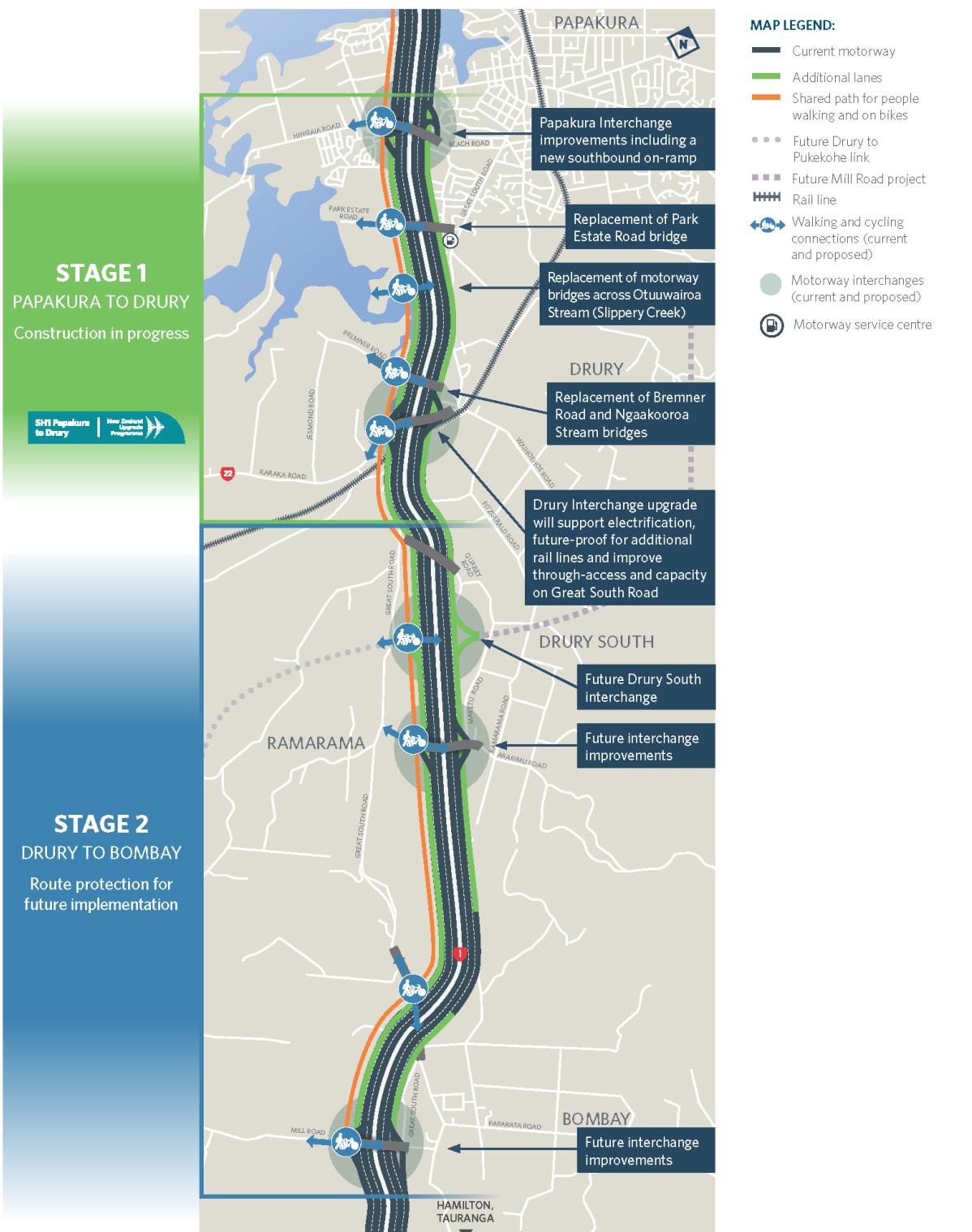


Figure 2-1: Indicative location plan showing Stage 2 of the NZTA P2B project

Table 2-1: Stage 2 P2B project Notice Package Summary

Notice	Requiring Authority	Project	Purpose	Extent	Lapse Period
NoR 1	NZTA	Alteration to SH1 Designation 6706	Motorway between Takanini and Hamilton	SH1 CH 15160 to CH 15500 State Highway 1 from north of Takanini Interchange to south of Quarry Road, Drury	Given effect (i.e. no lapse date)
NoR 2		Alteration to SH1 Designation 6700	Motorway	SH1 CH 15500 to CH 22740 State Highway 1 from south of Quarry Road, Drury to Bombay Road, Bombay	
NoR 3		Alteration to SH1 Designation 6701	Motorway	SH1 CH 22740 to CH 24600 State Highway 1 from Bombay Road to Mill Road, Bombay	
NoR 4		Shared User Path	Designation for the construction, operation and maintenance of a shared path and associated infrastructure.	SH1 CH 15160 to CH 24580 State Highway 1 from Quarry Road, Drury to Bombay Interchange/Mill Road.	20 years
NoR 5		Drury South Interchange Connections	Designation for the construction, operation and maintenance of a new link road and associated infrastructure.	CH 300 to CH 1750 Adjacent State Highway 1 at Drury South Interchange, linking to Quarry Road to the east, and Great South Road to the west.	20 years

3 ASSESSMENT METHODOLOGY

3.1 Preparation of this Report

This Report has been prepared in accordance with the typical arboricultural assessment process of large-scale infrastructure projects.

We have also drawn on experience gained through providing specialist arboricultural input and reporting as part of other recent NoR Projects on behalf of NZTA and AT.

3.2 Methodology

The Arboricultural Assessment methodology involved recording details of protected trees that may be impacted by the construction and operation of the Project within the proposed designations. Trees in this instance will be any woody plant that is 4 m or greater in height, or that may reach this dimension in the future. In particular, trees that are protected by the AUP: OP, under the District Plan provisions were recorded (e.g. if scheduled (i.e. a Notable Tree), within the road reserve, open space zone or located in an AUP: OP overlay).

The protection status of trees was recorded, based on the current District Plan rules that apply to the tree/s growing location. Those trees protected through District Plan provisions are discussed in this Report in terms of an assessment of effects and potential mitigation measures to address these effects. Those trees protected through Regional Plan provisions are included in this report for completeness only. Any regional consent requirements in relation to removal or works proximate to trees covered by the Regional Plan provisions will be assessed through a future resource consent process.

Specifically, this assessment was undertaken using the following methodology:

- An overview Project Team workshop. This workshop defined the proposed corridor and detailed the three NoRs to be assessed as part of the Project;
- A review of the project corridor. Additional information was requested from the Project Team, and this informed the initial survey works;
- A high-level desktop survey of all trees and vegetation affected by the Project corridor was undertaken. A high-level route and works footprint plan set were used to inform the initial survey in order to assess the presence of street trees, large areas of densely planted vegetation or significant individual trees (such as Notable Trees);
- The exact number of trees, areas of vegetation and Notable Trees affected by the proposed works were then refined. This information was then provided to the Project Team and a discussion was held with other discipline specialists including landscape architecture and ecology on potential mitigation;
- A site visit was undertaken to assess the Notable trees impacted by the works within the St Stephen's School grounds. A site visit was also undertaken to confirm the health and condition of those trees growing within the immediately vicinity of the Bishop Selwyn Carn. This site visit also included a site wide drive over to ensure no other protected trees stood within those areas that are subject to protection, such as Road Reserve beyond the existing designation boundaries or in residential areas where tree protection would normally apply. These areas would typically include Road Reserve or on adjacent land subject to a Significant Ecological Area (SEA) overlay.
- The initial tree and vegetation information has been used to inform the proposed tree and landscape mitigation assessment; and

- This arboricultural assessment has then been prepared to summarise the anticipated arboricultural effects on protected trees or vegetation. This Report provides a recommended mitigation strategy, assessment of arboricultural effects in terms of the AUP: OP provisions pertaining to trees and vegetation on roads and open space zoned land and general recommendations from an arboricultural perspective to inform the NoRs and supporting documentation.

For the purposes of this Report, vegetation standing on private property is not assessed in terms of effects unless it is subject to a specific overlay in the AUP: OP (such as SEA) and is impacted by the Project.

4 STATUTORY CONTEXT

4.1 Notice of Requirement – District Plan requirements

This assessment has been prepared to support the AEE and NoR process. If confirmed, the designations will authorise the District Plan land use components of the Project. Accordingly, when assessing the actual or potential effects on the environment of allowing the requirement in terms of Section 171 of the RMA, this assessment has been limited to matters that would trigger a District Plan consent requirement. Where regional consenting requirements are triggered, these will not be authorised by the designation, and will require further regional consents.

In order to demonstrate the split between Regional and District Plan matters, protected trees (under either the Regional or District provisions of the AUP: OP) have been listed in tables and plotted on site plans in the Appendices of this Report. The tables and site plans assist to identify the potential arboricultural effects of the construction of the Project, and whether these are Regional Plan, or District Plan matters under the AUP: OP.

4.2 Future regional resource consents

No regional resource consents are currently being sought for the Project. These will be sought at a later date, before construction commences, which is not expected to occur for 15-20 years. Although regional consents are not being sought at this time, arboricultural effects arising in respect of activities that require regional consents have been considered as part of this assessment to inform design, and the proposed designation footprint. While arboricultural effects in respect of regional consent matters have been considered for these limited purposes, a detailed assessment of Regional Plan matters is not proposed to be undertaken at this NoR phase.

4.3 Regional Plan and District Plan rules

The following tables set out the relevant rules that apply tree protection for the Project under the District Plan and the Regional Plan jurisdiction of the AUP: OP.

Table 4-1 AUP: OP Regional Plan and District Plan rules

AUP: OP jurisdiction	Reference	Rule	Where rule applies	Activity status
DP	E26.4.3 Activity Table	All activities (must) obtain the approval of the Tree Asset Manager	Trees in roads and on open space zones	Mandatory requirement
DP	E26.4.3.1 (A83)	Tree trimming or alteration	Trees in roads and on open space zones	Permitted Activity
DP	E26.4.3.1 (A84)	Tree trimming or alteration that does not comply with Standard E26.4.5.1 (Trees in streets and open space zones) or Standard E.26.4.5.3 (Notable Trees)	Trees in roads and on open space zones	Restricted Discretionary Activity
DP	E26.4.3.1 (A87)	Works within the protected root zone that comply with Standard E26.4.5.2	Trees in roads and on open space zones	Permitted Activity
DP	E26.4.3.1 (A88)	Works within the protected root zone not otherwise provided for	Trees in roads and on open space zones	Restricted Discretionary Activity
DP	E26.4.3.1 (A89)	Tree removal of Notable Trees	Notable Tree overlay	Discretionary

DP	E26.4.3.1 (A90)	Tree trimming, alteration or removal on roads adjoining rural zones and on roads adjoining the Future Urban Zone	Trees in roads	Permitted Activity
DP	E26.4.3.1 (A91)	Tree alteration or removal of any tree less than 4m in height and/or less than 400mm in girth	Trees in roads and on open space zones	Permitted Activity
DP	E26.4.3.1 (A92)	Tree alteration or removal of any tree greater than 4m in height and/or greater than 400mm in girth (See note 2)	Trees in roads and on open space zones	Restricted Discretionary Activity
DP	E26.4.3.1 (A93)	Tree trimming, alteration or removal not otherwise provided for	Trees in roads and on open space zones	Discretionary Activity
DP	E26.4.3.1	Where land is zoned 'Strategic Transport Corridor', trees are not subject to protection as this land is 'zoned'. An exception would occur when trees are protected under rules pertaining an AUP rule on adjacent land (such as Open Space zoned land)	Trees in roads	Permitted Activity

Note 1:

Standard E26.5.3.2 Vegetation alteration or removal states:

- (1) *Must not include trees over 6 m in height, or 600 mm in girth unless their removal is otherwise permitted by a rule in this Plan.*
- (2) *Must not result in the removal of more than 20 m² of vegetation within a significant ecological area, except within the formation width of the road.*
- (3) *Must not result in the removal of more than 50 m² of vegetation within a coastal area or riparian area not identified as a significant ecological area.*
- (5) *Must not result in the removal of more than 500 m² of vegetation within the legal road or the formation width of the road in a rural zone.*
- (6) *Must not result in the removal of more than 250 m² of vegetation outside the legal road or the formation width of the road in a rural zone.*

4.4 Existing and Future Zoning Considerations

The projects encompassing the Stage 2 package will be constructed 15-20 years from now. The implementation timeframe for each project will vary and correspond with future land demands within the area, as determined by NZTA. Assessing the effects on the environment solely as it exists today (i.e., at the time of assessment) will not provide an accurate reflection of the environment in which some of the effects will be experienced. Accordingly, the assessment of effects considers both the existing environment, and the likely receiving environment in which the effects will likely occur.

5 ASSESSMENT OF ARBORICULTURAL EFFECTS ACROSS ALL PROJECT NORS

The Stage 2 NoR package will be constructed and will operate alongside existing urban environments or planned future environments (i.e. what can be built under the existing Auckland Unitary Plan: Operative in Part (AUP: OP)).

This section assesses common or general arboricultural matters across the overall Project. This section also recommends measures to avoid, remedy, or mitigate actual or potential adverse effects for the overall network.

5.1 Positive Arboricultural Effects

Positive arboricultural effects will occur within the proposed NoR areas (with the exception of NoR 4) when considering the existing land use. Most tree planting within the existing grass berms and residual land is largely ‘ad hoc’, with no formal plantings on State Highway 1 between the Drury Interchange and Quarry Road.

From Quarry Road southwards to the Bombay Interchange, most vegetation within the existing NZTA designation is self-seeded (including regenerating Manuka & Totara between Chainage 21160 & 21840 (eastern and western sides)) or consists of non-uniform plantings, with the exception being a number of English Oak (*Quercus robur*) trees planted between Ramarama and the Great South Road overbridge (Chainage 21160-21840 (eastern side)). Based on their form and structure, these particular Oak trees appear to be of the same lineage as those planted near to the existing Drury Interchange, on existing Strategic Corridor zoned land.

The future construction of the altered traffic lanes and associated shared path will enable replacement planting on NZTA land, across the entire project. It is recommended that available land not required for operational reasons be revegetated. Provided areas currently grassed are revegetated in accordance with best practice, the loss of vegetation within the existing SH1 designation can be adequately mitigated.

In the case of protected vegetation within the proposed NoR boundaries, beyond the existing SH1 designation, specific mitigation is recommended. This relates to the proposed removals of Notable trees within NoR 4 and is discussed in further detail in Sections 6.3 & 6.4 of this report,

5.2 Assessment of construction effects

Specific construction effects are discussed in more detail for each NoR in the following sections.

5.3 Assessment of operational effects

Operational effects of the Project are largely limited to the maintenance of sight lines and the overhead and lateral clearances of general traffic lanes and the high-quality walking and cycling facilities. The required clearances will largely be limited to existing retained vegetation. Newly planted vegetation within proposed berm areas will only require management in the medium term.

5.4 Recommended measures to avoid, remedy or mitigate operational effects

It is recommended that any new public trees or mass planted vegetation (trees specifically) are planted no closer to the future general traffic lanes than 1 m to enable unrestricted future growth.

Once the Project has been constructed, no further effects on trees are anticipated. Ongoing maintenance of street trees and trees retained adjacent to the corridor is a standard operational requirement.

5.5 Summary and Conclusions

Table 5-1 Summary of Operational Effects and Recommendations – Overall Network

Effect	Assessment	Recommendation
Operational		
Tree trimming or alteration	New or replacement trees may require maintenance to retain sight lines and the overhead and lateral clearances of general traffic lanes and the high quality walking and cycling facilities	New street trees or mass planted vegetation (trees specifically) are planted no closer to the future general traffic lanes than 1 m. This is to be addressed in the ULDMP

6 ASSESSMENT OF ARBORICULTURAL EFFECTS NOR 1-3 ALTERATION TO SH1 DESIGNATIONS AND NOR 4 SHARED USER PATH

This section assesses the specific arboricultural matters relation to NoR 1-3: Alterations to the existing SH1 Designations 6706, 6700, and 67001, and NoR 4: Shared User Path Quarry Road to Bombay Interchange.

6.1 Specific Statutory Context

The Project Area comprises State Highway 1 south from the existing Drury Interchange to Bombay, with a new Shared User Path proposed from Quarry Road to the Bombay Interchange.

Vegetation, with the exception of Notable trees, Riparian or SEA vegetation, is not subject to protection within the existing Strategic Corridor zoned Road corridor.

As the assessment of effects on riparian and SEA vegetation is a regional planning matter, this assessment only discusses such impacts in general terms, with the expectation that such works will be subject to a future resource consent process.

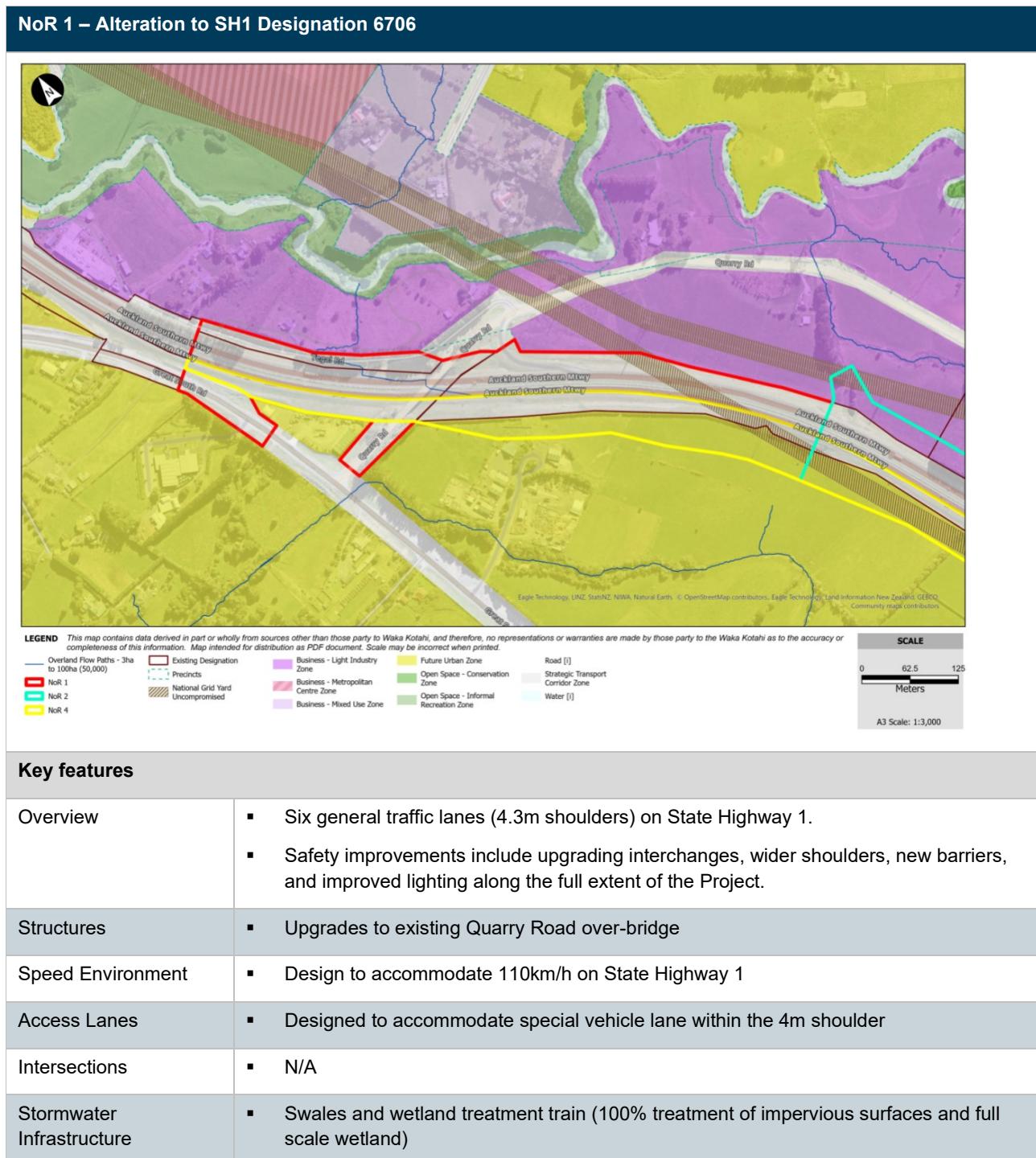
6.2 Overview and description of works

The following section provides a brief overview of the works proposed within the each of the Project NoRs.

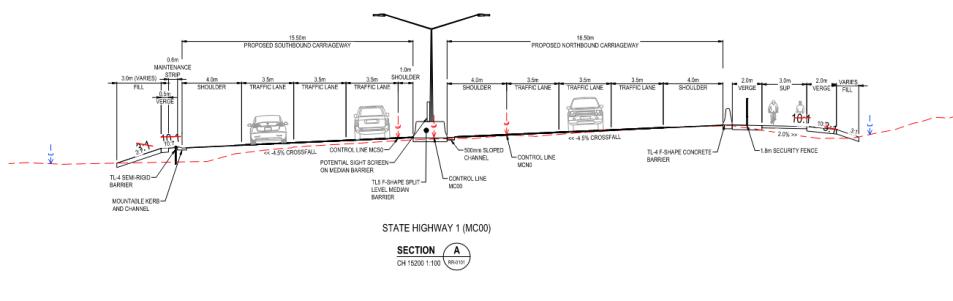
6.2.1 NoR 1 – Alteration to SH1 Designation 6706

As set out in Table 6-1 below, the proposed alterations to the existing SH1 Designation 6706 to provide widening of the existing SH1 corridor and accommodate the future upgrades to the SH1 network.

Table 6-1: Overview of alteration to SH1 Designation 6706



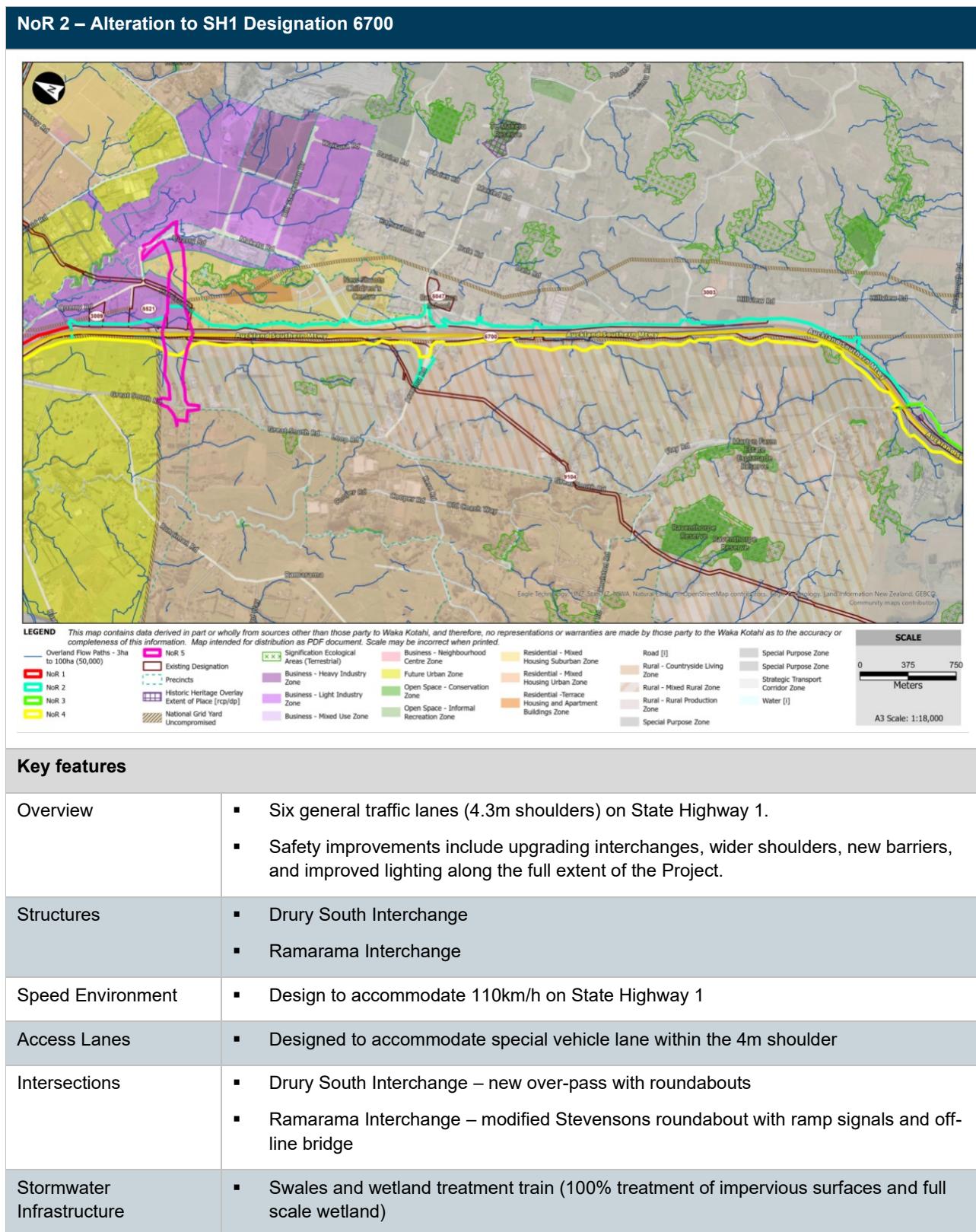
Typical cross sections



6.2.2 NoR 2 – Alteration to SH1 Designation 6700

As set out in Table 6-2 below, the proposed alterations to the existing SH1 Designation 6700 to provide widening of the existing SH1 corridor and accommodate the future upgrades to the SH1 network.

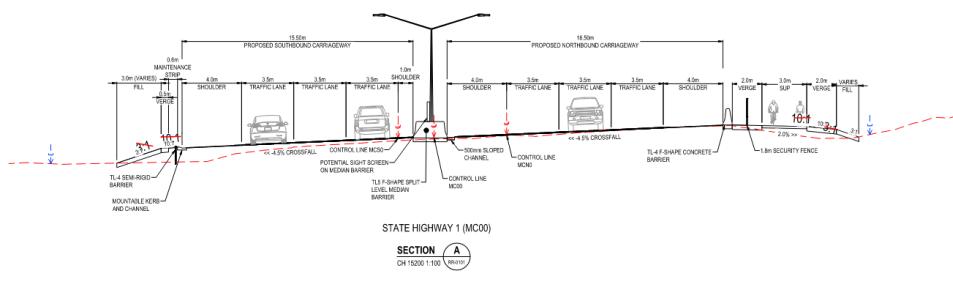
Table 6-2: Overview of alteration to SH1 Designation 6700



Key features

Overview	<ul style="list-style-type: none"> Six general traffic lanes (4.3m shoulders) on State Highway 1. Safety improvements include upgrading interchanges, wider shoulders, new barriers, and improved lighting along the full extent of the Project.
Structures	<ul style="list-style-type: none"> Drury South Interchange Ramarama Interchange
Speed Environment	<ul style="list-style-type: none"> Design to accommodate 110km/h on State Highway 1
Access Lanes	<ul style="list-style-type: none"> Designed to accommodate special vehicle lane within the 4m shoulder
Intersections	<ul style="list-style-type: none"> Drury South Interchange – new over-pass with roundabouts Ramarama Interchange – modified Stevensons roundabout with ramp signals and off-line bridge
Stormwater Infrastructure	<ul style="list-style-type: none"> Swales and wetland treatment train (100% treatment of impervious surfaces and full scale wetland)

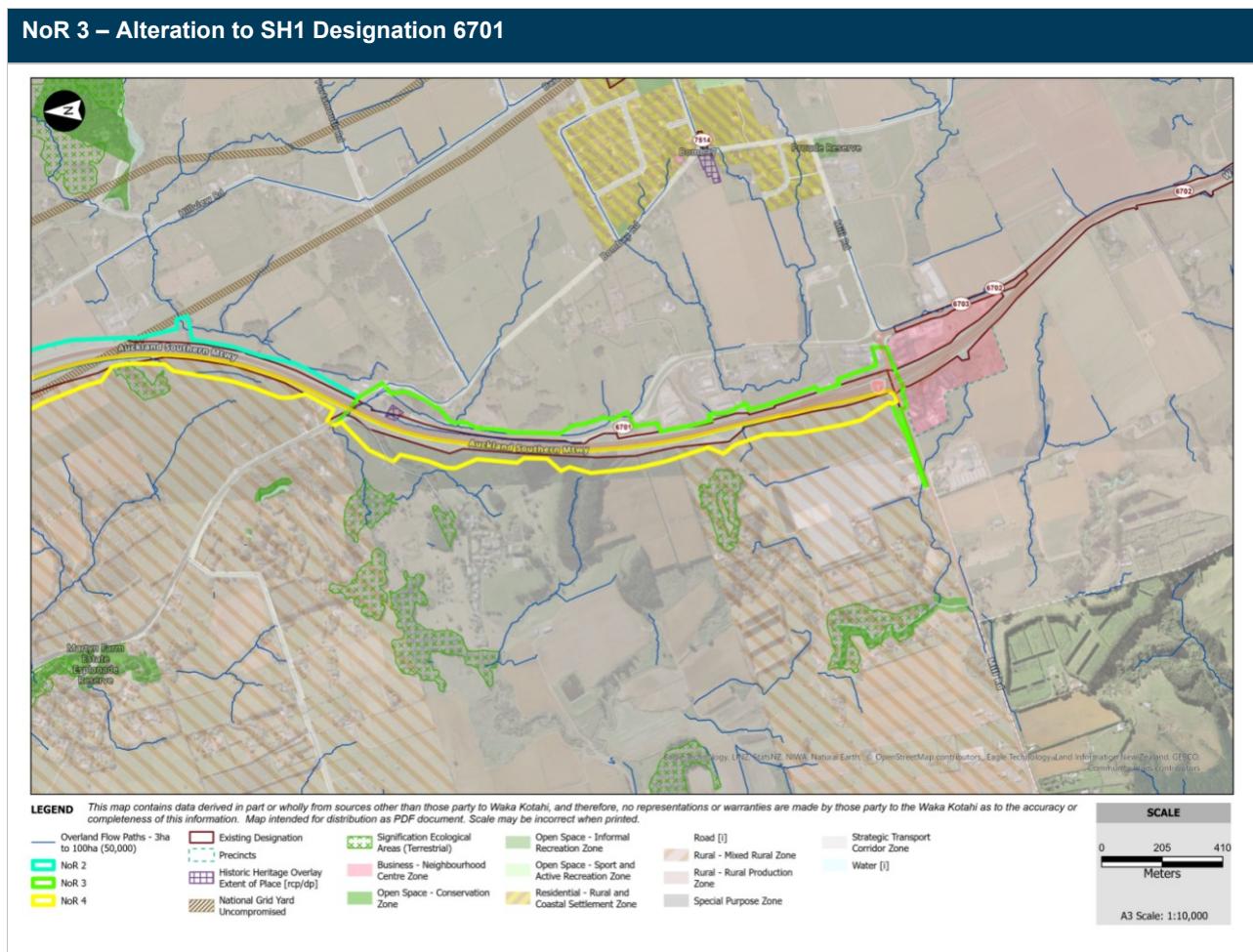
Typical cross sections



6.2.3 NoR 3 – Alteration to SH1 Designation 6701

As set out in Table 6-3 below, the proposed alterations to the existing SH1 Designation 6701 are to provide widening of the existing SH1 corridor and accommodate the future upgrades to the SH1 network.

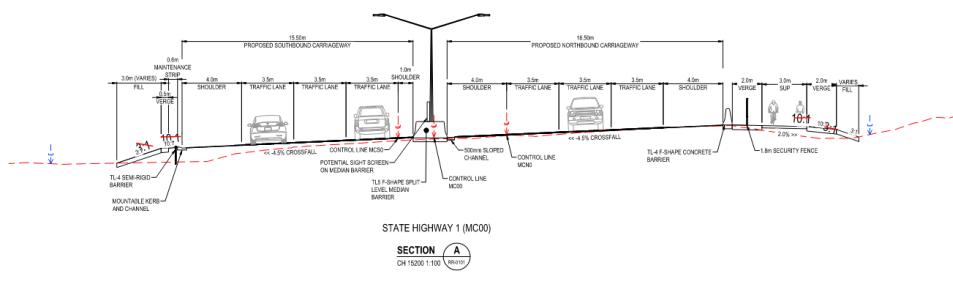
Table 6-3: overview of the alteration to SH1 Designation 6701



Key features

Overview	<ul style="list-style-type: none"> Six general traffic lanes (4.3m shoulders) on State Highway 1. Safety improvements include upgrading interchanges, wider shoulders, new barriers, and improved lighting along the full extent of the Project.
Structures	<ul style="list-style-type: none"> Upgrades to the existing Mill Road/Bombay Interchange Mill Road over-bridge and abutments SH1 Great South Road Bridge
Speed Environment	<ul style="list-style-type: none"> Design to accommodate 110km/h on State Highway 1
Access Lanes	<ul style="list-style-type: none"> Designed to accommodate special vehicle lane within the 4m shoulder
Intersections	<ul style="list-style-type: none"> Bombay Interchange – northbound signals Mill Road Bridge – altering both abutments to allow realignment of the road beneath Bombay Interchange
Stormwater Infrastructure	<ul style="list-style-type: none"> Swales and wetland treatment train (100% treatment of impervious surfaces and full-scale wetland)

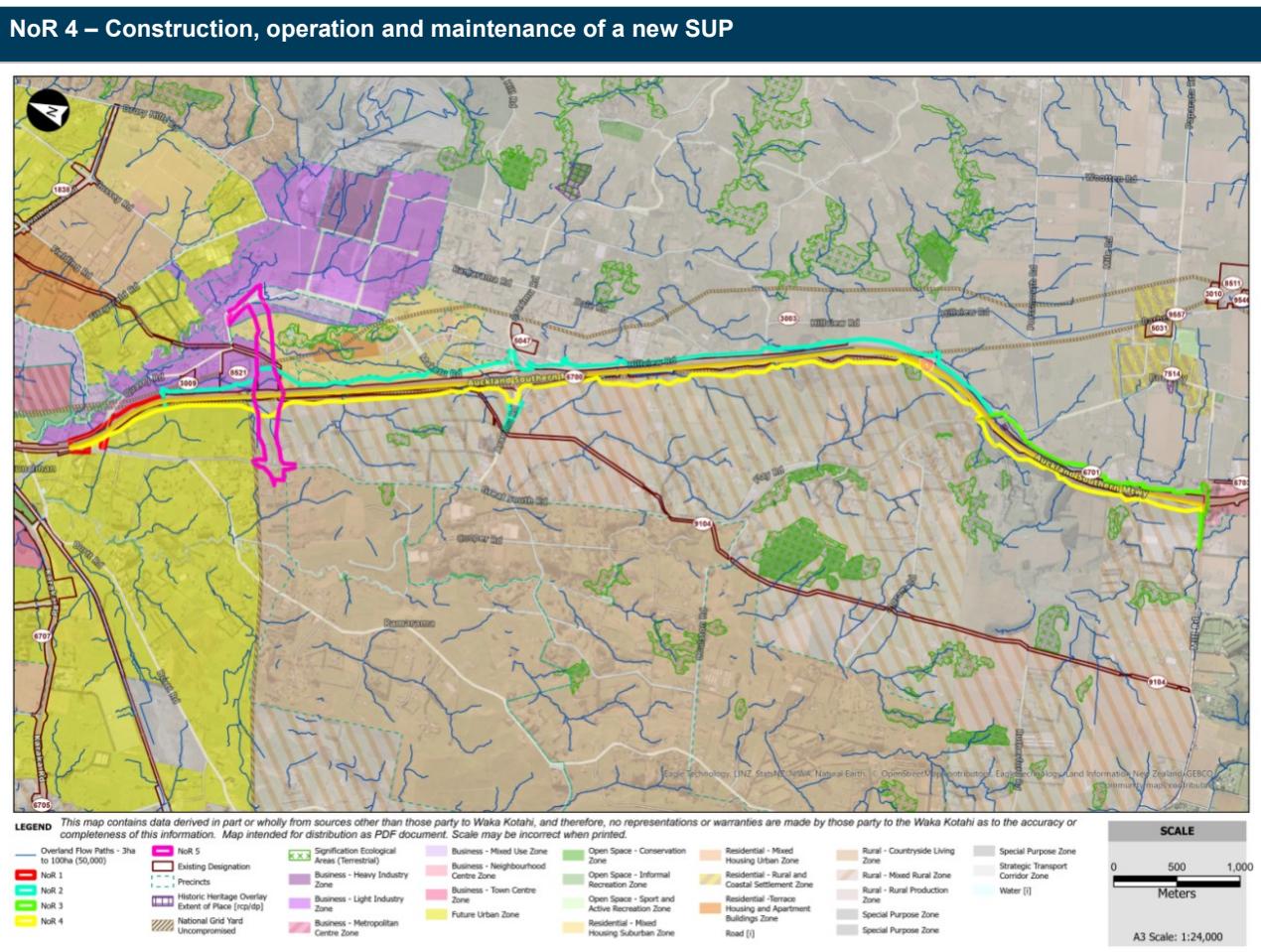
Typical cross sections



6.2.4 NoR 4 – Construction, Operation and Maintenance of a SUP

As set out in Table 6-4 below, the proposed designation to accommodate the construction, operation and maintenance of a new Shared User Path.

Table 6-4: Overview of the Shared User Path



Key features

Overview	<ul style="list-style-type: none"> Requires a new designation between 200m north of Quarry Road to the existing Mill Road/Bombay Interchanges, with some locations overlapping the existing SH1 Designations 6706, 6700 and 6701. 3.0m wide SUP continuing from 200m north Quarry Road to the existing Bombay/Mill Road Interchange. Located on the western side of the motorway.
Structures	<ul style="list-style-type: none"> Tie-ins to all new and upgraded motorway interchange (ie. Drury South, Ramarama and Bombay) New bridge at Great South Road
Speed Environment	<ul style="list-style-type: none"> N/A
Access Lanes	<ul style="list-style-type: none"> N/A
Intersections	<ul style="list-style-type: none"> Grade separated tie-in at all interchanges

Stormwater Infrastructure	<ul style="list-style-type: none"> ▪ Swales and wetland treatment train (100% treatment of impervious surfaces and full scale wetland)
Typical cross sections	

6.3 Existing environment

6.3.1 General Corridor

As touched on in Section 5.1, the existing environment within the bounds of the existing designation consists largely self-seeded specimens dominated by Manuka (*Leptospermum scoparium*), Totara (*Podocarpus totara*) and Taupata (*Coprosma repens*).

Formalised re-vegetation plantings are present on the northern and southern sides of the existing Ramarama off ramp, with this planting also dominated by Manuka and Taupata, with the occasional self-sewn Gum tree (*Eucalyptus sp.*).

South of the Ramarama offramp, vegetation is largely self-sewn or naturally occurring, with Totara, Manuka and Privet (*Ligustrum lucidum*) being the dominant species(Chainage 21160 & 21840 (eastern & western sides)).Adjacent to 61 Flay Road, formal plantings of English Oak (*Quercus robur*) are growing within the existing SH1 designation. These trees are semi-mature specimens, largely of good form and condition. (Chainage 21160-21840 (eastern side)).

6.3.2 Significant Ecological Area (1799B Great South Road)

An area of indigenous vegetation is growing within 1744B Great South Road, near the existing SH1 designated area (See Figure 6-1). This fenced area is in private ownership, and includes several large Eucalyptus and Monterey Pine (*Pinus radiata*) near the boundary of SH1, with the remaining vegetation largely consisting of mature Puriri (*Vitex lucens*), Kohekohe (*Dysoxylum spectabile*), Karaka (*Corynocarpus laevigatus*), Taraire (*Beilschmiedia tarairi*) and the occasional weed species tree including Privet and Hawthorn (*Crataegus monogyna*).



Figure 6-1 View of the SEA within 1799B Great South Road, as seen from SH1 (Google Maps Image)

6.3.3 Great South Road Overbridge (Northern side adjacent to and within 1832 Great South Road)

A row of Notable London Plane (*Platanus x acerifolia*) trees (AUP ID 2152) is growing immediately adjacent to the existing SH1 overbridges to the south of the main vehicle entrance that services 1832 Great South Road.

Schedule 10 of the AUP lists a Group of London Planes within the subject property. Further information has been sought from Auckland Council, with a map provided showing the location of the Notable trees. The extent is re-marked on the GIS image shown as Figure 6-2 and appended as Figure A3.

The row of Notable London Plane trees within 1832 Great South Road extends from Road Reserve southwards along the existing entranceway, with no clear delineation between those trees within the adjacent SH1 designation and those protected within the site. According to the relevant Auckland Council documents, the protected trees include all London Plane trees from the existing vehicle entrance within Road Reserve, along the entire entranceway to the southwest within the site (See Figures 6-3 to 6-5 below).

Based on onsite investigations, the more significant trees are further south within the site, with the smaller trees growing adjacent to the existing site entry roadway. When considering arboricultural values, the London Plane trees provide positive value from an ecosystem service perspective, with the larger trees having provided a larger function due to their current size. This function would be largely measured in terms of their positive contribution in terms of stormwater amelioration and open space shading. In terms of habitat creation, their attributes would be limited. As exotic deciduous trees they would typically provide lesser benefits for indigenous wildlife.

Positive amenity value is also provided via their form and function as an avenue, with the most visual presence provided by the younger trees fronting Great South Road.



Figure 6-2 Larger, more significant London Plane trees shown by black outline above, with smaller trees shown in red



Figure 6-3 Row of Notable London Plane trees seen from Great South Road looking south. The trees seen here are the smaller specimen planted following the construction of SH1 in approximately 1993



Figure 6-4 - Larger London Plane trees existing prior to the construction of SH1



Figure 2-5 Historic Photographs showing original London Plane trees prior to SH1 construction (Source: Retrolens.co.nz 20/03/1988)

6.3.4 Notable Trees on Great South Road to the southeast

Two groupings of Notable trees are growing to the southeast of SH1, directly adjacent to Great South Road. These groupings include two (2) Notable Norfolk Island Pine (*Araucaria heterophylla*) (AUP ID 2158 & 2695) and a grove of mature Puriri trees (AUP ID 2152).

These trees are associated with the Bishop Selwyn Cairn, with the Puriri trees the most significant trees in this location from Historic Heritage perspective.

One of the limbs of the northernmost tree within the grouping has recently collapsed and is resting on the ground, with regenerative growth visible on the newly exposed interior limbs, a typical trait of the species.

The Norfolk Island Pine trees are healthy specimens growing further to the north, closer to the nearby intersection with Bombay Road.

The area in which the trees are growing is currently used as a recreational park, with a parking and picnic area accessed via Great South Road.

The area in which the Puriri trees are growing is also subject to a Historic Heritage overlay, with the extent of place extending into the existing SH1 designation. The notable trees on Great South Road to the southeast can be seen through the Figures 6-6 to 6-8 below.



Figure 6-6 Notable Puriri tree group seen from Great South Road, looking northwest



Figure 6-7 & 6-8 Notable Norfolk Island Pine trees seen from Great South Road, looking northeast and extent of Historic Heritage overlay covering the Notable Puriri trees

6.4 Assessment of construction effects

In it is anticipated that all vegetation within the footprint of the proposed designation would require removal, unless otherwise discussed in this report.

In some instances, further detailed design may enable the retention of some trees. However, with the final extent of disturbance to be determined in the future, this assessment is to serve as a baseline assessment only.

6.4.1 Significant Ecological Area (1799B Great South Road) (Group 1)

While not subject to protection as a district plan matter, the proposed designation extent is discussed here to serve as an assessment of the vegetation at this point in time.

The proposed NoR designation has been altered so as to largely avoid impacts this area of vegetation,

It is critical that the extent of disturbance is minimised, with priority given to the more significant trees and vegetation further to the south. As discussed in Section 5.0, the outer vegetation is of lower value when considering the wider stand.

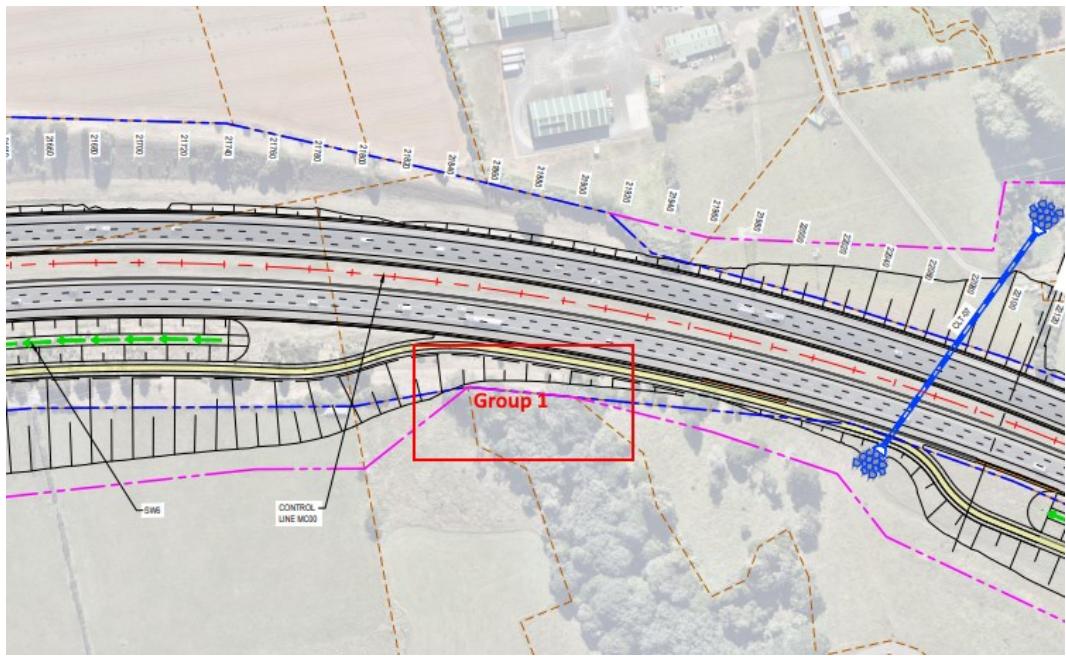


Figure 6-9 Extent of the proposed designation adjacent to Group 1

As shown by the plan above, some works may be required within the protected root zone of vegetation within Group 1. Such works can be appropriately managed by way of the TMP and will be subject to a future regional resource consent process.

6.4.2 Works affecting London Plane trees within 1832 Great South Road (Groups 2 & 3)

The proposed designation extent will include a new Shared Use path to be constructed on the northern side of SH1, adjacent to 1832 Great South Road.

The current design shows extensive battering to the north of the widened traffic lanes and associated shared path.

As currently proposed, it is anticipated that the row of London Plane trees currently growing directly adjacent to the northern side of SH1 on Road Reserve will require removal. The proposed removals will consist of approximately twenty-one (21) smaller Notable London Plane trees growing on either side of the entranceway (running east west), and at least thirteen (13) of the more significant, Notable, London Plane trees growing on either side of entranceway (six (6) on the southeast side and seven (7) on the northwest side also requiring removal. These removals would be required to construct the proposed SUP and the subsequent batter, with the re-alignment of the existing driveway also requiring tree removal.

Furthermore, the anticipated re-alignment of the St Stephen's School entranceway will require works within the protected root zones of at least eleven (11) of the remaining Notable London Plane trees.

6.4.2.3 Assessment of Group 2

As noted above, Group 2 consists of a row of 21 smaller London Plane trees growing on the northern and southern sides of the existing entrance to St Stephen's School (See Figure 6-10). These trees are much younger than the trees within Group 2, and range from 0.95 metres to 2.8 metres in girth, with average heights between approximately 6.0 metres and 14 metres. These trees are likely to have been planted after the motorway construction works in 1993 (putting their approximate age at no greater than 30 years).



Figure 6-10 Avenue of London Plane trees comprising Group 2 (21 trees)

6.4.2.4 Assessment of Group 3

As noted previously, Group 3 consists of a row of larger London Plane trees growing further to the southwest (See Figure 6-11). These trees are estimated to be at least 100 years old, with historical imagery dating back to 1942 showing the trees at a semi-mature size (Retrolens.co.nz 27.05.1942). These trees are in good health and condition and of typical form for the species, appearing to have been pruned historically. These trees range from 2.43 metres to 3.43 metres in girth. Further details are provided in Appendix A of this assessment showing the specific locations of each affected tree. The extent of notable trees for Group 2 & 3 is seen in Figures 6-12 and 6-13 below.



Figure 6-11 Image showing larger Notable London Plane trees growing on the northern side of the existing entranceway (proposed for removal for batter and re-aligned entry)

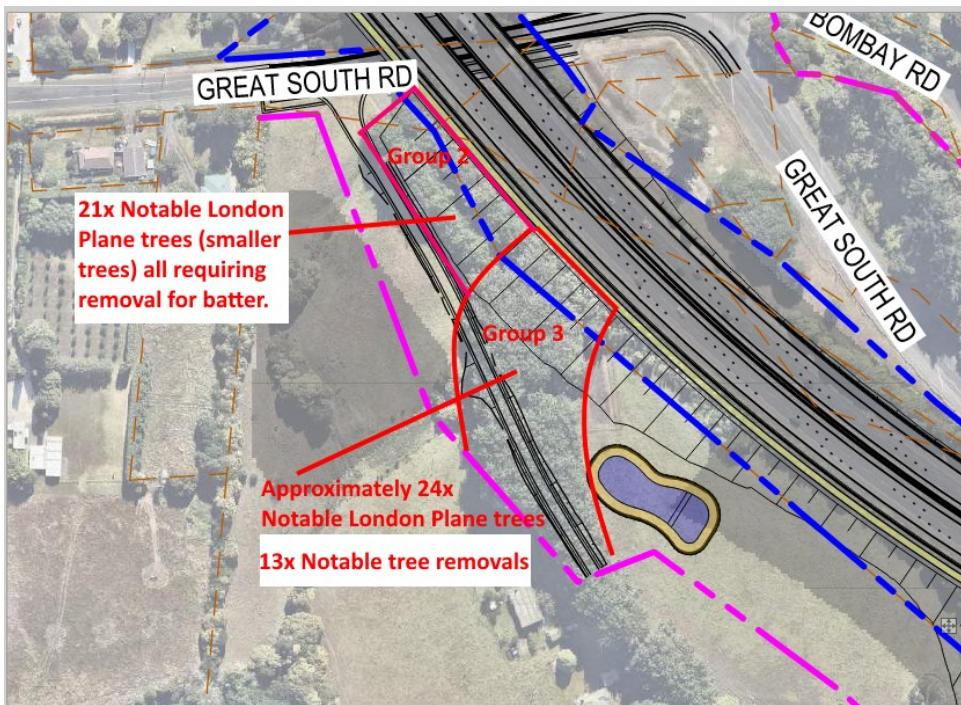


Figure 6-12 Extent of proposed works within the designation for lane alterations and the formation of the Shared Use Path

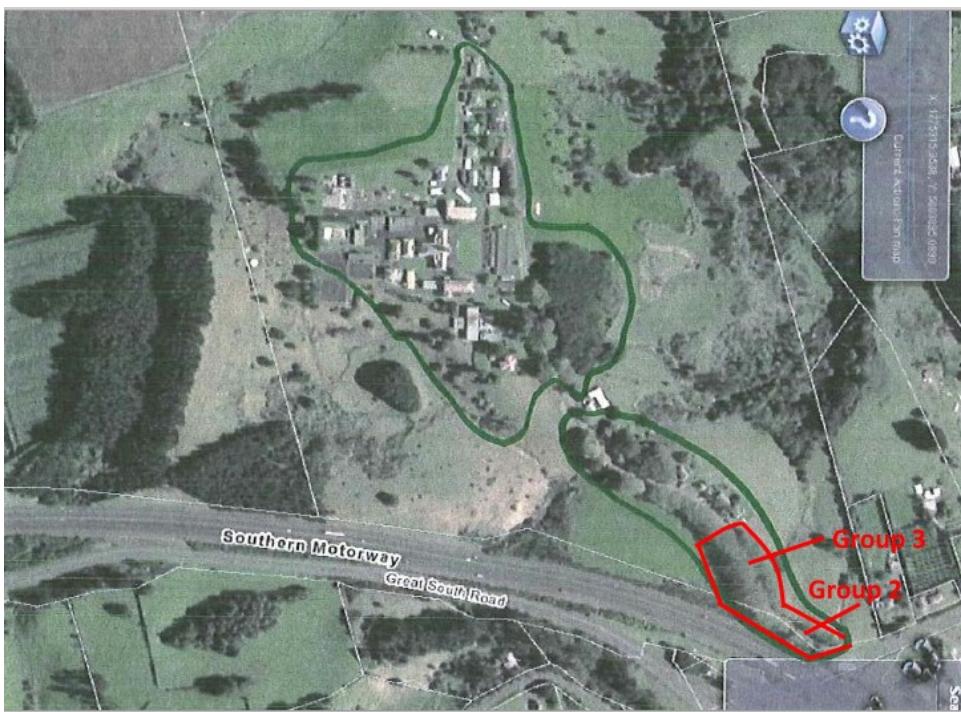


Figure 6-13 Auckland Unitary Plan Map showing extent of Notable trees (green outline) with Groups 2 & 3 marked

6.4.3 Works adjacent to the Notable Puriri tree grove and Norfolk Island Pine trees (Groups 4 & 5)

Groups 4 & 5 will be currently unaffected when considering the proposed traffic lane alignment. The proposed designation will extend beyond the current Great South Road boundary but does not currently show any earthworks near these trees. As the trees are currently shown as retained, all works proposed as part of a future detailed design phase must ensure their ongoing protection. The extent of notable trees for Group 4 & 5 is seen in Figures 6-14.

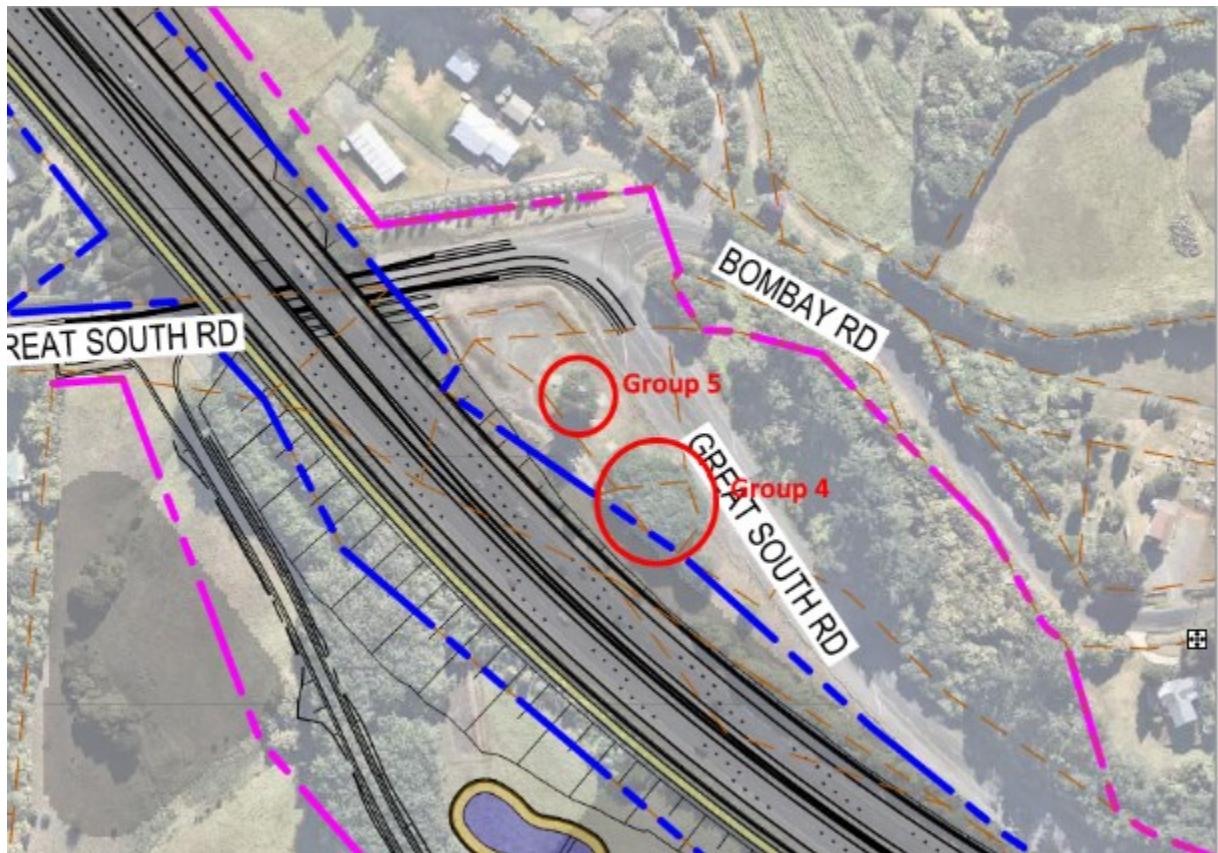


Figure 6-3 Proposed extent of designation adjacent to Groups 4 & 5

6.5 Recommended measures to avoid, remedy or mitigate construction effects

6.5.1 Tree Removal – Groups 2 & 3

A Tree Management Plan (TMP) should be developed prior to construction to assess the existing trees protected under the District Plan provisions (limited to those trees assessed in Appendix A of this report) that require removal and detail methods for all work within the root zone of trees that are to be retained. The TMP should include:

- Confirmation that protected trees identified in **Appendix A** still exist;
- Advice on how the design and location of works can avoid, remedy or mitigate effects on the existing trees;
- Recommended planting to replace trees that require removal;
- Establishing tree protection zones and specifying tree protection measures such as protective fencing, ground protection and physical protection of roots, trunks and branches; and,
- Detailing methods for all work within the root zone of trees that are to be retained in line with appropriate arboricultural standards.

6.5.2 Replacement Planting – Groups 2 & 3

In order to adequately mitigate the removal of the two Notable tree avenues, specific mitigation is proposed. This mitigation is to be in the form of a new area of mass planting, to be undertaken near the site of the removed trees adjacent to the future Shared Use path. The canopies of Groups 2 & 3 currently occupy approximately 6800m² of area, with the proposed planting area to be in excess of 8500m². As such, the replacement planting area will be in excess of a 1:1 replacement ratio.

The vegetation types to be replanted will be decided through planting details for the Project under the Urban Landscape Design Management Plan (ULDMP) proposed as a condition on the designation. The ULDMP should also include detail of methodologies to establish the new trees within the mass planting area, including creation of quality below ground environments, correct planting and appropriate maintenance.

A further provision is to be included as part of Condition PC7, that ensures that new trees within this area will include species that reach a mature height greater than 10.0m. It is expected that this area would be planted with indigenous vegetation, with the intent to create a holistic indigenous forest ecosystem, in keeping with the local known indigenous terrestrial ecosystem type. Provided this planting is undertaken and protected in perpetuity, I consider that the proposed tree removals would be adequately remediated in the medium to long term.

For the collective NoRs, the TMP will be limited to the identification of trees protected under the District Plan, as trees protected under Regional Plan provisions will be addressed as part of a future resource consent process if affected. Consideration of tree transplanting should be included in the TMP, where good quality trees in the road reserve are identified for removal. An assessment of the quality of the trees and the feasibility of transplantation should form part of the TMP.

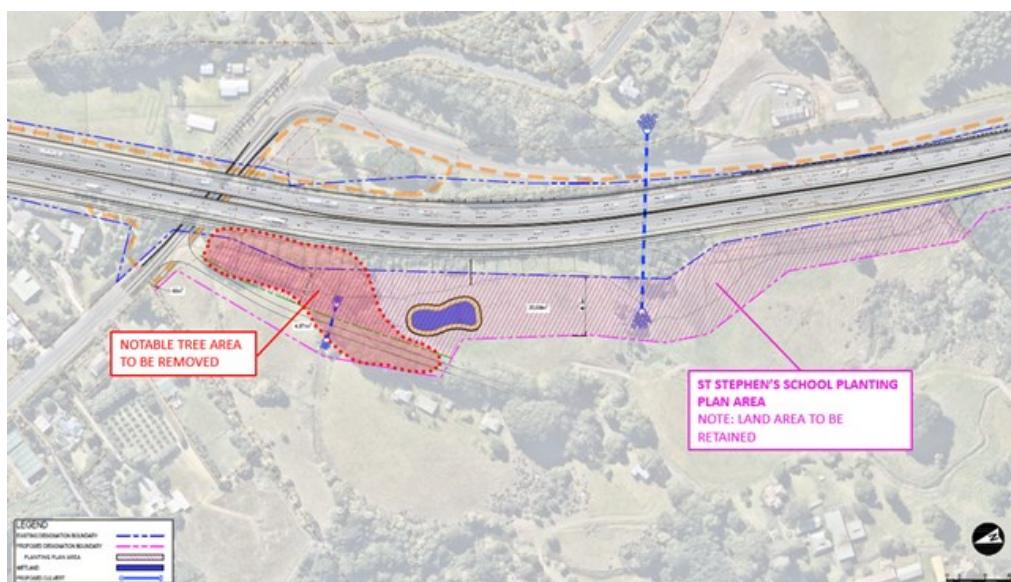


Figure 6-15 – Proposed Notable tree removals vs proposed planting area

6.5.2 Works near Retained Vegetation

Care must be taken to minimise any construction impacts in terms of the fragmentation of the remaining vegetation beyond the proposed removed areas.

Where practicable, the works area must be kept to a minimum, with retaining walls utilised in place of batters where adjacent to retained vegetation. Edge effects must be managed appropriately in the management of construction machinery required to avoid unnecessary temporary effects.

A specific assessment and recommendations are to be provided as part of the preparation of the TMP. These recommendations must include a tree protection methodology and set out parameters for the management of the ongoing health of any retained trees.

In some cases, it may be possible to transplant/relocate some specimen trees in these areas. A detailed transplant assessment should be prepared at the time of detailed design. The transplant assessment is to include maintenance periods, methodology of transplant and the new location for each relocated tree.

6.6 Assessment of operational effects

No additional effects to those overall effects identified in section 5.3 of this Report

6.7 Recommended measures to avoid, remedy or mitigate operational effects

Nil. Refer to section 5.4 of this Report.

6.8 Summary and conclusions

The Project works will require the removal of thirty-four (34) Notable trees and will require works within the protected root zone of at least eleven (11) remaining Notable Plane trees. The works are likely to have adverse effects on these trees. The extent of clearance where practical should be minimised, with all remaining significant trees retained and protected where possible during the Project works. Where retention is not possible any removed tree is to be replaced with new trees as part of the CDEMP. Provided this can be achieved, the effects on these trees will be mitigated.

Table 6-5: Overview of the Shared User Path

Effect	Assessment	Recommendation
Construction		
Removal of trees to enable the Project	The removal of at least thirty four (34) Notable London Plane trees will be required to enable the Project in this section (6800m ²)	Replacement planting will be decided through planting details for the Project under the ULDMP proposed as a condition on the designation. Where Notable trees growing within the bounds of NOR4 (St Stephens School) require removal, these removals must be effectively remedied with new plantings that would include indigenous tree species that will reach a mature height larger than 10.0m. The area proposed for replanting is 8500m ² in size, verse the anticipated area of removal being 6800m ² .
Works within the protected root zone of the remaining Notable trees	Works within the protected root zone of at least eleven (11) retained Notable London Plane trees	Tree protection measures and specific design is to be analysed as part of the TMP process to ensure the ongoing protection of retained trees vegetation. Any tree protection measures must be certified by a suitably qualified consultant arborist.
Operation		
Tree trimming or alteration	Replacement trees may require maintenance to retain sight lines and the overhead and lateral	New street trees or mass planted vegetation (trees specifically) are

Effect	Assessment	Recommendation
	clearances of general traffic lanes and the high quality walking and cycling facilities	planted no closer to the future general traffic lanes than 1 m.

7 CONCLUSION

The existing environment for the majority of the Project corridor is primarily rural or Future Urban, the exception being the riparian areas within NoR 5. Tree cover associated with the existing rural environments typically include plantings of amenity trees, naturally occurring emergent and established indigenous mass planted areas and riparian vegetation within the road reserve and open space zones.

The future environment is likely to change over the next 10 – 15 years as intensification occurs along the corridor as a result of recent changes in national policy direction and changes to the Resource Management Act 1991 (**RMA**). This will likely result in a reduction of trees adjoining the corridor, on business and residentially zoned land, which are not afforded any protection in the Auckland Unitary Plan: Operative in part (**AUP:OP**).

A summary of the trees or vegetation requiring removal for each NoR, which are protected by District Plan provisions in the AUP:OP is provided in the table below:

Table 8-1: Summary of vegetation requiring removal

NoR	Number of Protected Trees/ Requiring Removal	Protected Mass planted areas/groups of vegetation requiring removal
NoR 1	0	0
NoR 2	0	0
NoR 3	0	0
NoR 4	34 (Groups 2 & 3)	0
NoR 5	0	0
Total	34	0

It is recommended that a Tree Management Plan (**TMP**) be developed where construction work impacts on trees and groups of trees that are protected under the District Plan provisions (trees protected under Regional Plan provisions will be addressed as part of a future resource consent process). Replacement planting protocols are proposed to be developed further as part of the TMP where protected trees are to be removed.

Opportunities for replanting within areas of residual land beyond the new traffic lanes is possible to mitigate effects arising from tree removal associated with the Project.

APPENDICES

APPENDIX A – TREE DETAILS

NoR 1 & 4

Status	Tree/Group No.	Vegetation Type	Protection	Location	Species	Age	Comments
To be retained and protected, some works within the protected root zone of retained vegetation	1	Group of Trees	SEA (Private land) (Regional Protection Only)	Within 1799B adjacent to SH1	Mixed exotic and indigenous species (Eucalyptus, Puriri, Taraire etc)	Semi – Mature to mature	Works proposed to the east of grouping. Some works likely within the protected root zone of retained trees. To be Assessed further as part of a Regional Resource Consent process.
Removal anticipated	2 (Trees 26-47)	Group of Trees	Strategic Corridor/Road reserve	Boundary of 1832 Great South Road	21x Notable London Plane trees (semi-mature)	Semi-mature	Removal currently proposed for Shared Use Path and batter
Likely to be removed/ portion to be removed.	3 (Trees 1-25)	Group of Trees	Strategic Corridor/Road reserve and Private land Notable x37	1832 Great South Road	24x Notable Plane trees affected. 13x removals (Trees 1-13) anticipated. Works within the protected root zone of an additional 11 trees.(Trees 14 –25)	Mature	Removal currently proposed for Shared Use Path and batter.
To be retained and protected	4	Group of Trees	Road Reserve	To southeast of SH1	Notable Group of Puriri trees	Mature	To be retained and protected as part of works
To be retained and protected	5	Group of Trees	Road Reserve	To southeast of SH1	2s Notable Norfolk Island Pine trees	Mature	To be retained and protected as part of works



Figure 1. - Snip showing row of Notable London Plane Trees in 1942 (Source: www.retrolens.nz 27.5.42)



Figure 2. - Snip showing row of Notable London Plane Trees in 1988 (Source: www.retrolens.nz 20/03/1988))

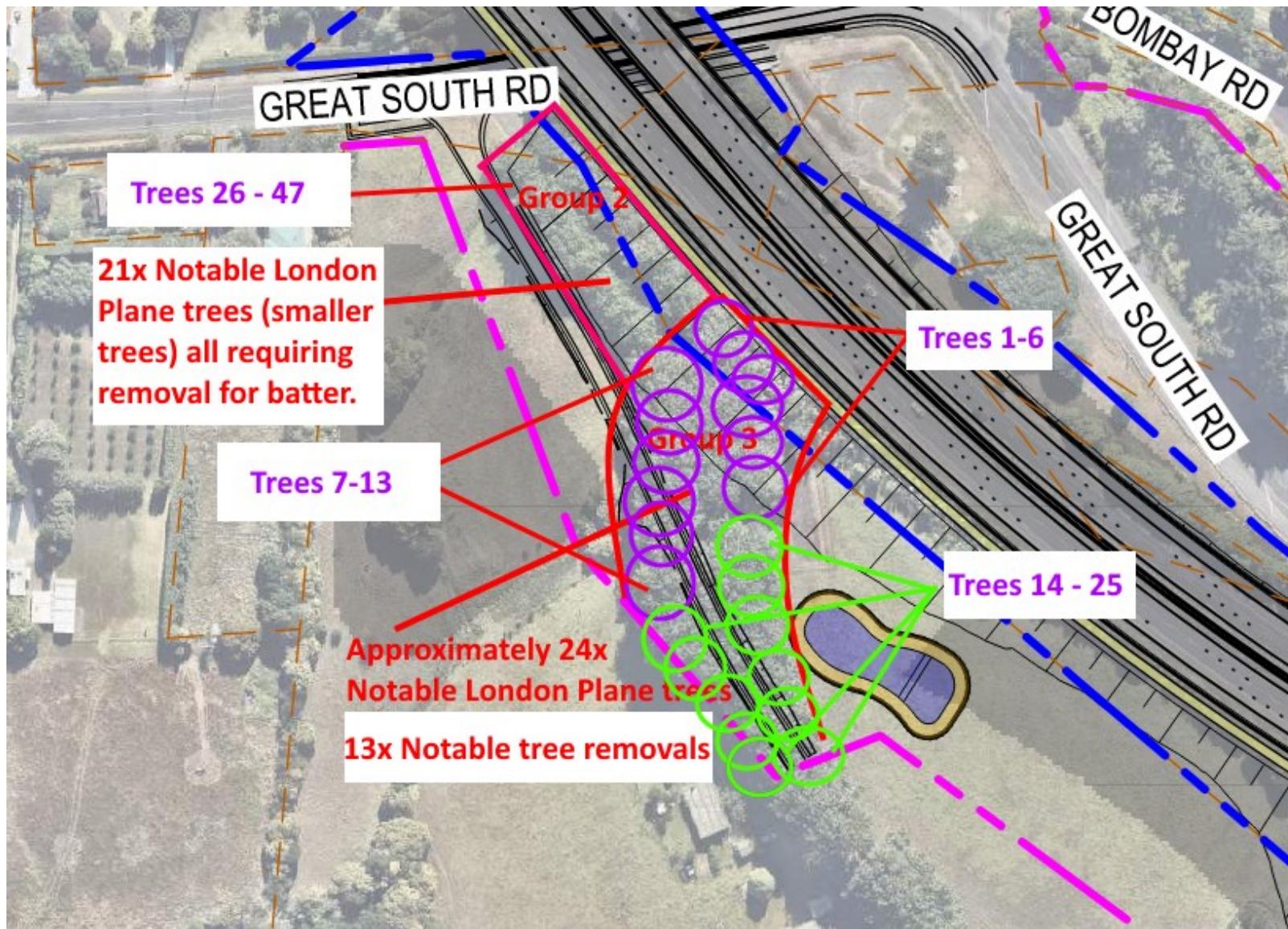


Figure 3 – Tree Location Plan (NoR 4) (Place Holder)



Papakura to Bombay Project Office

Aurecon New Zealand Limited

Level 3, Te Tahi
110 Carlton Gore Road,
Newmarket, Auckland 1023

PO Box 9762, Newmarket, Auckland 1149, New Zealand
New Zealand