

Grey Lynn Tunnel


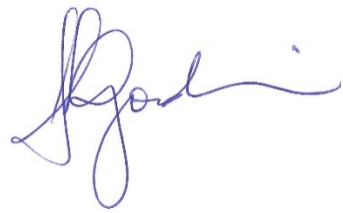
Assessment of Landscape and Visual Effects
Prepared for Watercare Services Ltd

20 February 2019

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Abbreviations

AC - Auckland Council

AEE - Assessment of Environmental Effects

ATF - Air Treatment Facility

AUP OIP - Auckland Unitary Plan Operative in part

CBD - Central Business District

CI - Central Interceptor

CSO - Combined Sewer Overflow

GLT – Grey Lynn Tunnel

LVEA - Landscape and Visual Effects Assessment

NoR - Notice of Requirement

RC - Resource Consent

RL - Reduced level; this is based on a mean sea level above datum

RMA - Resource Management Act

TBM - Tunnel Boring Machine

Watercare - Watercare Services Ltd

Glossary of Key Terms

Amenity - Amenity values are those values which create the appeal of a particular place. They are the natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence and recreational attributes.

Baseline - The landscape and visual character as it exists at the commencement of the assessment process – i.e. prior to the development proposal under consideration.

Building Envelope – For the purpose of assessing the effects of the proposal on the environment, and providing the community with information about the proposal, design parameters have been developed for the site that define a three-dimensional envelope within which the construction, operation and maintenance of the future development will occur.

Landscape Character - Is the distinct and recognisable pattern of elements that occur consistently in a particular landscape. These elements reflect particular combinations of geology, landform, soils, vegetation, land use and human settlement.

Landscape Capacity - The degree to which a particular landscape character type or area is able to accommodate change without unacceptable adverse effects on its character. Capacity is likely to vary according to the type and nature of change being proposed.

Landscape Effect – Change in the physical landscape, which may change its character or value.

Landscape Feature – An element which is a small part of the landscape and has characteristics which distinguish it from the wider landscape.

Magnitude (of change) - A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration.

Perception - Combines the sensory (that we receive through our senses) with the cognitive (our knowledge and understanding gained from many sources and experiences.) The aesthetic and perceptual aspects of the landscape/seascape include such aspects as scale, openness/enclosure, form, pattern, unity, colour, movement etc.

Residual Effects - Those effects remaining after the implementation (where necessary) of the proposed mitigation, compensation and enhancement measures.

Visual Amenity – Relates to the perceptual component of amenity, that is the visual qualities perceived by people.

Visual Effect – Change to a specific view which may change the visual amenity experienced by people.

Zone of Theoretical Visibility - A map, usually digitally produced, showing areas of land within which a development is theoretically visible. Also known as an Extent of Visibility.

1.0 Executive Summary

Watercare Services Ltd proposes to carry out works at the eastern end of Tawariki Street, Grey Lynn to construct a new wastewater collector system (Tawariki Street Shaft Site) to be connected to the Central Interceptor. Works associated with the Tawariki Street Shaft Site will necessitate excavations for the construction of two drop shafts, underground wastewater control / grit chambers, and an above ground plant / ventilation building with integrated air vent stack.

The Landscape and Visual Effects Assessment assesses the effects of the proposed infrastructure at Tawariki Street on physical landscape elements, landscape character and visual amenity. The assessment considered both temporary construction and permanent operational effects resulting from the proposed infrastructure.

The assessment concludes that both temporary and permanent effects upon the landscape and visual amenity will be limited and localised within the site boundary and in close proximity to the site and activity.

During the construction phase the operating machinery will generate the main character change on Tawariki Street by introducing structures typical of such activity within a residential neighbourhood. Views of the construction activities will be generally contained by topography and intervening buildings / vegetation, resulting in low (less than minor) adverse effects on the wider area and low-moderate (a minor level of) adverse effects on the Tawariki streetscape amenity. High (more than minor) short term adverse effects on visual amenity are expected on a few properties, which are located on an elevated position directly opposite to the subject site.

The permanent above ground structures such as the plant / ventilation building, and air stack, will be designed to be suitable for a residential area. Therefore, the operational effects on the wider area and on the Tawariki streetscape are considered to reduce to a low (less than minor) level, with no effects on the wider surrounding urban landscape. Visual amenity effects are also evaluated as low (less than minor) on Tawariki Street and the wider area, with low-moderate (minor) adverse effects on the visual amenity of properties opposite to the subject site at Nos. 35-41 Tawariki Street.

2.0 Introduction

The Landscape and Visual Effects Assessment (LVEA) will form part of a Notice of Requirement (NoR) and Resource Consent (RC) application for the proposed wastewater interceptor from Tawariki Street, Grey Lynn to Western Springs Reserve ("Grey Lynn Tunnel"). The Grey Lynn Tunnel (GLT) will connect to the Central Interceptor at Western Springs.

The LVEA is prepared by registered Landscape Architects at Boffa Miskell Ltd for Watercare and examines the landscape and visual amenity effects caused by the proposed infrastructure for both the construction phase (temporary effects) and operational phase (permanent / residual effects) of the project.

The LVEA presents an assessment of the effects of the proposed infrastructure at Tawariki Street on physical landscape elements, landscape character and visual amenity:

- **Landscape effects** derive from changes in the physical landscape, which may give rise to changes in its character and how this is experienced. This may in turn affect the perceived value ascribed to the landscape.
- **Visual effects** relate to the changes that arise in the composition of available views as a result of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity¹.

This assessment of landscape and visual effects report has been based on information provided by the Grey Lynn Tunnel Project Team. Details of the proposed works / development are included in the Assessment of Environmental Effects (AEE) documents, including the other specialists reports and drawings. Particular reference has been made to the Tawariki Site General Arrangement – Site Layout Plan (Drawing No. 2012917.100).

3.0 Methodology

This assessment of landscape and visual amenity effects has been undertaken with reference to a number of nationally and internationally recognised guidance documents. These include the Quality Planning Landscape Guidance Note² with its signposts to examples of best practice including: the UK guidelines for landscape and visual impact assessment³ and the New Zealand Landscape Institute Guidelines for Landscape Assessment⁴. This assessment has also been undertaken with consideration of the Auckland Council Information Requirements for the assessment of Landscape and Visual Effects (September 2017)⁵.

Assessing the significance of landscape and visual effects involves a combination of both qualitative and quantitative processes and relies on reasoned professional judgement. While there is some scope for quantitative measurements (i.e. the amount of earthworks or vegetation removed, or numbers of trees planted) much of the assessment relies on qualitative judgement (i.e. relating to visual amenity or the change in character of an area of landscape)⁶. Therefore, the determination of the scale of potential landscape and visual effects can only be defined in relation to the individual development and its location.

The assessment criteria and effects ratings are set out in the assessment methodology in Appendix 1.

Site Inspection

Site inspections were carried out on 1 June and 1 August 2018. The site visits enabled the assessors to understand the general site conditions and character and the relationship of the site to the surrounding topography, buildings and vegetation; and the likely visibility of the

¹ <http://www.qualityplanning.org.nz/index.php/planning-tools/land/landscape/landscape-assessment>

² <http://www.qualityplanning.org.nz/index.php/planning-tools/land/landscape>

³ Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, 2013

⁴ Best Practice Note Landscape Assessment and Sustainable Management 10.1, NZILA

⁵ <http://www.aucklanddesignmanual.co.nz/resources/tools/landscapeandvisualeffectsassessment>

⁶ <http://www.aucklanddesignmanual.co.nz/resources/tools/landscapeandvisualeffectsassessment>

subject site / proposed infrastructure. Key landscape / streetscape features and sensitive viewer locations were also identified during the field survey.

4.0 Planning Context

The proposed site is subject to the Auckland Unitary Plan Operative in Part (AUP OIP) provisions. The majority of the subject site is currently in three residential lots (Nos. 44,46 and 48 Tawariki Street), each containing a detached single family home, with the road reserve in front of these lots also forming part of the proposed site as depicted in the Site Layout Plan. The underlying zoning of the three lots and residential land opposite and to the west is zoned Residential – Mixed Housing Urban Zone⁷. The northern boundary of the site borders the Marist School and Church land and the eastern edge of the site borders the St Paul's School playing field grounds, both zoned as Special Purpose - Schools.

The site and surrounding land outlined above is not subject to any landscape protection, special character or heritage overlays⁸.

5.0 Landscape and Site Context

The subject site is located at the end of the cul de sac on Tawariki Street, within the residential suburb of Ponsonby, 2 km to the west of the Auckland Central Business District (CBD)⁹. Although the subject site area is part of Ponsonby, streets including Tawariki Street, Hukanui Crescent, Moira Street have been developed subsequent to the original grid of Ponsonby. This disassociation with the heritage of the Ponsonby area is reinforced through the Auckland Unitary Plan zoning which has most of the Ponsonby area to the north and east zoned as Residential – Single House Zone¹⁰, whereas the subject site is within Residential – Mixed Housing Urban Zone which provides for development of up to 3 storeys (maximum 12m high).

The main grid of Ponsonby is orientated along a ridge running north-south, which is followed by the main street of the suburb, Ponsonby Road, 700m away at its closest point to the subject site. The topography of the area falls from this ridge to the west towards Cox's Bay (1.1 km from the subject site).

Tawariki Street extends between Parawai Crescent 400m to the west of the subject site, and St Paul's College Sports grounds of which the subject site abuts to the east. Tawariki Street, including the subject site, is closely bounded by two large landholdings, Marist Catholic School to the north and St Paul's College grounds immediately to the east of the subject site.

St Paul's College for boys is a 7.3-hectare landholding with extensive grounds for sporting and other activities. The 300m x 130m, sports field is located approximately 7m above the Tawariki

⁷ Appendix 2: Auckland Unitary Plan Zoning

⁸ Appendix 2: Auckland Unitary Plan Overlays

⁹ Appendix 2: Context Map

¹⁰ Appendix 2: Auckland Unitary Plan Zoning

Street level and accordingly above the subject site. Topographically Tawariki Street and the houses along its northern side lie in a gully, and properties on the southern side of the street benefit from an elevated position above the gully floor.

The streetscape of Tawariki Street has an established residential character with timber weatherboard bungalows on regular sized lots, with mature trees as a feature both on the street and in front and rear gardens. Most dwellings are set back from the street, thereby creating a pleasant leafy residential character. As a cul de sac, Tawariki Street does not have through-traffic for vehicles however for pedestrians there are two footpath connections (along the west and east side of Moira Reserve) that connect with Moira Street and further to the south with Richmond Road.

Vehicle access to the cul de sac of Tawariki Street is accessed from Parawai Crescent, which links with Richmond Road, 200m to the south. Richmond Road is a major arterial corridor with a collection of local shops at the intersection with Parawai Crescent.



Photo 1: The cul de sac end of Tawariki Street, with the bank of St Paul's Collage playgrounds forming an enclosed backdrop.



Photo 2: View towards the subject site on Tawariki Street. Dwellings: No's 42 (will remain) and 44-48 Tawariki Street (will be removed).



Photo 3: View towards the subject site along well vegetated street frontage of Tawariki Street.

6.0 Proposed Infrastructure

The Grey Lynn Tunnel involves construction, operation and maintenance of a 1.6km gravity tunnel from Western Springs to Tawariki Street, Grey Lynn with a 4.5m internal diameter, at an approximate depth of between 15 to 62m below ground surface, depending on local topography. The tunnel will be constructed northwards from Western Springs using a Tunnel Boring Machine ("TBM"). The Grey Lynn Tunnel will connect to the Central Interceptor at Western Springs via the Western Springs shaft site.

The GLT also involves construction, operation and maintenance of two shafts and associated structures at Tawariki Street. In order to accommodate the proposed development, the removal of three dwellings, No's 44-48 Tawariki Street will be required at the cul de sac end which abuts with the western boundary of the St Paul's College playing fields. Construction works will also take place within the road reserve at the eastern end of Tawariki Street and a small area of school land (St Paul's College) bordering the end of Tawariki Street (approximately 150m²).

The timing and duration of the works will result in different types of effects during the construction and operational phases.

6.1 Construction

Tunnelling will be undertaken by a TBM, while the wastewater interceptor construction works at Tawariki Street, which have the potential to generate landscape and visual effects will involve the following:

- Construction of a perimeter fence up to 2.4m in height;
- Excavation and construction of 25m deep (26-27m excavated depth) / 12m excavated for TBM retrieval, and 10.8m finished inside diameter for the final drop structure;
- Construction of connections to Orakei Main Sewer and Tawariki Combined Sewer Overflow (CSO);
- Excavation and construction of control chambers approximately 10m long, 5m wide and 11m deep below ground;
- Construction of the plant / ventilation building approximately 14m long, 6m wide and 4m high with incorporated 5m high air vent stack;
- Construction of the 44m long, 3m wide and 2m high retaining wall;
- Replacement of the existing grit trap approximately 16m long, 5m wide and 13m deep;
- TBM retrieval from the Tawariki shaft; and
- Activities of the construction machinery will include shaft excavation mechanical equipment e.g. CAT 330 medium hydraulics excavators and two cranes, for the shaft construction a typical crawler 120t crane and for the TBM recovery 450t crane. The highest lift of the cranes will be 30m.

According to the Arboricultural Assessment¹¹ a number of trees within the properties boundaries and growing on the bank along site's eastern boundary, which is within the ground of St Paul's College, will require removal, or works within their root zone.

The trees identified as being potentially impacted by the proposed works, are identified as either plant pests (e.g. wattle, woolly nightshade) or only of fair condition. None of the trees are protected under the relevant rules of the AUP OIP and their removal is regarded as a permitted activity.

In order to place the proposed control chamber (for the Orakei Main Sewer) next to the bank and allow machinery to manoeuvre around, a concrete retaining wall will be erected, which will involve cut into the bank abutting with the site's eastern boundary, part of St Paul's School grounds.

Construction Timeframe

The construction works for the main shaft, chambers and tunnel will occur at the same time as works for the Central Interceptor. Construction will be up to 2½ years total duration. The construction of the main shaft and chambers is estimated to take approximately 12 months initially, followed by a hiatus of several months waiting for the TBM to arrive at Tawariki Street Shaft Site. This will be followed by approximately 9 months of activity to remove the TBM and complete the internal structure of the main shaft.

The secondary shaft will be constructed in conjunction with the future sewers at a later date but (subject to need) within a 10-year period following construction of the main shaft and tunnel.

Mitigation

Perimeter fences (1.8-2.4m high) will be set around the main works area to secure the site. It is likely that solid plywood wall will be used to reduce noise emissions and improve security. This fence will also screen lower level construction activities and to maintain public health and safety.

6.2 Site Reinstatement

The shaft roof slabs (i.e. lids) will be buried except for manholes and hatches at the ground surface which will be secured from public entry. The site will be reinstated upon completion of construction and surfaced with a mix of concrete hardstand and trafficable, grassed surface with planting along the site perimeter. Hard surfaces are proposed around the plant building and on top of the main shaft, and for access from the street to the building. The rest of the site will be in grass.

6.3 Operation Phase

The only facility remaining above-ground level will be the proposed plant and ventilation building. The facility will be of a small scale (single storey 14m x 6m,) located close to the site's north eastern corner and designed with materials suitable to be visually integrated into the residential area.

¹¹ Greenscene NZ, 2018, Assessment of Arboricultural Effects Grey Lynn Tunnel

An air vent in a form of a 5 m stack (total height) will be incorporated into the plant and control building and discharge air vertically via a roof vent. The vent stack will be designed with a flange to allow future extension of up to 8 m in total height and approximately 1 m in diameter in the unexpected event of odour issues. The height of the roofline will be 4m, so the 5m stack will be a metre above the roofline and the 8m extendable stack (only required in the event that odour nuisance occurs i.e. less than a 1 in 10-year event) will be 4m above the roofline. The stack will therefore be another above ground visible feature. This LVEA assesses the worst case scenario with a permanent vent air stack of up to 8m high (4m above the roofline).

In addition, the permanent concrete retaining wall (approximately 44m long, 3m wide and 2m high) of the bank at the end of Tawariki Street will be part of the change on the streetscape of Tawariki Street.

Mitigation

It is expected that the proposed plant and ventilation building will be completed with a simple but appropriate design, using recessive materials and colours. This should include a design treatment to integrate the building and air vent into the surrounding residential neighbourhood.

The ventilation stack represents an industrial element and therefore recessive materials and dark colours would help to blend it with the tree-belt adjacent to the site's northern boundary on the Marist School property.

The retaining wall along the site's eastern boundary will be designed to fit into the suburban context. There are a number of decorative and colouring options for concrete walls to allow the best integration to the surrounding context. Planting could also be undertaken to assist to reduce the scale of the 2m high wall and soften its appearance.

Within the site's boundaries there would be limited space for tree planting, however this will also be considered following the second shaft construction in ten years' time along with other landscaping appropriate to this residential neighbourhood.

7.0 Visual Catchment and Viewing Audiences

The subject site is topographically well sited, benefiting from an enclosed low level (approx. contour level of RL12m) location on a gully floor. The St Paul's Collage playgrounds (approx. contour level of RL22m) rises immediately to the east of the site, screening views from the east of any structure up to approximately 8-10m above the site's ground level. Properties and associated vegetation on top of the slope of the gully rising to the south of the subject site will intervene in many views from the south. In views from the north the mature tree-belt on the northern slope of the gully obscures visibility of the site. Views from the west along / from Tawariki Street are also screened / densely filtered by the intervening dwellings and associated vegetation.

On this basis, it is considered that potential visibility of the majority of the proposed development will be largely restricted to close proximity properties / viewers, which are located opposite to the subject site at the end of Tawariki Street. Limited filtered views may also be afforded from Moira Reserve and from some properties along this street that are located to the

south of the site. Existing mature treebelt on the north western boundary of Moira Reserve screens views from properties further to the south-west.

However, the proposed development involves high structures such as cranes (up to 30m high) and a permanent vent air stack (if 4m above the roofline) which could be seen within the wider area.

In order to assist in evaluating potential visual effects arising from the cranes and air vent, a Zone of Theoretical Visibility (ZTV) map¹² was generated to identify the potential extent of the related visibility over the surrounding area and to identify potentially affected viewing audiences. The potential visibility of the cranes' hoists is illustrated by the ZTV in Figures 5 and 6 respectively.¹³

The ZTV of the cranes indicates potential distant sporadic visibility along Summer Street and from upper level buildings in the Ponsonby / Grey Lynn area, and close proximity views along the eastern end of Tawariki Street, Moira Reserve and a few houses to the south, and also St Paul's School Playground.

Based on the ZTV and site / surrounding area inspection the following sensitive viewing audience (as identified in Figure 4) is identified for this assessment:

- the closest residences (No 35-41) immediately adjacent to the site's southern boundary (Photo 4);
- property No 42 next to the site's western boundary (Photo2);
- Moira Reserve playground (Photo 5);
- the path which connects Tawariki Street and Moira Street (Photo 5);
- four houses (No 22-28), located to the south on the northern side of Moira Street (Photo 6); and
- properties on John Street close to its intersection with Summer Street (Photo 8).



Photo 4: View of the closest residences (No 35-41) immediately adjacent to the site's southern boundary.

¹² Appendix 2: Visibility Analysis - Above Ground

¹³ Appendix 1: ZTV Methodology



Photo 5: View from the footpath to the east of the Moira Reserve towards the subject site.



Photo 6: View is taken from Moira Reserve, towards the properties alongside its southern boundary.



Photo 7: View is taken at the driveway to the church of 'Our Lady of Perpetual Help', towards the subject site.



Photo 8: View towards the subject site on John Street close to its intersection with Summer Street.

8.0 Assessment of Landscape and Visual Effects

The degree to which landscape character and visual effects are generated by a proposal depends on a number of factors. These include:

- The degree to which the proposal contrasts, or is consistent, with the qualities of the surrounding landscape;
- The proportion of the proposal that is visible, determined by the observer's position relative to the objects viewed;
- The distance and foreground context within which the proposal is viewed;
- The area or extent of visual catchment from which the proposal is visible;
- The number of viewers, their location and situation (static or moving) in relation to the view;
- The backdrop and context within which the proposal is viewed;
- The predictable and likely known future character of the locality; and
- The quality of the resultant landscape, its aesthetic values and contribution to the wider landscape / streetscape character to the area.

In urban areas, and in particular those areas identified for more intensive future forms of urban residential and mixed-use living, change including the introduction of taller and larger scaled buildings with bigger footprints can be expected. The appropriateness of such buildings will depend on their context and the way in which they are designed and positioned to relate to the public realm and their neighbours, having regard to the outcomes expected by the Unitary Plan standards.

The significance of effects has been determined according to the seven-point rating scale set out in Appendix 1.

8.1 Effects on Landscape Character

The location of the subject site within a quiet residential area is considered relatively sensitive to the proposed development, the construction of which will involve mobile / moving machinery that will temporarily block the pedestrian path to the east of the Moira Reserve. However, the enclosed setting of the subject site is zoned as Residential – Mixed Housing Urban and its location is outside of any protected landscape overlays, makes the site less sensitive in comparison to surrounding urban areas.

Short Term / Temporary

The construction works will affect the existing character of the Tawariki streetscape, however activities such as the removal of houses and site vegetation are permitted activities ensuring the type of change is applicable in Residential – Mixed Housing Urban Zone. The ground effects due to the excavation works will be limited within the site's boundary and will be largely

restored. On this basis the operating machinery will generate the main character change by introducing construction structures on Tawariki Street and affecting the surrounding urban landscape character. Large cranes are not typically seen as being part of suburban character and it is therefore considered that construction works will have **moderate** short term adverse effects on the Tawariki streetscape and **low** adverse effect on the wider urban landscape for the duration of the works.

Long Term / Permanent

The permanent change on the Tawariki streetscape by the proposed infrastructure is evaluated **low** adverse and **very low** neutral on the wider urban landscape. This is based on the plant / ventilation building, and air vent stack being designed as being appropriate for a suburban setting e.g. through the use of appropriate materials and colours that are visually recessive. The magnitude of change will be limited, and the scale and type of change is not out of character with Residential – Mixed Housing Urban Zone, where areas for infrastructure facilities are part of the urban environment. The enclosed setting at the end of Tawariki Street limits the magnitude of change. In the case of the proposed development the selection of the site has been part of the process in avoiding the potential adverse effects caused by the type of the works / infrastructure proposed, resulting in the site being located at the end of Tawariki Street.

Summary Table: Landscape Effects

Landscape Effects on	Short Term Effects	Long Term Effects
Tawariki streetscape	Moderate	Low
Wider urban landscape	Low	Very low

8.2 Effects on Visual Amenity

Assessment of the visual effects of the proposed infrastructure relates to changes in the visual amenity of the range of potential viewing audiences i.e. the degree of change in character and quality of views. Visual effects result from changes to specific views experienced by people.

Generally residential and recreational viewers are considered as a sensitive viewing audience to the type of change proposed.

Short Term / Temporary

Although views of the construction activities will be generally contained by topography and intervening buildings / vegetation, with only upper parts of the cranes' hoists potentially visible within the wider area, close to the site the effects on visual amenity are considered to result in **high** level adverse effects on a limited number of properties (Nos 41, 39 and 37), which are located directly opposite to the subject site and will therefore overlook the works from an elevated position above the subject site.

Viewers in the property at No. 42 on the site's western boundary, although slightly less affected due to the dwelling being at the same level as the subject site, and not being orientated towards the site, are also considered to be adversely affected to a moderate-high level.

The magnitude of change will drop immediately beyond the boundaries of the above named closest properties.

Views from Moira Reserve playground (Photo 5) to the south of the subject site are regarded to be less affected, although occupying an elevated location above the site, a clear view over the site is not available due to the intervening dwellings and vegetation, however the upper parts of the cranes will be seen by playground users. Also a few properties on the eastern end of Moira Street, approximately 90m to the south of the subject site, will have views of operating cranes on the site from second storey windows, which look over from their rear north facing gardens.

Crane hoists are a relatively slim tilted vertical structure, the visual appearance of which is somewhat transparent, and more easily obscured / filtered by intervening trees / buildings than a solid object. Due to the low level location of the site it is expected that only the upper part of the cranes hoists would be seen in the wider area. As shown by the view at the driveway to the church of 'Our Lady of Perpetual Help' (Photo 7), the upper parts of the hoists would be difficult to distinguish when appearing on the backdrop of distant landform. Whereas in the view from John Street and the St Paul's College playing fields (Photo 8) the hoists would be seen against the skyline.

Therefore, beyond immediate proximity the magnitude of change drops resulting in **moderate-low** adverse effects from the above Tawariki Street / Moira Street and the Marist School area, and **low** adverse effects on the wider area.

Long Term / Permanent

As already noted above demolition and tree removal are permitted activities and although visible from adjacent properties, the completion of these activities is considered as an expected change within Residential – Mixed Housing Urban Zone, although causing a temporary deterioration in the existing close proximity views.

The proposed permanent infrastructure will constitute a minor element of the view from these properties which will not be prominent and not readily detected by the majority of other viewers in the local area.

The permanent above ground structures such as the plant / ventilation building, and air stack, will be designed to be suitable for a residential area.

The proposed plant / ventilation building and air vent stack will be located on the north eastern boundary of the site therefore appearing in views from the south against the backdrop of the trees within the school grounds to the north. In more distant views from the east (from John Street) across the St Paul's Playground the stack will appear on the backdrop of the vegetation associated to Tawariki Street.

Visual amenity effects of the permanent facility on the wider area and the Tawariki streetscape are considered to reduce to **very low** neutral and **very low** adverse on the visual amenity of a few properties opposite to the proposed infrastructure on Tawariki Street.

Summary Table: Visual Effects

Visual Effects on	Short Term Effects	Long Term Effects
Few opposite properties (Nos 41, 39, 37)	High	Low
Beyond immediate proximity of the site	Moderate-low	Very low
Wider urban area	Low	Very low

9.0 Summary and Conclusions

Overall the proposal is considered to generate temporary adverse effects up to high (more than minor) for construction in respect of a small number of houses immediately opposite and adjacent to the site. The scale of permanent effects will be equally localised to the site's proximity, however reduced to a low to very low level (less than minor) due to the integration of above ground facilities into a suburban context. With increasing distance, the magnitude of change will reduce rapidly, resulting in a very low level of effects on the Tawariki streetscape. It is therefore considered that the Tawariki streetscape and the surrounding area will have the capacity to absorb the proposed infrastructure.

Additional temporary landscape and visual amenity effects will occur with the construction of the second shaft, this however will be temporary, resulting in minor adverse landscape effects on the Tawariki streetscape and the same high level effects on the visual amenity from adjacent properties. Due to the first shaft and associated structures already being in place at the time, the permanent landscape and visual amenity effects associated with the second shaft will reduce to low (less than minor) and then neutral on its completion.

The key conclusions of the assessment are:

- The site is not covered by any landscape protection overlays;
- The site is away from the heritage area of Ponsonby;
- The siting of the proposed infrastructure takes advantage of the enclosed setting of the subject site;
- The overall visual catchment is limited and confined to the site's proximity visibility of a few properties opposite to the proposed development on Tawariki Street; and
- The permanent above ground structures such as the plant / ventilation building, and air stack, will be designed to be suitable for a residential area.

Appendix 1: Assessment Methodology

Table 1: Determining the significance of landscape effects

Contributing Factors		Higher	Lower
Sensitivity	Susceptibility to change	The landscape is strongly distinctive with important biophysical, sensory and associative aspects. There is an absence of landscape detractors which make it highly vulnerable to the type of change which would result from the proposed development.	The landscape lacks any distinctive biophysical, sensory or associative aspects. It has many detractors and has the ability to accommodate the proposed development without undue consequences to landscape character.
	The value of the landscape	The landscape requires protection as a matter of national importance (ONF/L).	The landscape is of low or local importance.
Magnitude of Change	Size or scale	Total loss or addition of key features or elements. Major changes in the key characteristics of the landscape, including significant aesthetic or perceptual elements.	The majority of key features or elements are retained. Key characteristics of the landscape remain intact with limited aesthetics or perceptual change apparent.
	Geographical extent	Landscape character area scale.	Site scale, immediate setting.
	Duration and reversibility	Permanent. Long term (over 10 years).	Reversible. Short Term (0-5 years).

Table 2: Determining the significance of visual effects

Contributing Factors		Higher	Lower
Sensitivity	Susceptibility to change	Views from dwellings and recreation areas where attention is typically focussed on the landscape.	Views from places of employment and other places where the focus is typically incidental to its landscape context.
	Value attached to views	Viewpoint is recognised by the community such as identification on tourist maps or in art and literature. High visitor numbers.	Viewpoint is not typically recognised or valued by the community. Infrequent visitor numbers.
Magnitude of Change	Size or scale	Loss or addition of key features in the view. High degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture). Full view of the proposed development.	Most key features of view retained. Low degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture). Glimpse / no view of the proposed development.
	Geographical extent	Front on views. Near distance views; Change visible across a wide area.	Oblique views. Long distance views. Small portion of change visible.
	Duration and reversibility	Permanent. Long term (over 15 years).	Transient. Short Term (0-5 years).

Table 3: Determining the nature of effects

Nature of effect	Use and Definition
Adverse (negative):	The proposed development would be out of scale with the landscape or at odds with the local pattern and landform which results in a reduction in landscape and visual values
Neutral (benign):	The proposed development would complement (or blend in with) the scale, landform and pattern of the landscape maintaining existing landscape and visual values
Beneficial (positive):	The proposed development would enhance the scale, landform and pattern of the landscape, improving the landscape and visual quality through removal of damage caused by existing land uses or addition of positive features

Table 4: Determining the overall significance of landscape and visual effects

Effect Rating	Use and Definition
Very High:	Total loss to the characteristics or key attributes of the receiving environment and /or visual context amounting to a complete change of landscape character.
High:	Major change to the characteristics or key attributes of the receiving environment and /or the visual context within which it is seen; and/or a major effect on the perceived amenity derived from it. <i>Oxford English Dictionary Definition</i> High: adjective- 1. Extending above the normal level. 2. Great in amount, value, size, or intensity.
Moderate-High:	A moderate - high level of effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or have a moderate - high level of effect on the perceived amenity derived from it.
Moderate:	A moderate level of effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or have a moderate level of effect on the perceived amenity derived from it. <i>Oxford English Dictionary Definition</i> Moderate: adjective- average in amount, intensity, or degree
Moderate - Low:	A moderate - low level of effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or have moderate - low level of effect on the perceived amenity derived from it.
Low:	A low level of effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or have a low effect on the perceived amenity derived from it. <i>Oxford English Dictionary Definition</i> Low: adjective- 1. Below average in amount, extent, or intensity.
Very Low:	Very low or no modification to key elements/ features/ characteristics of the baseline or available views, i.e. approximating a 'no change' situation.

Zone of Theoretical Visibility (Viewshed) Mapping

The term ‘Zone of Theoretical Visibility’ (ZTV) is used to describe the area over which a infrastructure or structure can theoretically be seen and is generated from a Digital Terrain Model (DTM). It is also known as a Zone of Visual Influence (ZVI), Visual Envelope Map (VEM) or Viewshed Map.

There are a number of software packages that will generate a ZTV Analysis – Boffa Miskell uses ArcGIS for this. A DTM is generated from either LIDAR data, contours, or break-lines (or a combination of all of these). Observer points are added to the DTM and the resulting ZTV is then produced as an overlay over a topographic base, typically as a transparent colour. The coloured areas represent where a infrastructure or structure is ‘theoretically visible’.

Traditionally, ZTV mapping is based on ‘bare ground’ LIDAR or contour data, and therefore does not take into account the screening effects of intervening vegetation or structures in the landscape. However, it is now possible to include ‘above ground’ or ‘first response’ LIDAR data, which records the top of forest and vegetation canopies. This enables a ZTV analysis to take vegetation or man-made features into account, producing a much more accurate result. However, it still fails to illustrate the effects of partial screening (e.g. winter time vegetation or forestry can be felled). Neither does the ZTV take account of the effects of distance.

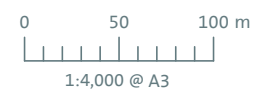
A ZTV analysis also takes into account factors relating to the curvature of the earth and light refraction, which increases over distance.

It should be remembered that while ZTV is a useful assessment tool, is important to recognise its limitations.

For this project, the following parameters were used:

Nature of target points:	crane
No of target points:	1
Location of target points:	the subject site
Height of target points:	25m
Observer Eye Height:	1.7m
Coefficient of Earth Curvature and Refraction:	0.07
Base Spheroid used for computation:	WGS 84

Appendix 2: Maps



Legend


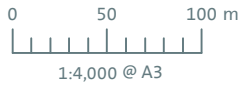
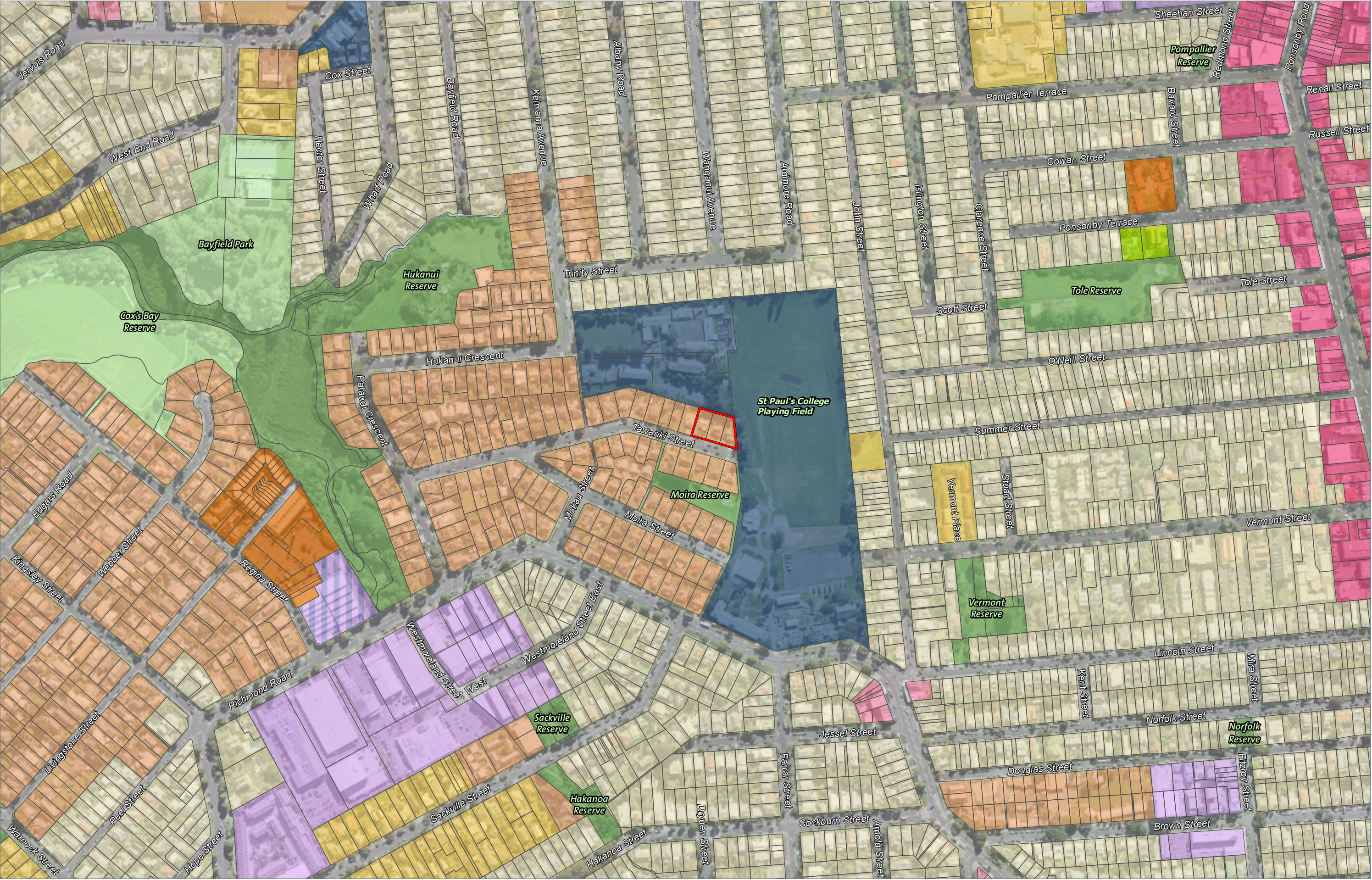
-  Contours
-  Land Parcels
-  Site Location

Figure 1: Landscape Context



Legend

- Unitary Plan Zoning
- Single House
- Mixed Housing Urban
- Mixed Housing Suburban
- Terrace Housing and Apartment Buildings
- Neighbourhood Centre
- Town Centre

- Mixed Use
- General Business
- Informal Recreation
- Sport and Active Recreation
- Community
- Special Purpose
- Water [i]

 Site Location

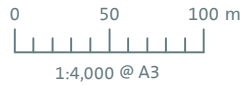
A08301E GREY LYNN TUNNEL






Figure 2: Auckland Unitary Plan Zoning

Date: 14 February 2019 | Revision: 0

Plan prepared by Boffa Miskell Limited




Project Manager: John.Goodwin@boffamiskell.co.nz | Drawn: SGA | Checked: KOT



- Legend**
-  Site Location
 -  Historic Heritage Overlay Extent of Place
 -  Special Character Areas Overlay Residential and Business
 -  Sites and Places of Significance to Mana Whenua Overlay
 -  Significant Ecological Areas (Terrestrial)



Legend

-  Contours
-  Site Location
-  Land Parcels





- Legend
- Air Vent Stack (8m height)
 - Areas of Visibility
 - Site Location

Note* - The visibility analysis was performed using the above-ground 2013 LiDAR that includes buildings and vegetation.

Figure 6: Visibility Analysis of the Air Vent Stack

