

North Harbour 2 Watermain and Northern Interceptor in Shared Corridor

WATERCARE

Technical Report G - Landscape and Visual Impact Assessment

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North Harbour 2 Watermain and Northern Interceptor in Shared Corridor

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## Executive summary

Kamo Marsh has been commissioned by Watercare Services Limited (Watercare) to assess the potential landscape and visual effects related to the construction, operation and maintenance of Watercare's proposed North Harbour 2 Watermain (NH2) and Northern Interceptor (NI) Shared Corridor Projects. This also includes the Pump Station at Buckley Avenue, Hobsonville and micro tunnelling works associated with NI in the shared corridor.

The report addresses the likely landscape and visual effects of the proposal on the existing receiving environment and provides an assessment of the likely effects. These are considered in the context of Part 2, Sections 6 and 7 of the Resource Management Act 1991 (RMA / the Act), the Proposed Auckland Unitary Plan and relevant sections of the Auckland Council District Plan. It was considered that the proposals are consistent with the values and objectives outlined in the various plans. The proposals are not located in an Outstanding Natural Landscape area, as identified in the Proposed Auckland Unitary Plan and where the pipeline crosses areas of significant vegetation it is proposed to tunnel the pipe to avoid vegetation removal and effects to the underlying topography.

The report assesses the likely effects on the landscape character into which the pipeline is to sit and the effects, both during construction and after mitigation, would have on an area's topography, vegetation, waterways and built form. In all proposals being NOR1, NOR2 and NOR3 (including the Buckley Avenue Pump Station and micro tunnel shafts), it was found that effects were predominantly less than minor at most during construction with a small number of locations where effects were more than minor. In all cases the residual effects reduced to less than minor following mitigation and construction. This is largely due to the pipeline following the road alignment without the need for widespread vegetation clearance or above ground structures. The main areas of concern were the four streams within the NOR1 designation (Titirangi to Westgate) and Oteha stream in NOR2 (Western end of Greenhithe Bridge to Albany) where the pipeline crosses streams with high amenity values and where the pipe may be located above ground. A series of mitigation measures were developed to ensure any adverse effects were addressed, and mitigated or avoided where possible. They were as follows:

1. Any above ground pipes and structures / pump stations, shall be finished in colours that are appropriate for the receiving environment. Building walls and paving materials shall be at a natural reflectivity of no greater than 37% in accordance with British Standard 5252 Groups A and B, Resene Colour Range.
2. All permanent exterior lighting (if required) shall be designed so as to reduce lux spill.
3. Following the completion of construction, works areas are to be reinstated to their original condition prior to construction.
4. All planting is to be implemented in the first available planting season (1 April to 30 August) following the completion of construction, if not sooner.
5. As part of construction, detailed landscape plans are to be prepared by the Project Landscape Architect and submitted to Council. These plans shall include species planting plans, proposed soil cover preparation, fertiliser, mulching and maintenance plans.
6. All landscaping required for this consent shall be maintained, with any dead, diseased or dying landscaping to be replaced immediately with plants of the same species and at the minimum height at the time of planting as specified in the Landscape Plan.
7. Works areas are to be reinstated to their original condition prior to construction.

The following measures are suggested, specific to NOR1 only:

8. All pipes shall be located as close as is practical to the existing bridge structure, preferably at a height that will maintain open views from the bridge. In some instances there may be flood, engineering, ecological or other requirements which require the pipe location to vary but the above description is the preferred alignment.
9. The pipe crossing over Oratia Stream maintains its alignment on the Waitakere Ranges southern side of the bridge, away from the footpath and the Oratia walk and cycleway. This will also avoid a well-established stand of cabbage trees which are located on the northern side.
10. The pipe over Paremuka Stream is kept as close as practical to the existing bridge and below the top of the deck if possible to maintain open views from the bridge.
11. A Planting plan should be prepared to mitigate for the loss of vegetation on the central median on Shetland Street and for the loss of the tree in the intersection at Don Buck / Universal / Swanson.

The following measures are suggested, specific to NOR2 only:

12. Selecting a trenchless technology solution for the section of pipe through the Oteha Stream and Fern Hill escarpment would minimise vegetation removal and visual impact. As with item 7 above, other issues may result in this option not being possible. If Option 2 or 3 is selected, then existing native trees will be retained as far as practicable.

The following measures are suggested, specific to NOR3 only:

The main areas of concern were the Pump Station and associated structures (MH17) due to the proximity to neighbouring housing. A series of mitigation measures (MM) were developed to ensure adverse effects were addressed, and mitigated or avoided where possible.

- |     |  |
|-----|--|
| MM1 | Any above ground pipes and structures/Pump Stations, shall be finished in colours that are appropriate for the receiving environment. Building walls and paving materials shall be at a natural reflectivity of no greater than 37% in accordance with BS5252 Groups A and B.  |
| MM2 | All exterior lighting (if required) shall be designed so as to reduce lux spill. This is with the exception of the Pump Station site where normal security lighting is expected.   |
| MM3 | As part of construction, detailed landscape plans are to be prepared for sensitive areas and submitted to Council. These plans shall include species planting plans, proposed soil cover preparation, fertiliser, mulching and maintenance plans. The sites recommended for planting plans are the Buckley Ave Pump Station and the MT7 site where above ground structures are proposed. |
| MM4 | All landscaping shall be maintained, with any dead, diseased or dying landscaping to be replaced immediately with plants of the same species and at the minimum height at the time of planting as specified in the Landscape Plan.   |
| MM5 | Works areas are to be reinstated to their original condition prior to operation with any surplus excavation material removed from site.  |
| MM6 | All planting is to be implemented in the first available planting season (1 <sup>st</sup> April to 30 <sup>th</sup> August) following the completion of construction, if not sooner.   |

#### BUCKLEY AVENUE PUMP STATION

- MM7 A 1m high landscape bund is to be constructed along the road frontage with 1 in 3 batters. The bund is to have a minimum 300mm depth of topsoil to assist with plant growth.
- MM8 The bund is to be planted with native species at 1.5m centres and 75mm of mulch applied. Refer to figure 13 of the figures for recommended plant species.
- MM9 Suggested that a shared entrance is created for the Vector site and the Watercare Pump Station to minimise / consolidate vehicle crossings.
- MM10 Any security fencing along Buckley Road should consider positioning behind the landscape bund to mitigate adverse visual effects from a 2m high chain mesh fence (or similar). The gate to the site should be positioned a minimum of 5m from the street boundary to allow a vehicle to park in front of the gate without disrupting pedestrian movements. It also assists with reducing any visual effects from a security gate.
- MM11 In terms of built form, any buildings on site should be sympathetic to the nearby residential dwellings. Buildings within the site should use a consistent palette of materials and colours to appear unified. There is a preference for a number of smaller individual buildings as opposed to a larger, single building.

All three NORs are considered to have less than minor residual effects after mitigation on landscape values, landscape character and visual amenity and visual amenity following implementation of the proposed mitigation measures. The greatest effects are likely to be on residents adjacent to and users of the four stream corridors which run across the alignment in NOR1 and where the pipe will be above ground. For the remainder of the NOR1 alignment the NH2 watermain is below ground and will only result in minimal vegetation clearance. I consider that many of the measures which may have been considered mitigation measures have already been incorporated into the construction methodology as a way of reducing residual effects. The greatest potential effects are likely where the NOR2 pipeline traverses Oteha Stream and Fernhill Escarpment. If Options 2 or 3 are selected for this area, the likely effects are considered to be Significant, only reducing to minor if vegetation removal is minimal. Option 1 where tunnelling is proposed for the pipeline under this area, thereby avoiding any potential landscape effects, is the preferred option as it avoids felling significant native vegetation. Lastly, the receiving environment of NOR3 is considered the most modified and is least sensitive to change.

For NOR3, the pipelines for both NH2 watermain and for NI within the Shared Corridor will have less than minor residual effects on landscape values, landscape character and visual amenity. The proposed construction methodology will minimise effects during construction and avoid the need to remove existing motorway planting. For the 16 sites assessed for the micro tunnel shafts and the Buckleys Avenue Pump station, all effects are considered to have less than minor residual effects after mitigation on landscape values, landscape character and visual amenity and visual amenity following implementation of the proposed mitigation measures. The proposed construction methodology will minimise effects during construction and reduce the need to remove existing motorway planting. The greatest effects are likely to be on residents adjacent to the new Pump Station where views into the site will be possible before vegetation becomes established. For the remainder of the alignment the NI pipeline is below ground with occasional manhole lids flush with ground level and will only result in minimal vegetation clearance.

# 1 Introduction

Kamo Marsh Landscape Architects Ltd has been commissioned by Watercare Services Limited (Watercare) to assess the potential landscape and visual effects related to the construction, operation and maintenance of Watercare's proposed North Harbour 2 Watermain (NH2) project between Titirangi and Albany and the land use effects associated with the construction, operation and maintenance of the Northern Interceptor (NI) project between Westgate and Hobsonville, where a shared corridor is proposed for both water and wastewater infrastructure.

The NH2 will convey potable water from storage reservoirs in Titirangi, via west Auckland and North Shore to storage reservoirs in Albany (a length of approximately 33km). Its purpose will be to increase capacity and resilience of the water supply network to western and northern Auckland.

The NH2 project incorporates:

- Pipeline installation, operation and maintenance of a new watermain of 1200 mm (west of Greenhithe Bridge) and 900mm (east of Greenhithe Bridge) nominal diameters (DN);
- Pipeline length of approximately 33km mostly within public road reserve; and
- Other features including valve chambers, scour valves, air valves, line valves, bulk supply points, pipe bridges, and associated works.

Most of the watermain will be constructed by open trenching, micro tunnelling or bored tunnel (the latter two referred to as "trenchless technology") within a typical construction corridor of approximately 12 – 22 metres width with additional areas required for erosion and sediment control devices, traffic management, construction yards and storage areas at intervals along the route for construction purposes.

The NI project comprises of a new wastewater pipeline and associated activities to convey flows from north-west Auckland to the Hobsonville Pump Station, and then to the Rosedale Wastewater Treatment Plant (WWTP).

The proposed NI project in the shared corridor begins in the vicinity of Hobsonville Road (West Harbour), near the intersection of the Upper Harbour and North Western Motorways (SH18 and SH16). From this location, the alignment follows the southern side of the SH18, continuing northeast to the Hobsonville Pump Station. Future phases of the NI project will also include new pipelines between the Hobsonville Pump Station and the SH18 causeway.

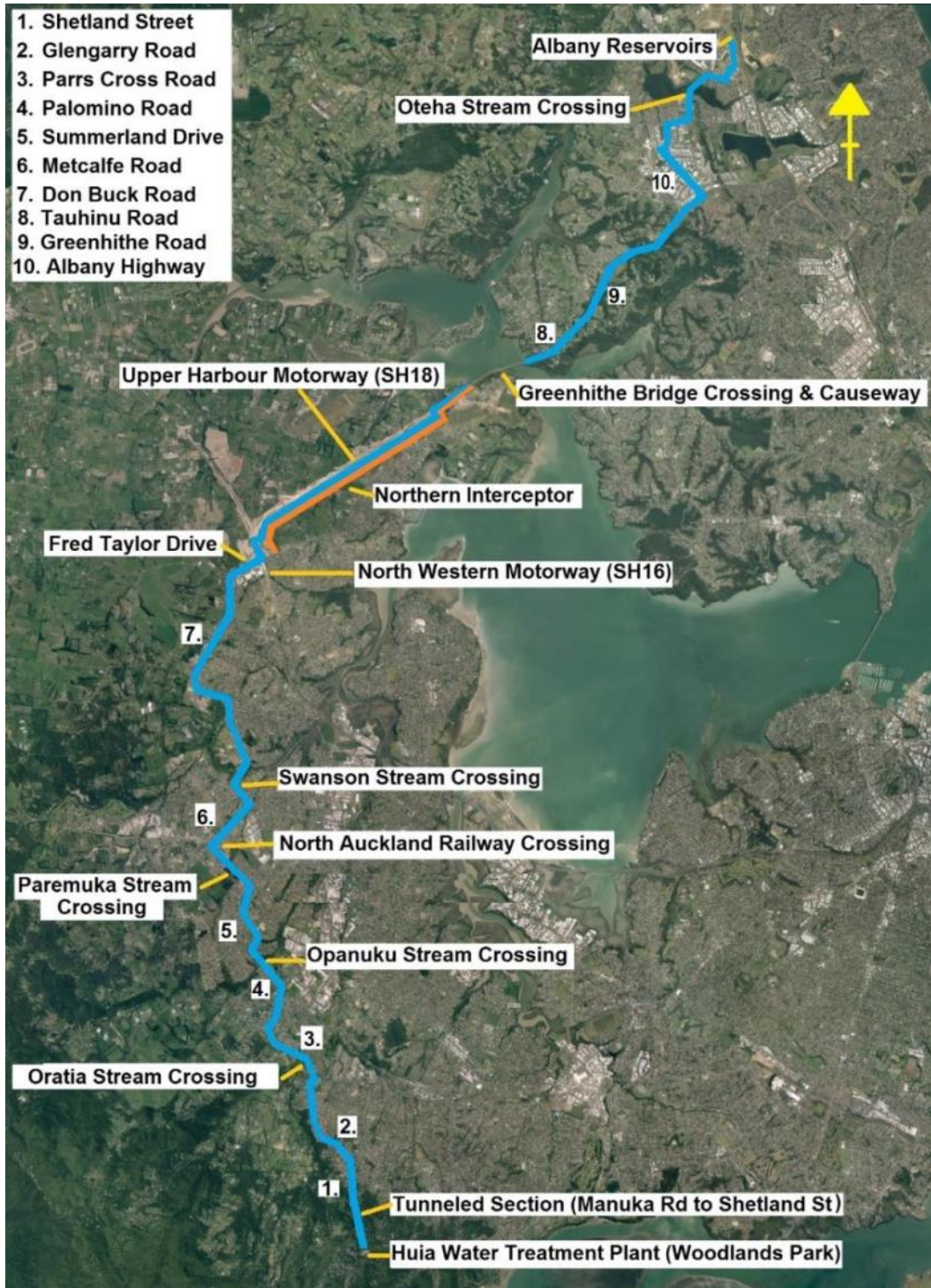
Within the shared corridor, the NI project incorporates the following:

- A new 5km wastewater pipeline of 2100mm DN;
- 16 pits / shafts for trenchless technology construction purposes. Five of these will be permanent manholes (MT Pits 2, 7, 11, 13 & 17) while the others (MT Pits 3, 4, 5, 6, 8, 9, 10, 12, 14, 15 and 16) will be temporary only until construction / testing is completed;
- MT Pit 7 will be a drop structure with permanent access, to allow for a future wastewater pipeline connection across SH18;
- A new 50m long wastewater pipeline and manholes connecting the 2100mm ND pipeline to the existing Pump Station;
- A new 1750 l/s Pump Station with future capacity across the site of 3,500l/s;
- Wastewater storage (within pipeline);
- Two 800m 1500mm DN rising mains (length to the causeway); and
- A 2100mm DN pipe installed by trenchless technology at SH18.

The proposed alignment of NH2 and the location of the NI project are shown in Figure 1.

*Figure 1 – Blue line is the proposed NH2 route and Orange line is NI section within shared corridor*





A full description of the proposed works and construction methodology is included in the North Harbour 2 Watermain and Northern Interceptor in Shared Corridor Assessment of Effects on the Environment (the AEE report) prepared by AECOM Consulting Services (NZ) Ltd (AECOM) and Jacobs New Zealand Limited (Jacobs).

Watercare is proposing to designate land for the NH2 project between Titirangi and Albany and the NI project between Westgate and Hobsonville, and will also be seeking various resource consents for NH2 under the Resource Management Act 1991 (RMA). This technical report provides specialist input for the AEE which supports the Notices of Requirement for designation (NOR) and the resource consent applications. The alignment drawings referred to in this report are contained within Volume 3 of the AEE. Resource consents required for works associated with the NI project will be sought by Watercare at a later date, nearer to the proposed date of construction.

This report provides the following:

- A description of the environmental baseline for the particular receiving environment(s) potentially affected by the projects;
- Description of specific aspects of the projects in relation to the subject area being investigated;
- Description of the investigations undertaken to assess TECHNICAL AREA G: Landscape and Visual;
- An assessment of the actual or potential effects on the environment (construction, operation and maintenance). This includes the identification of activities that could result in potential adverse effects and, in turn, identifying design refinements or construction methodologies that could avoid, remedy or mitigate potential adverse effects; and
- Conclusions.

## 2 Methodology

The landscape and visual impact assessment considers the likely effects of the proposal in a holistic sense. There are two broad components to the assessment:

1. The landscape assessment addresses whole-of-landscape issues, particularly those identified by Sections 6 and 7 of the RMA. The landscape assessment consists of two components: a descriptive component that describes landscape character, natural character (s6a) and landscape amenity (s7c), and an evaluative component that addresses landscape values in terms of the requirements of s6b.
2. The visual impact assessment is primarily concerned with the effects of the proposal on the visual experience of the landscape by the principle groups of landscape users: residents, workers, travellers and recreationists.

Three site visits were undertaken in the preparation of this report by Kamo Marsh staff, with the entire alignment and associated sites visited. Photos were taken from key viewpoints and broadbrush vegetation surveys completed, with particular importance given to stream crossings and the Pump Station site on Buckleys Road. These visits occurred in: November 2014, October 2015; and March 2016.

### 2.1 Landscape Assessment Methodology

The landscape assessment will draw upon landscape assessment theory, professional best practice, the requirements of the RMA (particularly with regard to matters of national importance identified in Part 2 Section 6), and procedures and principles established through case law in the Environment Court.

#### 2.1.1 Landscape Character

The general methodology applied is that described by Peart (2005),<sup>1</sup> whereby the landscape unit of analysis is first described in terms of its landscape character, with any value or significance given later.

The framework for describing landscape character is divided into the categories of topography; land cover; built form / structures / human elements; and natural character. Section 6a of the RMA requires that a sub-set of landscape character – natural character – be subject to specific analysis.

Natural landscape character is a narrowly defined aspect of landscape character. In simple terms it is an assessment of the degree to which a given landscape is the product of nature, as opposed to cultural intervention. It can be assessed along a continuum of states from pristine wilderness, where no evidence of human intervention is apparent, to wholly developed, where scant evidence of natural elements, patterns, and processes remains. It is important to emphasise that natural character is not an absolute quality that either exists or doesn't, but rather occurs across a continuum in matters of degree. Human interventions may diminish natural character, but do not necessarily eliminate it altogether. Natural character is generally understood to be determined by the extent to which the natural elements, patterns and processes occur in the landscape, and the extent to which they are modified by human interventions. The highest degree of natural character (greatest naturalness) occurs where there is least modification.

- Natural elements: these are the products of ecological, erosional and depositional processes; the biophysical characteristics of the landscape, such as landforms, rock outcrops, hydrological features and vegetation communities.
- Natural patterns: patterns are formed through the interactions between landscape elements and the processes operating on them. Patterns are apparent through the interactions of plants, soils, aspect and slope, or through the erosion of the coastline through wave action. The regimented character of a forestry


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<sup>1</sup> Peart, R. (2005). *Landscape planning guide for peri-urban and rural areas*. Environmental Defence Society, Auckland

plantation or apple orchard compared with the apparently random patterns of trees in an indigenous forest, illustrates how natural and unnatural patterns might be understood.

- Natural processes: Natural processes are the dynamic processes at work on the biophysical landscape, shaping landform and vegetation communities through processes of erosion and deposition, soil forming processes, colonisation and succession, regeneration and energy and nutrient flows.

**Table 1: Continuum of Natural Character**



Natural	Near-natural	Semi-natural (including pastoral agriculture and exotic forests)		Agricultural (arable and intensive cropping)		Near-cultural	Cultural
Very high- pristine	High	Moderate High	Moderate	Moderate- low	Low	Very Low-nil	

### 2.1.2 Landscape Value / Significance

Following the descriptive phase of landscape assessment, an evaluative phase is undertaken whereby values or significance is ascribed to the landscape.

An accepted approach, where the landscape value of the site is not identified in the District Plan under Section 6(b) of the RMA, is to use criteria identified in *Wakatipu Environmental Society Inc. & Ors v QLDC* [2000] NZRMA 59 (generally referred to as the modified Pigeon Bay criteria). The Pigeon Bay criteria include natural science factors, aesthetic value (an aspect of landscape values over which there is considerable debate regarding the theoretical basis for assessing visual or scenic quality), and the methods and techniques to be used. A professionally-based evaluation has been applied to the task of assessing aesthetic value, drawing upon the theoretical work of Kaplan and Kaplan (1989).<sup>2</sup> The technique used to assess aesthetic quality includes reference to several of the factors which form the framework for the assessment of landscape character.

Where the District Plan has identified Outstanding Natural Features or Landscapes, the objectives, policies and rules contained within the plan are used as the basis for landscape significance or value, and it is these values which the proposal is assessed against. Where there is some uncertainty of the landscape value, such as when the District Plan has a broad description of an Outstanding Natural Landscape (ONL), but it is not site specific, or the site neighbours an ONL, it is often necessary to complete an assessment against the values of the District Plan for completeness sake.

The Proposed Auckland Unitary Plan has identified area of Outstanding Natural Landscapes. Outstanding Natural Features are listed in Appendix H and Landscape Elements are listed in Appendix J of the Waitakere section of the Auckland Council District Plan.

## 2.2 Visual Assessment

In response to Section 7c of the RMA, an evaluation is undertaken to define and describe visual amenity values. As with aesthetic values, with which amenity values share considerable overlap, this evaluation was professionally-based using current and accepted good practice rather than community-based. Amenity values are defined in

<sup>2</sup> Kaplan, R., & Kaplan, S. (1989). *The Experience of Nature: A Psychological Perspective*. Cambridge: Cambridge University Press.

the Act as *“those natural or physical qualities and characteristics of an area that contribute to people’s appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes.”* The visual assessment looks at the sensitivity of receptors to changes in their visual amenity through the analysis of selected representative viewpoints and wider visibility analysis. It identifies the potential sources for visual effect resulting from the project and describes the existing character of the area in terms of openness, prominence, compatibility of the project with the existing visual context, viewing distances and the potential for obstruction of views.

The visual impact assessment involves the following procedures:

- Identification of key viewpoints: A selection of key viewpoints is identified and verified for selection during the site visit. The viewpoints are considered representative of the various viewing audiences and distances, being taken from public locations where views of the proposal were possible, some of which would be very similar to views from nearby houses.
- Assessment of the degree of sensitivity of receptors to changes in visual amenity resulting from the proposal: Factors affecting the sensitivity of receptors for evaluation of visual effects include the value and quality of existing views, the type of receiver, duration or frequency of view, distance from the proposal and the degree of visibility. For example, those who view the change from their homes may be considered to be highly sensitive. The attractiveness or otherwise of the outlook from their home will have a significant effect on their perception of the quality and acceptability of their home environment and their general quality of life. Those who view the change from their workplace are considered to be only moderately sensitive as the attractiveness or otherwise of the outlook will have a less important, although still material, effect on their perception of their quality of life. The degree to which this applies depends on whether the workplace is industrial, retail or commercial. Those who view the change whilst taking part in an outdoor leisure activity may display varying sensitivity depending on the type of leisure activity. For example, walkers in open country on a long distance tramp are considered to be highly sensitive to change while other walkers may not be so focused on the surrounding landscape. Those who view the change whilst travelling on a public thoroughfare will also display varying sensitivity depending on the speed and direction of travel and whether the view is continuous or occasionally glimpsed.
- Identification of potential mitigation measures. These may take the form of revisions/refinements to the engineering and architectural design to minimise potential effects, and/or the implementation of landscape design measures (e.g. screen tree planting, colour design of hard landscape features etc.) to alleviate adverse visual effects and generate potentially beneficial long term visual effects.
- Prediction and identification of the residual visual effects after the implementation of the mitigation measures.

To assist with the assessment of likely effects the following matrix has been prepared based on the NZILA Best Practice Guide – Landscape Assessment and Sustainable Management (02.11.10) with a seven point scale:

**Table 2: Effects Matrix**

		MAGNITUDE OF CHANGE (EFFECT / IMPACT)			
		NEGLIGIBLE	SMALL	MODERATE	LARGE
SENSITIVITY OF RECEPTOR  (landscape, visual amenity or visually sensitive receptor)	LOW (industrial workers, travellers)	NIL	LESS THAN MINOR	MINOR	MORE THAN MINOR
	MEDIUM (commercial workers, travellers)	LESS THAN MINOR	MINOR	MORE THAN MINOR	SIGNIFICANT
	HIGH (residents, recreational users)	MINOR	MORE THAN MINOR	SIGNIFICANT	UNACCEPTABLE

## 2.3 Statutory Documents

Relevant statutory documents referred to below are the Resource Management Act 1991, the Proposed Auckland Unitary Plan, and the Operative District Plan (Waitakere and North Shore sections).

The Waitakere Ranges Heritage Area Act 2008 is also relevant in the overall assessment of part of NH2 and this has been addressed in the AEE.

### 2.3.1 Resource Management Act 1991

Section 6 of the RMA identifies matters of national importance:

*"In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:*

- s.6 (a) *The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use and development;*
- s.6 (b) *The protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development;*
- s.6 (c) *The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna."*

Other matters are included under Section 7:

*"In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to-*

(c) *The maintenance and enhancement of amenity values."*

### **2.3.2 NOR1 – Auckland Council District Plan: Waitakere District**

The NOR1 proposal is located within the Waitakere District of the Auckland Council District Plan. The alignment starts at the Woodland Reservoir area, which is classified as a 'Managed' Natural Area Map and Bush Living / Open Space on the Human Environment Map in the District Plan. This classification puts an importance on the natural environment and the sensitive placement of housing and infrastructure around natural elements.

The alignment then moves into the Living 2 zone and areas which are classified as a Sensitive Ridge - Moderate (65m) and as a Sensitive Ridge - Broad (100m). Oratia Stream is an ecological linkage opportunity in the Living Zone while the other streams have a 'managed' underlying natural area classification. Paremuka has a 'protected' area downstream of the alignment, approximately 20m away from the road reserve. Throughout the rest of the alignment, the receiving environment is a living zone with no landscape protection requirements or values, with the exception of a small portion of Don Buck Road close to its intersection with Red Hills Road where a Sensitive Ridge – Broad (100m) overlay occurs. For further detail, refer to the Planning reports prepared for this project.

### **2.3.3 NOR2 - Auckland Council District Plan: North Shore District**

The proposal site starts within the designation of SH18 – Upper Harbour Highway which is surrounded by residentially and structure plan zoned land. At William Pickering Drive the alignment is through Business zoned land until it gets to the Albany Town Centre. It does not cross any Outstanding Natural Landscape areas. For further detail, refer to the Planning reports prepared for this project.

### **2.3.4 NOR3 – Auckland Council District Plan: Waitakere District**

The NOR3 proposal is located within the Waitakere District of the Auckland Council District. The majority of the works are located within designation NZTA4 for the SH18 with the underlying zones being Countryside on the northern side of the motorway and Special Area – Hobsonville on the southern side. The alignment is not located within an Outstanding Natural Landscape Area and there are no landscape values outlined in the District Plan for this section.

For further detail on the Auckland Council District Plan: Waitakere District and Proposed Auckland Unitary Plan requirements, refer to the section 3 of the main AEE.

Given the existing designations and overlays across this zone, I do not consider the proposed alignment and Pump Station being inconsistent with the Proposed Auckland Unitary Plan.

## 3 NOR1 - The Receiving Environment and Effects

### 3.1 Receiving Environment - Landscape

#### 3.1.1 Landscape Character

The NOR1 proposal traverses through two distinct landscape areas for approximately 16.5km, the first being the tunnelled section from Huia Water Treatment Plant (Woodland Park Road Reservoir) site to Shetland Street where the pipe goes underneath an area of the Waitakere Ranges Regional Park. The steep hillside is covered by regenerating native bush, large stands of native trees and houses are dotted within the bush. The natural character of the area is more dominant than its suburban character with large trees and shrubs screening views of houses and auxiliary buildings. Fences are few and many boundaries are either not defined, or defined by vegetation as opposed to hard materials. Roads in the area are narrow with no kerb and channel, being two way but with limited on-street parking potential without blocking a side of the road. Large stands of manuka are common, being in excess of ten metres in height. This area has a high sensitivity to change due to the dominance of natural elements over built structures.

From Shetland Street to Westgate the character of the receiving environment is fairly consistent, being characterised by low density suburban development and pockets of commercial businesses. Surrounding houses are typically one or two stories and generally standalone, fully detached dwellings. The topography is undulating and the network of roads and streets tend to follow the form of the topography as opposed to being a grid pattern. The main road which the alignment follows is typically 20m wide and is largely free of any street trees for the entire 16km length of this portion with some exceptions (these are outlined below under Vegetation). The character of the street corridor is open with few features of note. The alignment crosses four streams, being Oratia, Opanuku, Paremuka and Swanson, which are discussed in more detail below under Waterways.

Each of the landscape elements which make up the landscape character are described in further detail below.

#### 3.1.2 Topography

The topography of the receiving environment is undulating with the main alignment traversing a number of small hills and stream gullies. At Shetland Street the pipe is at approximately 110 m above sea level (masl) dropping down as low as 10masl before climbing back up to 100masl at the Don Buck Road / Waimumu Road intersection. Plans showing the contours of the area are shown in figures of the attached drawings. The character of the receiving environment is heavily influenced by the underlying topography of the area with Glengarry Road running along the top of a small ridgeline before dropping down into Oratia Stream on Parrs Cross Road. The alignment then steeply climbs back up to Forest Hill Road before gradually dropping down to Opanuku Stream. This stream is deeply incised with the water level estimated to being 8-10m below the top of the bridge, which crosses the stream at a relatively flat profile. On the northern side of Opanuku Stream, Palomino Drive climbs up to the intersection with Summerland Drive where it drops down again into the Paremuka Stream catchment, being the lowest point on the NOR1 alignment. From this point the alignment rises again up Monroe Road, flattening out before dropping down into the Swanson Stream catchment.

Overall, it is considered that the topography has a low-medium sensitivity to change given the suburban character, and the degree of modification that has occurred, for the majority of the receiving environment.

#### 3.1.3 Vegetation

The vegetation varies along the alignment with the most sensitive areas to change being the southern end within Waitakere Ranges Regional Park, part of Shetland Street where there is a central retaining wall covered in vegetation and all four of the stream corridors where riparian planting has become well established. As a general observation, vegetation within the road alignment from the start of Glengarry Road through to the North Western motorway crossing is limited with the exception of the following:



- 6-8m high Melia azederach street trees on Border Road and Palomino Drive;
- 4m high magnolia trees in the grass verge on Summerland Drive between Summerland Primary School and Paremuka Stream. The trees are small and are yet to influence the character of the streetscape; and
- There is a single 10-12m tall deciduous tree located in the roundabout/intersection of Swanson / Universal and Don Buck Drive.

The Ecology report (refer Technical Report D in Volume 2 of the AEE) prepared by Biosearches (dated November 2015) describes the vegetation by the stream crossings as young, planted and generally of poor or marginal fauna habitat value. Two sites at the far western end of the pipeline route were identified as having high terrestrial ecological value. These areas are at Woodland Park Reservoir Connection Point, and between Scenic Drive and Selwyn Avenue. Overall it is considered that the vegetation along the alignment has the following sensitivity to change:

- |                      |          |
|----------------------|----------|
| • Woodland Reservoir | moderate |
| • Stream corridors   | moderate |
| • Road reserve       | low      |

### 3.1.4 Waterways

There are four major waterways located along the alignment being Oratia, Opanuku, Paremuka and Swanson. All of the streams are of a significant size, being 4-8m in width and deeply incised with the water typically being 6-10m below the bridge deck. All of the streams have well-established native riparian vegetation along with large native and exotic trees but with a mix of qualities. All of the plants appear to have been planted as opposed to be naturally occurring with the exception of weed species (common). The streams provide a moderate level of amenity to the local area and most include walk / cycleways linking to amenities further downstream. The stream corridor, including banks are generally wide with adjoining residential properties setback between 10 and 20m from the stream centre line.

Oratia Stream on Parrs Cross Road has a mix of native riparian planting, mostly on the northern side of the 65m wide corridor, and larger exotic tree species including poplars. The southern side of the stream is undeveloped farm land while the northern side is heavily planted and contains the Oratia walk /cycleway which a 2.5m concrete path connecting downstream to Sunnyvale train station. The bridge has open railings and the water surface is clearly visible.

Opanuku Stream on Palomino Drive is a heavily planted stream corridor, approximately 120m wide with both native and exotic plantings. A walkway cycleway is located on the eastern bank of the stream, linking upstream to Henderson Valley Road and downstream into a network of reserves and paths. The bridge has open style railings and the water surface is clearly visible, being approximately 8m below the bridge deck.

Paremuka Stream on Munroe Road is also heavily vegetated stream corridor approximately 70m wide with a mix of native and exotic vegetation. The banks are relatively steep with the water located 8-10m below the bridge deck. The bridge has a decorative railing detail which provides character but limits views of the stream due to the solid nature of the railing. There is a large grass area on the eastern side of the stream but no formed pathway.

Swanson Stream on Don Buck Road is heavily vegetated on the downstream side with well-established stands of native riparian vegetation and large exotic trees. Large manuka trees frame the stream corridor on the stream side. The stream is approximately 6m below the bridge deck and with open style railings the water is clearly visible. The upstream side of the stream is more open with vegetation less well established and a pathway.

All of the streams have a high natural character and amenity value, and have a medium sensitivity to change.

### 3.1.5 Built Structures

The built form of the alignment generally consists of houses constructed in the 1960's onwards, either single or two storey but predominantly standalone detached houses. Setbacks varying but are generally 5-6m with a suburban built character. Roads are typically 20m corridors with some wider portions along the alignment including Summerland Drive which is approximately 22.5-23 m wide, and Don Buck Road north of the intersection with Triangle Road where it extends out to over 30m at some points.

At the northern end of the alignment for NOR1 is the Westgate Shopping Centre which consists of large, big box retail buildings up to 6-8m in height and large expanses of car parking. The centre sits down below the Fred Taylor Drive with views possible across the roof tops. A large Pak'n'Save supermarket has recently opened on the northern side of Fred Taylor Drive. Fred Taylor Drive itself is a large, dual carriageway road with a raised central median, traffic lights with no vegetation of note. A series of tall pylons run across the drive, at the intersection with the entrance to the mall. These are estimated to be over 20m in height.

Overall, the built form of the alignment has a low sensitivity to change.

## 3.2 Effects on Landscape Values and Character

### 3.2.1 Landscape Values (from statutory documents)

The proposed works are not located in an Outstanding Natural Landscape but the southern end is located within the Living Bush zone close to the Waikare Ranges where natural features dominate, but settlement has substantially fragmented the bush. A partly residential but, nonetheless, "nonurban" character predominates as a result. The Woodland Reservoir area is a high amenity area with well-established native vegetation and a predominance of natural elements over built development. It is classified as Managed Natural Area Map and Bush Living / Open Space on the Human Environment Map in the District Plan. In this location the pipe is to be tunnelled with minimal above ground structures or elements. There will be localised vegetation removal required where the pipe emerges from the tunnel but with suitable reinstatement planting, any residual effects will be less than minor in this location.

The pipeline will run along Shetland Street in the Living 2 zone which is classified as a Sensitive Ridge - Moderate (65m) and continues along Glengarry Road which is classified as a Sensitive Ridge - Broad (100m). In both locations the works will not affect the integrity of the ridgeline with the pipe being below ground and minimal earthworks required.

Oratia Stream is an ecological linkage opportunity in the Living Zone while the other streams have a 'managed' underlying natural area classification. Paremuka has a 'protected' area downstream of the alignment, approximately 20m away from the road reserve.

Throughout the rest of the alignment, the receiving environment has a suburban character with no landscape protection requirements or values, with the exception of a small portion of Don Buck Road close to its intersection with Red Hills Road where a Sensitive Ridge - Broad (100m) overlay occurs. Overall it is considered that there will be NIL residual effects on landscape values.

### 3.2.2 Landscape Character

Prior to mitigation I consider that the effects on Landscape Character will be minor at most resulting from localised vegetation clearance. Overall I consider that the NOR1 proposal will have less than minor effects after mitigation on the existing landscape character and landscape elements along the alignment. The nature of the pipe being underground and that a significant portion of the pipe where the landscape is most sensitive will be tunnelled means that residual effects on the landscape will be minimal. The majority of the works are being undertaken in an urban environment, with the road corridor with the pipe installation being no different from other infrastructure services being laid within the road. Minor changes will occur on Shetland Street and at the stream crossings but it

is considered these changes are less than minor. The potential loss of the 10m Pin Oak (T70 in the Technical Report H – Arboriculture Assessment report in Volume 2 of the AEE) at the intersection of Swanson, Don Buck and Universal will be noticeable in the short term. The tree is protected and options should be investigated to retain this tree if possible. Mitigation measures are described in section 7.

**Table 3: Assessment of Effects on Landscape Character and elements**

Landscape Character / Element	Sensitivity of Change	Magnitude of Change	Effect (before mitigation)	Residual Effect (after mitigation)	Comment
Character	Medium	Small	Minor	Less than Minor	For the majority of the alignment, the pipe is traversing through a suburban environment where the only visible elements will be manholes and where the pipe crosses the four streams. During construction the work areas will affect the character of the receiving environment but are temporary in nature so considered to be less than minor.
Topography	Low - medium	Negligible	Less than minor	Nil	The majority of the pipe work will either be tunnelled under sensitive areas, or will be open trench in the road corridor. There will be limited effects on the underlying topography which is considered to be in a modified condition already. Overall it is considered that there will be NIL effects on topographical elements.
Vegetation (streams and Waitakere)	Medium	Small	Minor	Less than minor	Potentially adverse effects could occur at the stream crossings if care is not taken to minimise vegetation removal. However in all cases the pipe is crossing away from the most heavily planted areas and any plant loss can be compensated.
Vegetation (remaining areas)	Low	Small	Less than minor	Less than minor	The effects on existing vegetation are limited due to the majority of works being located within the road corridor. Vegetation will be removed on Shetland Street and the loss of the tree in the intersection at Don Buck / Universal / Swanson will be noticeable, but these effects can be mitigated by replacement planting.
Waterways	Medium	Small	Minor	Less than minor	The four existing waterways all have a medium level of natural character and are sensitive to change. If not mitigated, the placement of the pipe could have an adverse effect on the character and amenity of these corridors. I consider that the current alignment has placed the pipes where their effect will be minimal and will result in the least amount of vegetation disturbance.

Built Structures	Low	Small	Less than Minor	Nil	The proposal will not affect the current suburban character of the receiving environment with the infrastructure largely being underground. The pipe crossing at the four streams will add a large utilitarian pipe to the receiving environment but is not of a scale to change the character.
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### 3.3 Receiving Environment - Visual Context

The visual context of the receiving environment is considered to be mostly limited to during the construction phase and at the four streams where the pipe rises above the ground and will be permanently visible. Given this, the number of key viewpoints and visually sensitive receivers is considered to be limited with many locations / people being able to be assessed in a collective manner.

#### 3.3.1 Key Viewpoints

A series of key viewpoints were selected to show a representative sample of the likely visual effects which could result from the proposal (refer to Appendix A for the relevant photo). All viewpoints are located on public land, and where possible located as close as possible to existing or proposed residential dwellings. In assessing the potential effect of a proposal the quality and openness of the view is considered as well as the availability of alternative views. These were as follows:

- 1) View along Shetland Street;
- 2) View from intersection of Phillip and Shetland Streets;
- 3) View along Parris Road including Oratia Stream;
- 4) View looking south down Parris Cross Road;
- 5) View of Opanuku Stream looking northwest;
- 6) View along Palomino Drive including Opanuku Stream;
- 7) View south along Summerland Drive up to Palomino Supervalue;
- 8) View along Summerland Drive including Paremuka Stream;
- 9) View of the Metcalfe Road rail crossing;
- 10) View along Don Buck Drive looking south at the intersection with Zita Maria Drive;
- 11) View along Don Buck Drive looking south at the intersection with Triangle Road; and
- 12) View along Fred Taylor Drive.

#### 3.3.2 Visually Sensitive Receptors

In assessing the potential effects on visually sensitive receptors, the key viewpoints outlined above have been used as a reference point where it is considered that the effects are likely to be similar.

These are as follows:

Table 3:1 Visually Sensitive Receptors

VSR No.	Visually Sensitive Receptors	Type of View (open, partial, screened)	Distance to Pipe Alignment	Description of Current View
VSR1	Residents of Shetland Street	Open	10-20m	Residents on Shetland Street enjoy open views of the street, including a retaining wall in the middle of the street where the road splits. The median is well planted and has a moderate degree of amenity.
VSR2	Residents of Glengarry Road, West Coast Road and Parrs Coast Road	Open	10-20m	Residents currently enjoy open views of the alignment, typically looking across to residential dwellings on the other side. There are few street trees along the alignment providing an open character to the streetscape. Vegetation on properties varies but in some cases greatly restricts views of the street or to the adjacent property.
VSR3	Users of Oratia Stream	Partial	25m	The pipe is proposed on the upstream side of the stream, away from the walk/cycleway. Users enjoy partial views of the stream, dependent on the position of vegetation, with a high amenity value.
VSR4	Residents of Parrs Cross Road through to Don Buck Road	Open	10-20m	Residents currently enjoy open views of the alignment, typically looking across to residential dwellings on the other side. There are few street trees along the alignment providing an open character to the streetscape. Vegetation on properties varies but in some cases greatly restricts views of the street or to the adjacent property.
VSR5	Users of Opanuku Stream	Open	10-20m	Pipe located on the downstream side close to the pedestrian path which is adjacent to stream. Riparian planting is more open than other streams and clear views of the water are possible from the path and from the bridge.
VSR6	Users of Paremuka Stream	Partial	10-20m	The pipe is located on the downstream side where there is a small grassed area before riparian planting begins, descending down to the water's edge. Views of the water are blocked from the bridge by a solid, decorative style railing and the adjoining houses have solid style fences screening views of the waterway.
VSR7	Users of Swanson Stream	Open	10m	The pipe is located on the upstream side where there is a pedestrian path, playground and grass areas. Views of the water and bridge are possible along with riparian vegetation.
VSR8	Travellers along the alignment	Open	0m	Travellers along the alignment experience a typical suburban streetscape with residential houses setback 4-8m from the front boundary. Views are open but limited by topography and bends in the road corridor.
VSR9	Workers and shoppers at Westgate	Open	20-40m	The Westgate Mall generally faces away from the alignment into internal areas. Views are dominated by large, big box buildings and supermarkets, road infrastructure, signage and pylons.

### 3.4 Effects on Visual Amenity

I consider that the effects on visual amenity will be negligible given the nature of the proposed works. The greatest change to the existing environment will occur during construction in those areas where open trenching will happen and the site works will be visible. For the most part, final works are below ground and there will be no residual effects with the exception of some loss of vegetation. However, the loss of vegetation is not considered to have an adverse effect on the visual amenity of the alignment. I consider that any adverse effects can be successfully mitigated, including the loss of vegetation, to ensure any residual effects are less than minor. The following section outlines the likely visual effect on Visually Sensitive Receptors.

### 3.5 Effects on Visually Sensitive Receptors (Visual Effects)

The following table assesses the potential visual effects resulting from NOR1. The table takes into account the likely sensitivity of the receptor (based on type), combined with the likely magnitude of effects (a combination of distance from the proposal and degree of change) to determine what the likely residual effects from the proposal will be. Mitigation measures are outlined in Section 7.

**Table 4: Assessment of Effects on Visually Sensitive Receptors**

Visually Sensitive Receptors (VSR)	Sensitivity of VSR	Magnitude of Change	Effect (before mitigation)	Residual Effect (after mitigation)	Comment
VSR1 - Residents of Shetland Street	High	Small	More than minor	Less than minor	The residents will experience the loss of mature vegetation in the road median and will view earthworks during construction. These activities will temporarily affect their visual amenity, though loss of screening. The loss of vegetation is not considered significant as it consists of small shrubs and trees which can be mitigated with replacement plantings.
VSR2 - Residents of Glengarry Road, West Coast Road and Parrs Coast Road	High	Negligible	Minor	Negligible	Residents will be affected during construction by earthworks and hoarding. It will be no different to the installation of other infrastructure in the road corridor. All effects are temporary.
VSR3 - Users of Oratia Stream walk and cycleway	High	Negligible	Minor	Negligible	Users will have partial views of the pipe line on the upstream side of the bridge, away from the public path. With mitigation planting, a muted colour finish, the same or similar to the existing NH1 pipeline, along with the pipe's placement close to the existing bridge, visual effects will be minimised with the pipe appearing as part of the bridge structure.
VSR4 - Residents of Parrs Cross Road through to Don Buck Road	High	Negligible	Minor	Negligible	Residents will only be affected during construction by earthworks, hoarding and localised vegetation loss. However, it will be no different to the installation of other infrastructure in the road corridor. All effects are temporary with the exception of the large tree in the Swanson/Universal/Don Buck intersection. This is not

					considered significant enough to change the visual character of the area.
VSR5 - Users of Opanuku Stream walk and cycleway	High	Small	More than minor	Less than minor	Users will have open views of the pipe line on the downstream side of the bridge, adjacent to the public path. With mitigation planting, a muted colour finish along with the pipe's placement close to the existing bridge, visual effects will be minimised with the pipe appearing as part of the bridge structure.
VSR6 - Users of Paremuka Stream walk and cycleway	High	Small	More than minor	Less than minor	Users will have open views of the pipe line on the downstream side of the bridge. Due to the finish of the pipe along with the pipe's placement close to the existing bridge, visual effects will be minimised with the pipe appearing as part of the bridge structure.
VSR7 - Users of Swanson Stream walk and cycleway	High	Small	More than minor	Less than minor	Users will have partial views of the pipe line on the upstream side of the bridge, partially screened by existing vegetation. There will be some vegetation loss also. With mitigation planting and a muted colour finish the visual effects of the pipe will be less than minor.
VSR8 - Travellers along the alignment	Low	Negligible	Minor	Negligible	Travellers along the alignment will only experience temporary visual effects from earthworks, hoarding and construction activities during construction. Following completion of the works, limited temporal views of any above ground pipes at stream crossings.
VSR9 - Workers and shoppers at Westgate	Medium	Negligible	Minor	Negligible	Workers and shoppers at Westgate will only experience temporary views of the proposed works and the existing view is of limited amenity.

## 4 NOR2 - The Receiving Environment and Effects

### 4.1 Receiving Environment - Landscape

#### 4.1.1 Landscape Character

The NOR2 proposal travels from the Albany side of Greenhithe Bridge up to William Pickering Drive in a landscape dominated by SH18 and associated infrastructure. Once the pipe leaves the highway alignment it moves through a light industrial / business park environment with large, predominantly two storey modern buildings on either side of the road corridor. The area has a suburban commercial character with considerable space between buildings, internal landscaping and on site-carparking in front of buildings. The roads are typically 20m wide with few street trees or vegetation of note.

The Oteha Stream area is a significant escarpment of native vegetation with a high level of natural character. The stream is located at the southern base of the escarpment, being 6-8m below the bridge deck. There are a number of pipes crossing the stream adjacent to the downstream side of the bridge but are of a scale that they do not detract from the naturalness of the corridor. Vegetation is well established with some good examples of tall native trees and epiphytes as well as exotic pine species.

The last section of pipe is in the Albany town centre which is characterised by wide roads, large expanses of carparking and big box retail buildings and business park-like buildings up to four storeys in height. The alignment roughly follows an existing pathway through a wide grass area up to the water tanks. There is little vegetation of note in this area and the receiving environment has a modified commercial character.

Each of the landscape elements which make up the landscape character are described in further detail below.

#### 4.1.2 Topography

The topography of the receiving environment is undulating with steep stream gullies and ridgelines common on the northern side of the Greenhithe Bridge. The pipe rises from approximately 50masl up to 85masl at the water tanks in Albany town centre but it is not a constant rise. The highway rises up to 70masl before dropping back down to William Pickering Drive at 35masl. Bush Road and Oteha Stream are at approximately 15masl. With the exception of the Oteha Stream escarpment, the topography has been modified by large scale infrastructure development although it retains a heavily undulating character. The topography in this area has a medium sensitivity to change.

#### 4.1.3 Vegetation

The majority of vegetation affected by the proposal is highway plantings adjacent to the SH18. The size and nature of the planting vary but they are typically small, being less than 5m in height. They are planted in masses of a single species where space permits. Species include manuka and flax along the alignment and are common in the local area. There are a number of trees lining the road reserve edges of William Pickering Drive, Rosedale and Bush Roads, including pohutakawa, liquidambar and oaks ranging in height from 6-10m, some of which overhang the carriageway in places. The rest of the alignment is largely devoid of any vegetation of note with the exception of the Oteha Stream / Fernhill Escarpment. The escarpment is a well-established area of native secondary podocarp forest, including large native trees with epiphytes, and is a Site of Special Wildlife Interest (SSWI 4) under the District Plan and a SEA in the PAUP. This area has a high sensitivity to change.

#### 4.1.4 Waterways

The alignment crosses Oteha Stream which is an important local feature and a site of ecological significance. The waterway has a high level of amenity with natural banks and native riparian vegetation. The stream is crossed by Bush Road as well as a number of other pipes, attached on the downstream side. The vegetation is of high value in this area and contributes to the natural character of this stream which is considered to be medium



to high. The waterway has natural banks and base with limited signs of modification visible. The waterway is highly sensitive to change.

#### **4.1.5 Built Structures**

The SH18 corridor contains a number of built structures including the highway itself, noise walls, overbridges, gantry signs, light poles and chain mesh security fencing.

The Albany industrial area is characterised by single and two storey light industrial buildings built from the 1980's onwards. Buildings are typically setback from the street 6-10m or greater with carparking and landscaping located in the front yard. The street scene was visually dominated by on-street carparking on the day of our site visit. Signs, free standing and attached to buildings are large and contribute additional visual clutter to the character of the receiving environment.

The town centre consists of large, two-four storey business park style buildings with large footplates. There are a number of sections which are yet to be developed and are currently open grass fields. The proposed pipeline follows an existing 2m wide path which runs through the area linking to the water tanks adjacent to SH1.

Built form is considered to have a low sensitivity to change.

## **4.2 Effects on Landscape Character and Values**

### **4.2.1 Landscape Values (from statutory documents)**

The proposed is not located in an Outstanding Natural Landscape with the only area of note being Oteha Stream and its escarpment, being a Site of Special Wildlife Interest (SSWI 4). The proposal is to tunnel this section of the pipe thereby removing the need to remove any vegetation. It is considered that the proposal does not have any effects on landscape values.

### **4.2.2 Landscape Character**

Prior to mitigation I consider that the effects on Landscape Character will be more than minor with the exception of Oteha Stream which has the potential to experience significant adverse effects if mitigation measures are not proposed. Overall I consider that the proposal for NOR2 will have less than minor residual effect on the landscape character with most elements experiencing negligible impacts with the exception of Oteha Stream / Fernhill escarpment. The stream and escarpment are a highly sensitive landscape element with high natural character values and the effects can only be reduced to a minor level, rather than a negligible level, by mitigation. The following table outlines the likely effects on the existing landscape character and elements prior to mitigation and following. Proposed mitigation measures are described in Section 7.

**Table 5: Assessment of Effects on Landscape Character and elements**

Landscape Character / Element	Sensitivity of Change	Magnitude of Change	Effect (before mitigation)	Residual Effect (after mitigation)	Comment
Character	Medium	Small	Minor	Less than Minor	For the majority of the alignment, the pipe is traversing through either a light industrial environment or highway corridor where the only visible elements will be manholes and where the pipe crosses Oteha stream. During construction the work areas will affect the character of the receiving environment but are temporary in nature so considered to be less than minor.
Topography	Medium	Negligible	Less than minor	Nil	The majority of the pipe work will either be tunnelled under sensitive areas, or will be open trench in the road and highway corridor. There will be limited effects on the underlying topography which is considered to be in a modified condition already, with the exception of the Oteha Stream area. Overall it is considered that there will be NIL effects on topographical elements.
Vegetation	Medium	Small	Minor	Less than minor	The effects on existing vegetation, with the exception of Oteha, are limited due to the majority of works being located within a road or highway corridor, requiring only localised canopy trimming at most. The majority of the vegetation affected is either young natives or trees of a lesser quality.
Vegetation - Oteha Stream and Fernhill Escarpment	High	Moderate	Significant	Minor / Less than Minor	The Oteha Stream / Fernhill escarpment is of a high landscape and amenity value. If Options 2 or 3 are implemented where open trenching occurs and elevated pipe work it will require the removal of a group of trees at the southern end of the bush for the pipe stream crossing. This bush includes totara, tanekaha and a significant kahikatea with epiphytes and would result in a significant loss if these trees were felled. For this reason, in landscape and amenity terms, the tunnelling option (Option 1) is considered a mitigation measure as it avoids the need to fell these trees. If Option 1 is selected, residual effects will be Less than Minor. If Option 2 or 3 is selected and significant trees are required to be felled then the residual effects are considered to remain More than Minor. If the felling or pruning of trees at Oteha can be avoided then residual effects will be less than minor.

Waterways	High	Small	More than minor	Less than minor (Option 1)  Minor (Options 2 and 3)	Oteha Stream has a high level of natural character and a high sensitivity to change. It is largely free of built structures or human elements, with the exception of the road bridge and pipes immediately downstream. If construction works in the area are not mitigated, the placement of the pipe could have a more than minor adverse effect on the character and amenity of the stream by introducing a sizeable infrastructural element into a natural area. If vegetation removal can be avoided, residual effects would reduce to less than minor. From a landscape and amenity perspective, I consider that the proposed tunnelling (Option 1) will result in minimal effects and the least amount of vegetation disturbance.
Built Structures	Low	Small	Less than Minor	Nil	The proposal will not affect the current suburban-commercial and highway character of the receiving environment with the infrastructure largely being underground.

### 4.3 Receiving Environment - Visual Context

The visual context of the receiving environment is one of limited views due to the heavily undulating topography restricting views to small areas.

### 4.4 Key Viewpoints

A series of key viewpoints were selected to show a representative sample of the likely visual effects which could result from the proposal. All viewpoints are located on public land, and where possible located as close as possible to existing or proposed residential dwellings. In assessing the potential effect of a proposal the quality and openness of the view is considered as well as the availability of alternative views. These were as follows:

- 1) View looking northeast across the Upper Harbour Highway (SH18) / Albany intersection;
- 2) View looking southwest on Bush Road from Oteha Stream;
- 3) View looking northeast, back up Bush Road towards Albany town centre, across Oteha Stream;
- 4) View looking southwest from Corinthian Drive, Albany; and
- 5) View from the Albany Reservoir looking southwest across to Spencer Ridge Reserve.

#### 4.4.1 Visually Sensitive Receptors

In assessing the potential effects on visually sensitive receptors, the key viewpoints outlined above have been used as a reference point where it is considered that the effects are likely to be similar. These are as follows:

Table 5:1 Visually Sensitive Receptors

VSR No.	Visually Sensitive Receptors	Type of View (open, partial, screened)	Distance to Pipe Alignment	Description of Current View
VSR20	Motorists on the SH18	Partial	0-30m	Views are largely contained by the banks and vegetation running along either side of the highway alignment. The banks are planted with a mix of native species in wide swales. Built elements such as fencing, barriers, signs, light poles and overbridges are visible.
VSR21	Workers on William Pickering Drive, Bush Road, Douglas Alexander Parade and Rosedale	Open	0-20m	Workers have views of a typical street with on-street parked cars and two lanes of traffic with a 13m wide carriageway. Powerlines are underground and there are some street trees on the edge of the road reserve with the footpath immediately abutting the carriageway. Views along the street are typically open with building set back from the street edge.
VSR22	Residents on Rosedale Road (Northwood)	Partial / screened		The Northwood development is orientated away from Rosedale Road with landscaping and fencing partially screening views. It is considered these residents have a low sensitivity to this project.

VSR No.	Visually Sensitive Receptors	Type of View (open, partial, screened)	Distance to Pipe Alignment	Description of Current View
VSR23	Motorists on William Pickering Drive, Bush Road, Douglas Alexander Parade and Rosedale	Open	0m	Motorists currently experience open views with parked cars on the side of the road and buildings set back from the street edge.
VSR24	Recreational users of Oteha Stream and the paths through Albany	Open	0m	Open views can be gained from Bush Road in to the stream and native vegetation. The views have a high amenity level and sensitive to any change. Through Albany the views are less sensitive being wide open grass fields flanked by large business park-like buildings and big box retail.
VSR25	Workers in Albany Town centre	Open	Under 20m	Workers in Albany have open views across carparks and open grass fields.

## 4.5 Effects on Visual Amenity

I consider that the effects on visual amenity will be negligible given the nature of the proposed works. The greatest potential for adverse effects will occur during construction in those areas where open trenching will happen and the site works will be visible. For the most part, final infrastructure position is below ground and there will be no residual visual effects with the exception of the elevated pipe crossing at Oteha Stream. At this location the pipe will have a minor adverse effect on the visual amenity but I consider that any adverse effects can be successfully mitigated to ensure any residual effects are less than minor. The following section outlines the likely visual effect on Visually Sensitive Receptors.

## 4.6 Effects on Visually Sensitive Receptors (Visual Effects)

The following table assesses the potential visual effects resulting from NOR2. The table takes into account the likely sensitivity of the receptor (based on type), combined with the likely magnitude of effects (a combination of distance from the proposal and degree of change) to determine what the likely residual effects from the proposal will be, with proposed mitigation measures described in Section 7.

**Table 6: Assessment of Effects on Visually Sensitive Receptors**

Visually Sensitive Receptors (VSR)	Sensitivity of VSR	Magnitude of Change	Effect (before mitigation)	Residual Effect (after mitigation)	Comment
VSR20 - Motorists on SH18	Low	Small	Less than minor	Nil	The current view is open with expansive views forward and back but limited views to the side given the depressed nature of

					the motorway. Further to the east the views become more expansive as the motorway becomes more elevated. The temporary works will appear as part of the highway infrastructure and are not considered out of character, with any effects reducing to Nil once existing planting grows further.
VSR21 - Workers on William Pickering Drive, Bush Road, Douglas Alexander Parade and Rosedale	Medium	Small	Minor	Nil	Workers will only experience temporary views of the proposed works which will be fully mitigated once work is complete.
VSR22 - Residents on Rosedale Road (Northwood)	Low	Negligible	Less than Minor	Nil	Dwellings associated with Northwood face away from Rosedale Road with landscape planting providing a significant screen. At this location any of the works are temporary in nature and the residents are not considered affected as their dwellings are orientated away from the alignment.
VSR23 - Motorists on William Pickering Drive, Bush Road, Douglas Alexander Parade and Rosedale	Low	Small	Less than minor	Nil	Motorists will only experience temporary views of the proposed works which will be fully mitigated once work is complete. There will be no residual effects.
VSR24 - Recreational users of Oteha Stream and Fernhill Escarpment	High	Option 1 Negligible	Minor	Less than minor	Users of the Oteha Stream will view temporary works areas but with the tunnelling of the pipe through this section, any residual adverse effects will be avoided if existing vegetation can be retained.
		Option 2 Moderate	Significant	Minor	Unmitigated Option 2 could result in the felling of a number of trees along the road reserve, and include a number of significant trees. If tree felling in this area can be minimised or avoided and the pipe structure is designed in a sympathetic manner, residual effects would reduce to minor. If the felling of significant trees cannot be avoided then residual effects would remain significant.
		Option 3 Moderate	Significant	Minor	Option 3 could result in the felling of a number of trees to establish a work area for tunnelling within the bush area, following pipe bridging the stream. Adverse effects are likely to be the same as Option 2 but could potentially be larger if care is not taken to avoid trees. If the felling of

					significant trees cannot be avoided then residual effects would remain significant.
VSR25 – Workers and shoppers in Albany Town centre	Low	Small	Less than minor	Nil	Workers and shoppers in Albany town centre will only experience temporary views of the proposed works which will be fully mitigated once work is complete.

## 5 NOR3 - The Receiving Environment and Effects

### 5.1 Receiving Environment - Landscape

#### 5.1.1 Landscape Character

The NOR3, including Pump Stations and micro tunnels pits, proposal is largely contained within the SH18 road corridor from Westgate to the Greenhithe bridge. The road was opened by the NZ Transport Agency in August 2011 to connect the end of SH16 at Hobsonville Road to the Greenhithe Bridge and the Greenhithe Motorway.

Residential and commercial development is occurring on the southern side of the motorway corridor, with the master planned redevelopment of Hobsonville Air base into a new urban centre with retail, schools and housing. At the southwestern end is the existing suburb of West Harbour with Whenuapai located to the north of SH18.

Each of the landscape elements which make up the landscape character are described in further detail below.

#### 5.1.2 Topography

The topography of the receiving environment is undulating, having been modified for the construction of the motorway. The motorway is at approximately 10masl at the Greenhithe end rising to approximately 50masl at the intersection with Fred Taylor Drive, over a 5m distance. It is considered the topography has a low sensitivity to change. The alignment moves through a series of sections which are separated by local high points. In general, the motorway is lower than the surrounding area.

#### 5.1.3 Vegetation

Vegetation along this section consists of recently planted (within the last 5 years) of motorway plantings. Species include flax, pittosporum, cabbage trees and kanuka, and native wetland species around stormwater ponds. There are also large areas of pasture and rank grass along the alignment and adjacent to the streams. The plants are establishing well but yet to be of a size to influence the landscape character or amenity of the corridor. Existing vegetation on the MT17 where the Pump Station is proposed consists of a mixture of more established invasive species such as gorse, blackberry, pine and eucalyptus trees, pampas grass but also includes native tree ferns. There are no Heritage trees listed within the receiving environment and there were few trees of any notable size.

Vegetation along SH18 is considered to have a low sensitivity to change.

#### 5.1.4 Waterways

There are seven watercourses within the receiving environment for NOR3, being Trig and Rawiri Streams and five unnamed watercourses. The streams have a modified character and are diverted into culverts under the motorway. Within the NZTA designation there are some native riparian plantings but these are yet to establish. The streams sensitivity to change is considered medium to low given their modified character.

All of the streams have a modified natural character and amenity value, and have a medium-low sensitivity to change.

#### 5.1.5 Built Structures

The receiving environment is dominated by SH18 and its associated infrastructure including lighting, pedestrian and vehicle over bridges, stormwater channels, utility areas, noise walls, gantries and signage. The pedestrian bridge is a notable element on the skyline being a strong vertical element coloured yellow. At the northern end of the alignment, medium density residential development is occurring with two-three storey townhouse and terrace



house developments. This is changing the character of the receiving environment from peri-urban to fully urban, consistent with the Planning provisions. The dwellings are typically of a medium construction value.

Overall, the built form of the alignment has a low to medium sensitivity to change.

## 5.2 Effects on Landscape Character and Values

### 5.2.1 Landscape Values (from statutory documents)

The proposal is located within the Waitakere District of the Auckland Council District. The majority of the works are located within designation NZTA4 for the Upper Harbour Motorway (SH18) with the underlying zones being Countryside on the northern side of the motorway and Special Area – Hobsonville on the southern side. The alignment is not located within an Outstanding Natural Landscape Area and there are no landscape values outlined in the District Plan for this section. As discussed above, the proposal is consistent with the underlying zones of the Proposed Auckland Unitary Plan and will not affect the Objectives and Policies of this document.

The proposal will have NIL effects on Landscape Values.

### 5.2.2 Landscape Character

Overall I consider that the proposal will have Negligible to NIL effects on the Landscape Character as the corridor is dominated by the roading infrastructure associated with SH18. The table below outlines the findings in relation to each element, with proposed mitigation measures described in Section 6.

**Table 5.1: Assessment of Effects on Landscape Character and elements for the NH2 and NI pipelines, Pump Station and Micro tunnel pits**

Landscape Character / Element	Proposal Site	Sensitivity of Change	Magnitude of Change	Effect (before mitigation)	Proposed Mitigation Measure	Residual Effect (after mitigation)	Comment
<b>Character</b>	MT2-4 (MT2 Permanent )	Low	Negligible	Nil	MM1-6	Nil	The micro tunnel pits will not affect the highway character of the receiving environment given that in most locations the permanent works will be a flat concrete pad which will be installed at ground level. There will be localised vegetation removal, as well as truck movements and crane activity during the construction process but these are not considered out of context given the amount of construction that is occurring in the receiving environment at present. The receiving environment is changing from peri-urban to an urban character where large scale infrastructure is expected. The SH18 highway visually dominates the character of the area at present and the proposed works associated with this project will have a negligible magnitude of change in comparison.  The Hobsonville Pump Station will result in the loss of vegetation however the scale of the building and associated structures is considered small. The structures to be included are anticipated to be a dry well approximately 6metres in height, and a control room approximately 3-4metres in height. These will cover an area of approximately 25metres long by 16metres wide. Mitigation will involve design elements outlined in section 6 and replacement planting where there are disturbed areas and around the edges of the Pump Station site. The receiving environment is a highly modified transport corridor, and I consider that the proposal will not have any residual adverse effects.
	MT5-8 (MT7 Permanent )	Low	Negligible	Nil	MM1-6	Nil	
	MT9-12 (MT11 Permanent )	Low	Negligible	Nil	MM1-6	Nil	
	MT13-14 (MT13 Permanent )	Low	Negligible	Nil	MM1-6	Nil	
	MT15	Low	Negligible	Nil	-	Nil	
	MT16	Low	Negligible	Nil	-	Nil	
	MT17/ Pump Station (Permanent)	Low	Small	Less than Minor	MM7-11	Nil	
<b>Topography</b>	MT2-4 (MT2 Permanent )	Low	Negligible	Nil	MM5	Nil	The topography will not be significantly altered by the proposal. The pipework is underground and the only visible aspect of the micro-tunnelling is the lids which will be flush with the surrounding ground. There will also be some low level earth mounding at the Pump Station site (MH17) up to a height of 1 metre to mitigate the effects of the proposal. I consider that the proposal will not have any residual adverse effects on topography.
	MT5-8 (MT7 Permanent )	Low	Negligible	Nil	MM5	Nil	
	MT9-12	Low	Negligible	Nil	MM5	Nil	

	(MT11 Permanent )						
	MT13-14 (MT13 Permanent)	Low	Negligible	Nil	MM5	Nil	
	MT15	Low	Negligible	Nil	MM5	Nil	
	MT16	Low	Negligible	Nil	MM5	Nil	
	MT17/ Pump Station (Permanent)	Low	Small	Less than Minor	MM5, MM7	Nil	
Vegetation	MT2-4 (MT2 Permanent only)	Low	Negligible	Nil	MM3, 4, 6	Nil	A small area of establishing motorway native planting will be permanently replaced with the Micro-tunnel pit lids (approximately 80m <sup>2</sup> for each lid) and permanent access roads. A larger area of planting will be disturbed during construction. Site access should be planned to reduce the disturbance/loss of existing motorway planting and affected planting should be replanted.
	MT5-14 (MT7, MT11 & MT13 Permanent )	Low	Negligible	Nil	MM3, 4, 6	Nil	Micro-tunnel pit lids fall within establishing motorway native planting. This will reduce any long term effect of the proposal. Planting affected in the surrounding area during construction should be replanted.
	MT15	Low	Negligible	Nil	MM3, 4, 6	Nil	The Micro-tunnel lid will be located within a grassed area. The surrounding vegetation is a mix of gorse to the adjacent property boundary and the motorways native planting visible through a 2.0m high chain link fence. In the context of the surroundings it is not considered any additional planting is required around the Micro-tunnel pit lid.
	MT16	Low	-	-			Micro-tunnel lid is located within asphalt carpark. No vegetation will be affected by the proposal.
	MT17/ Pump Station (Permanent)	Low	Small	Nil	MM3, 8	Nil	The proposal site will be significantly cleared of existing mature vegetation. The existing vegetation is predominantly a mix of invasive exotic species such as gorse, pampass grass, eucalyptus and pine trees but also native tree ferns. The loss of this planting will in the short term have an impact on the area for the neighbouring residence. Replacement planting should better reflect the regional ecology and tie in with the adjacent shared corridor planting. Mounding of the street frontage will aid the quick screening of the area. It is suggested that the currently required 2metre wide x 1metre high area of planted bunding to the street frontage is widened to 4metres width to allow for more practical grades and a greater level of screening. It is considered the change to the vegetation will be NIL once new planting is establishes.
Waterways	All	N/A	N/A	N/A	N/A	N/A	No waterways will be affected by the proposal. It is proposed to tunnel along this section of the NH2 and NI, under both the Trig and Rawiri Streams and under other watercourses. There will be will be some loss of vegetation but all of the plants are young, having recently been planted.
Built Structures	All	N/A	N/A	N/A	N/A	N/A	The only above ground level structure will be the Pump Station and associated buildings. Typical dimensions indicate the dry well building would be approximately 6metres high and the control room would be approximately 16metres long and 3-4m in height. These built structures will be located within the context of the motorway corridor and will visually sit alongside the motorways built infrastructure such as lighting, over bridges and utility areas. Mounding and planting outlined above will effectively screen the proposal over time. It is recommended site fencing is aligned behind the planting on the Pump Station site to provide as high as possibly streetscape amenity.

## 5.3 Receiving Environment - Visual Context

The visual context of the receiving environment provides open expansive views of the NOR from all around, being distinctly part of a significant transport corridor. Built elements visually dominant the character of the corridor, with motorway planting yet to influence the area's amenity.

### 5.3.1 Key Viewpoints

A series of key viewpoints were selected to show a representative sample of the likely visual effects which could result from the proposal. All viewpoints are located on public land, and where possible located as close as possible to existing or proposed residential dwellings. In assessing the potential effect of a proposal the quality and openness of the view is considered as well as the availability of alternative views. These were as follows:

- 1) View looking north from Hobsonville Drive towards proposed MT2, MT3 & MT4
- 2) View looking south-west from Trig Road towards proposed MT2, MT3 & MT4.
- 3) View looking south-west from Trig Road overpass towards proposed MT2, MT3 & MT4.
- 4) View looking north-east from Trig Road overpass.
- 5) View looking east from Access to 51 Trig Road towards proposed MT5
- 6) View looking west from Access to 51 Trig Road towards proposed MT6.
- 7) View looking east from Access to 51 Trig Road towards proposed MT8.
- 8) View looking north from Brigham Creek Road towards proposed MT13.
- 9) View looking north-west from Sinton Road towards proposed MT15.
- 10) View looking east from pedestrian overpass at the end of Ockleston Road towards proposed MT16.
- 11) View looking north-east from the pedestrian footpath linking to Buckley Avenue towards proposed Pump-station/MT17
- 12) View looking west from Buckley Avenue towards proposed Pump-station/MT17.

### 5.3.2 Visually Sensitive Receptors

In assessing the potential effects on visually sensitive receptors, the key viewpoints outlined above have been used as a reference point where it is considered that the effects are likely to be similar. These are outlined in the table below.

## 5.4 Effects on Visual Amenity

I consider that the effects on visual amenity will be negligible given the current modified character of the motorway corridor and the nature of the proposed works being tunnelled. The works areas are relatively small in comparison to existing infrastructure in the area and any effects will be temporary in nature.

## 5.5 Effects on Visually Sensitive Receptors (Visual Effects)

The following table assesses the potential visual effects resulting from NH2 and NI. The table takes into account the likely sensitivity of the receptor (based on type), combined with the likely magnitude of effects (a combination of distance from the proposal and degree of change) to determine what the likely residual effects from the proposal will be, with proposed mitigation measures described in Section 7.

Table 5.2: Assessment of Effects on Visually Sensitive Receptors

Proposal Site	Visually Sensitive Receptors (VSR)	Sensitivity of VSR	Magnitude of Change	Effect (before mitigation)	Proposed Mitigation Measures	Residual Effect (after mitigation)	Comment
<b>MT2-4</b>							
VSR31	Residents and road users on Hobsonville Drive.	Medium	Negligible	Less than minor	MM1-6	Nil	Views of the proposal will be from approximately 200-500metres. The current view is open to the north with expansive elevated views over agricultural land towards the motorway in the distance. Vegetation consists of exotic trees to areas of pasture and native wetland planting to low areas. Large commercial buildings and the motorway are visible in the background. Within the setting of the motorway infrastructure the additional Micro-tunnel lids and access roads will have a less than Minor residual effect.
VSR32	Residents on Trig Road near motorway overpass.	Medium	Negligible	Less than minor	MM1-6.	Nil	Only MT2 will be permanently visible. This will be in the form of an approximately 6m diameter manhole lid.  MT3 & MT4 will be fully remediated following construction with no visible structures at ground level.
VSR33	Motorists on Trig Road near motorway overpass.	Low	Negligible	Nil	n/a	Nil	No view of proposal possible due to the existing motorway acoustic fence and planting.
<b>MT5</b>							
VSR34	Motorists on Trig Road	Low	Negligible	Nil	MM1-6	Nil	View during construction will be limited as it is approximately 200metres away and has native planting surrounding it.  MT5 will be fully remediated following construction with no visible structures at ground level.
VSR35	Residents on Trig Road	Medium	Negligible	Less than minor	MM1-6.	Nil	View during construction neighbouring residents will be limited due to the topography, distance away and surrounding native plantings.  MT5 will be fully remediated following construction with no visible structures at ground level.
<b>MT6</b>							
VSR36	Residents on Trig Road	Medium	Negligible	Less than minor	MM1-6	Nil	Topography and existing planting will effectively screen the micro-tunnel lid.  MT6 will be fully remediated following construction with no visible structures at ground level.
<b>MT7</b>							
VSR37	Residents on Trig Road	Medium	Negligible	Less than minor	MM1-6.	Nil	Topography and surrounding planting will effectively screen the micro-tunnel lid over time.
<b>MT8</b>							
VSR38	Residents on Trig Road	Medium	Negligible	Less than minor	MM1-6.	Nil	Topography and surrounding planting will effectively screen the micro-tunnel lid over time from the road. View of the micro-tunnel lid from the resident approximately 120m to the south-west is screened by existing mature trees.
<b>MT9-MT12</b>							

Proposal Site	Visually Sensitive Receptors (VSR)	Sensitivity of VSR	Magnitude of Change	Effect (before mitigation)	Proposed Mitigation Measures	Residual Effect (after mitigation)	Comment
VSR39	Motorists on SH18	Low	Negligible	Nil	MM1-6	Nil	Micro-tunnel lids and access roads will be set amongst the motorway planting. Due to the topography the lids will not be visible from the motorway to the north and will be effectively screened by the surrounding vegetation when viewed from the south.
<b>MT13</b>							
VSR38	Motorists on Brigham Creek Road	Low	Negligible	Nil	MM1-6	Nil	Micro-tunnel lid and access road will be visible to road users after completion. Given the context of the motorway and associated infrastructure and topography the effect of this will be Nil.
<b>MT14</b>							
VSR39	Motorists on SH18	Low	Negligible	Nil	MM1-6	Nil	Micro-tunnel lid will not be visible to motorway users after completion. However the access road will replace an area of motor way planting. It is not considered this loss of vegetation will have significant effect given the surrounding context of the shared corridor.
<b>MT15</b>							
VSR40	Motorists on Sinton Road towards proposed MT15.	Medium	Negligible	Less than minor	MM1-6	Nil	Views of the Micro-tunnel lid and access road from Sinton Road will be possible due to the topography. The lid will be located within a grassed area and will be flush with the surrounding area. The lid and access road will also be visible to residents and business located to the south-east on Hobsonville Road. Given the context of the motorway and associated infrastructure and the large scale development of the surrounding area the effect of this is considered to be less than Minor.
<b>MT16</b>							
VSR41	Pedestrians on the overpass at the end of Ockleston Road towards proposed MT16.	Medium	Negligible	Less than minor	MM1-6	Nil	The Micro-tunnel lid is located within the asphalt carpark of the bowling club. Site access should be arranged to avoid the need to damage/remove areas of existing native planting. The lid will be visible from neighbouring residential units currently under construction to the west but is considered to be a Minor imposition during construction reducing to Nil following mitigation.
VSR42	Residents of the dwellings (being constructed on Ockleston Road)	High	Negligible	Minor	MM1-6	Nil	
<b>MT17/ Pump Station</b>							
VSR43	Residents on Buckley Avenue looking towards proposed Pump-station/MT17.	High	Small	More than Minor	MM7-11	Less than minor	<p>The Micro-tunnel lid (MT17) and associated access way is located within existing vegetation that will need to be cleared. The area will be viewed by pedestrians, road users and residence overlooking the area on Buckleys Road. More significant than the lid itself, is the loss of vegetation and creation of hardstand areas. This will open views for residents towards the motorway corridor however due to the topography the motorway will not be clearly visible.</p> <p>When the Pump Station is built a planted bund will reduce the impact of the structures and along with architectural treatment of the buildings will allow them to assimilate into the urban receiving environment. Site fencing should ideally be setback from the road edge behind the landscape bund to reduce any utilitarian feel to the site. These buildings will sit alongside the other structures associated with the motorway corridor. Given the surrounding context it is considered the impact of these structures on the surrounding area will be no more than Minor.</p>

## 6 Recommendations/ Mitigation Measures

A series of mitigation measures have been developed for the three NORs and are recommended to mitigate potential adverse effects on landscape character, landscape values (from statutory documents), visual amenity or visually sensitive receptors. These are as follows:

### APPLICABLE TO ALL THREE PROPOSALS

1. Any above ground pipes and structures / pump stations, shall be finished in colours that are appropriate for the receiving environment. Building walls and paving materials shall be at a natural reflectivity of no greater than 37% in accordance with British Standard 5252 Groups A and B, Resene Colour Range.
2. All permanent exterior lighting (if required) shall be designed so as to reduce lux spill.
3. Following the completion of construction, works areas are to be reinstated to their original condition prior to construction.
4. All planting is to be implemented in the first available planting season (1 April to 30 August) following the completion of construction, if not sooner.
5. As part of construction, detailed landscape plans are to be prepared by the Project Landscape Architect and submitted to Council. These plans shall include species planting plans, proposed soil cover preparation, fertiliser, mulching and maintenance plans.
6. All landscaping required for this consent shall be maintained, with any dead, diseased or dying landscaping to be replaced immediately with plants of the same species and at the minimum height at the time of planting as specified in the Landscape Plan.
7. Works areas are to be reinstated to their original condition prior to construction.

The following measures are suggested, specific to NOR1 only:

8. All pipes shall be located as close as is practical to the existing bridge structure, preferably at a height that will maintain open views from the bridge. In some instances, there may be flood, engineering, ecological or other requirements which require the pipe location to vary but the above description is the preferred alignment.
9. The pipe crossing over Oratia Stream maintains its alignment on the Waitakere Ranges southern side of the bridge, away from the footpath and the Oratia walk and cycleway. This will also avoid a well-established stand of cabbage trees which are located on the northern side.
10. The pipe over Paremuka Stream is kept as close as practical to the existing bridge and below the top of the deck if possible to maintain open views from the bridge.
11. A Planting plan should be prepared to mitigate for the loss of vegetation on the central median on Shetland Street and for the loss of the tree in the intersection at Don Buck / Universal / Swanson.

The following measures are suggested, specific to NOR2 only:

12. Selecting a trenchless technology solution for the section of pipe through the Oteha Stream and Fern Hill escarpment would minimise vegetation removal and visual impact. As with item 7 above, other issues may result in this option not being possible. If Option 2 or 3 is selected, then existing native trees will be retained as far as practicable.

The following measures are suggested, specific to NOR3 only:

The main areas of concern were the Pump Station and associated structures (MH17) due to the proximity to neighbouring housing. A series of mitigation measures (MM) were developed to ensure adverse effects were addressed, and mitigated or avoided where possible.

- MM1 Any above ground pipes and structures/Pump Stations, shall be finished in colours that are appropriate for the receiving environment. Building walls and paving materials shall be at a natural reflectivity of no greater than 37% in accordance with BS5252 Groups A and B.
- MM2 All exterior lighting (if required) shall be designed so as to reduce lux spill. This is with the exception of the Pump Station site where normal security lighting is expected.
- MM3 As part of construction, detailed landscape plans are to be prepared for sensitive areas and submitted to Council. These plans shall include species planting plans, proposed soil cover preparation, fertiliser, mulching and maintenance plans. The sites recommended for planting plans are the Buckley Ave Pump Station and the MT7 site where above ground structures are proposed.
- MM4 All landscaping shall be maintained, with any dead, diseased or dying landscaping to be replaced immediately with plants of the same species and at the minimum height at the time of planting as specified in the Landscape Plan.
- MM5 Works areas are to be reinstated to their original condition prior to operation with any surplus excavation material removed from site.
- MM6 All planting is to be implemented in the first available planting season (1<sup>st</sup> April to 30<sup>th</sup> August) following the completion of construction, if not sooner.

#### BUCKLEY AVENUE PUMP STATION

- MM7 A 1m high landscape bund is to be constructed along the road frontage with 1 in 3 batters. The bund is to have a minimum 300mm depth of topsoil to assist with plant growth.
- MM8 The bund is to be planted with native species at 1.5m centres and 75mm of mulch applied. Refer to figure 13 of the figures for recommended plant species.
- MM9 Suggested that a shared entrance is created for the Vector site and the Watercare Pump Station to minimise / consolidate vehicle crossings.
- MM10 Any security fencing along Buckley Road should consider positioning behind the landscape bund to mitigate adverse visual effects from a 2m high chain mesh fence (or similar). The gate to the site should be positioned a minimum of 5m from the street boundary to allow a vehicle to park in front of the gate without disrupting pedestrian movements. It also assists with reducing any visual effects from a security gate.
- MM11 In terms of built form, any buildings on site should be sympathetic to the nearby residential dwellings. Buildings within the site should use a consistent palette of materials and colours to appear unified. There is a preference for a number of smaller individual buildings as opposed to a larger, single building.



## 7 Conclusion

Overall I consider that the residual effects of the project subject to the three NORs are:

- a. NOR1 – The pipeline running through Waitakere from the Huia Water Treatment Plant (Woodland Park Road Reservoir) site to Westgate will have less than minor residual effects on landscape values, landscape character and visual amenity following implementation of the proposed mitigation measures. The largest potential adverse effects are likely to be on residents adjacent to, and users of the four stream corridors which run across the alignment and where the pipe will be above ground, crossing the stream via a pipe bridge. For the remainder of the NOR1 alignment the pipeline is below ground and will only result in minimal vegetation clearance. I consider that many of the measures which may have been considered mitigation measures have already been incorporated into the construction methodology as a way of reducing residual effects.
- b. NOR2 – As with NOR1, it is considered that the pipeline running from Greenhithe Bridge to the Albany reservoir will have less than minor effects on landscape values, landscape character and visual amenity following implementation of the proposed mitigation measures. The largest potential adverse effects are likely where the pipeline traverses Oteha Stream and Fernhill Escarpment. If Option 2 or 3 are selected for this area, the likely effects are considered to be Significant, only reducing to Minor if removal of significant native vegetation can be avoided. All other effects are considered to be temporary during construction with no residual adverse effects.
- c. NOR3 – Of the three receiving environments, this area is the most modified and is least sensitive to change. The pipelines for the both NH2 watermain and for the Northern Interceptor in the shared corridor, including the Buckley Avenue Pump Station and micro-tunnelling pits will have less than minor residual effects on landscape values, landscape character and visual amenity following implementation of the proposed mitigation measures. The proposed construction methodology will minimise effects during construction and to minimise the need to remove existing motorway planting. The proposal is of a scale that it will not have an adverse effect on the character of the receiving environment and nearby sensitive receivers will not be adversely affected. It is possible for the proposed Pump Station to be designed in a way which is sympathetic to the receiving environment using a combination of building materials and colours, and landscape planting and bund.



David Compton-Moen

22 April 2016



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LANDSCAPE AND VISUAL IMPACT ASSESSMENT FIGURES - APPENDIX A

## NOR1 - NORTH HARBOUR 2 WATERMAIN AND NORTHERN INTERCEPTOR SHARED CORRIDOR

FOR WATERCARE

APRIL 2016 - 001 (FINAL)

REFER TO TECHNICAL REPORT G - LANDSCAPE AND VISUAL IMPACT ASSESSMENT

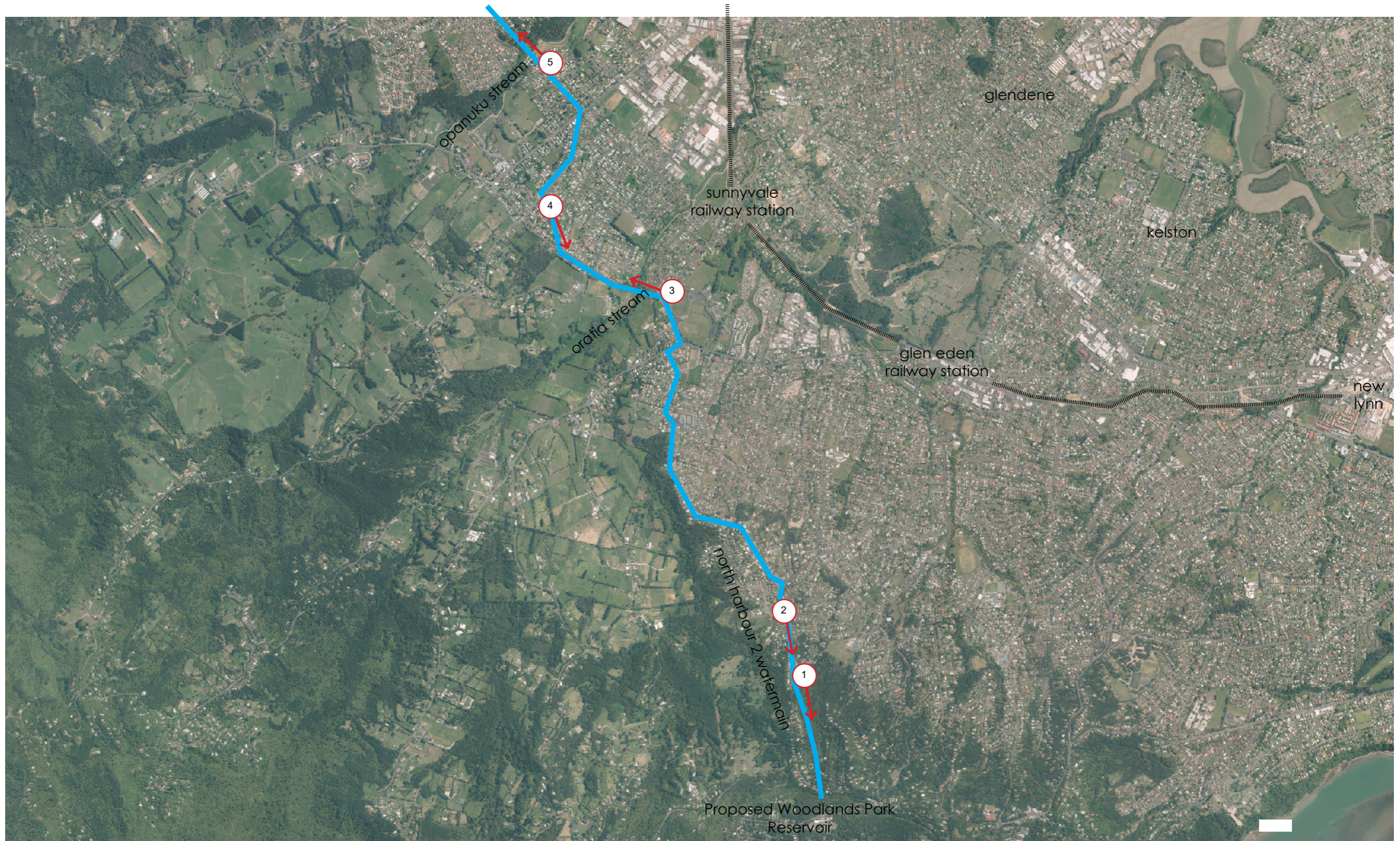


photo location map (1:25000@A3 approximately - taken from Auckland Council GIS viewer)

NORTH HARBOUR 2 WATERMAIN AND NORTHERN INTERCEPTOR SHARED CORRIDOR - LANDSCAPE AND VISUAL IMPACT ASSESSMENT FIGURES  
LOCATION PLAN AND KEY VIEWPOINT LOCATIONS (1)