



## **APPENDIX D**

Visual and Landscape Assessment  
(Boffa Miskell)



# Project Martha

Landscape and Visual Effects  
Prepared for Oceana Gold New Zealand Limited

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Boffa Miskell

## Document Quality Assurance

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# 1.0 Introduction

Boffa Miskell has been engaged by Oceana Gold New Zealand Limited (OGNZL) to prepare a landscape and visual effects assessment in relation to Project Martha. Mining activity associated with this project entails a combination of open pit and underground mining, namely:

- Martha Pit: Phase 4
- Martha Underground Mine (including the Rex vein)

This landscape and visual effects assessment focuses on the proposed extension of open pit mining within Martha Pit (Martha Pit: Phase 4). The proposed expansion of underground mining activity will remain entirely concealed except for one fresh air portal, one return air shaft, and one return air portal formed within the confines of the existing Martha Pit. Above ground, water vapour from the air return shaft and portal may also be visible on cold mornings. The combined mining activity will also utilise the existing Process Plant and associated rock and tailings storage facilities established to the east of Union Hill<sup>1</sup>.

Within Martha Pit, the extent of open pit mining proposed primarily occurs along the north wall and involves an expansion of a small part of the pit rim. During operation, mining in this area will reinstate a series of benches and associated haul roads which extend to the base of the pit and accommodate access and stockpiles associated with the proposed underground mine during the later stages of the development. Prior to operation, noise mitigation will also be constructed along the pit edge and includes provision to reinstate the pit rim walkway along the proposed pit edge.

## 2.0 Landscape Context

### 2.1 Site Context

Martha Pit has been established within the urban area of Waihi and generates a strong mining influence within the town. Despite its proximity, mining activity has not resulted in major visual impacts on adjoining areas, primarily due to the topography and vegetation which maintains an effective screen along the pit rim.

The location of the proposed above ground mining works comprising Martha Pit: Phase 4 primarily involves the north-western face of the existing open pit mine (see **Figure 1**). This area was subject to a slip which initially occurred in 2015 and halted production in the open pit. Stepped cut slopes and associated haul roads currently characterise the remaining areas of the open pit mine. The eastern area adjacent to the Martha Pit contains several existing operational facilities including an existing magazine building, crusher plant and entrance to the conveyor. Beyond the proposed pit rim, low density residential development extends along Cambridge towards Savage Roads on land that slopes to the west and away from the mine.

Martha Pit is connected to the existing Process Plant via a low profiled conveyer which passes through a tunnel formed through Union Hill (see **Figure 2**). The Process Plant occupies a terrace to the west of the Ohinemuri River and remains relatively well enclosed from the urban area by a sequence of surrounding hills. Existing overburden and associated tailings and rock storage facilities are located to the east of the Process Plant via the existing conveyor which continues across the Ohinemuri River. These landforms incorporate several large ponds which extend outwards from the adjacent landform backdrop. The wider landscape encompassing

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<sup>1</sup> Any changes to consented tailings storage facilities or disposal of waste rock is outside the scope of this assessment.

Waihi extends along the foothills of the Coromandel Range. In this area, the toe slopes of the Coromandel Range comprise of a series of gently rounded spurs and gullies which typically extend south of the main ridgeline. Martha Hill, within which Martha Pit is now located, previously formed part of this broader foothills landform and now forms part of an established working landscape associated with Waihi.

Waihi's Town Centre is located to the south of Martha Pit, beyond open space retained along the existing pit rim. The relocated Cornish Pump House retains a prominent location along the pit rim in this area. To the south-east of Waihi, the landscape undergoes a transition into an area of primary production lowlands adjoining the foothills of the Coromandel Range. This landscape is generally flat to gently undulating and generally accommodates productive rural land uses. A series of steep domed shaped hills extend to the east of Waihi which include the vegetated forms of Union Hill, Winner Hill and Black Hill.

No outstanding natural landscapes or features or amenity landscapes have been identified or classified in the relevant statutory planning documents, or are likely to occur in this area when the criteria specified in Appendix 12 of the Waikato Regional Policy Statement are applied.

### 2.1.1 Land Form

The existing excavated form of the Martha Pit forms a distinctive topographic feature of Waihi, the base of which is currently some 220 metres below the surrounding ground level and approximately 100 metres below sea level. The northern edge of the pit forms the highest part of the mine and culminates at an elevation of 164 masl.

The urban area surrounding the Martha Pit is typically flat to gently undulating between 80 and 160 masl, sloping away from the area where the extension of the Martha Pit is proposed. This surrounding landform is also bisected by the meandering form of the Mangatoetoe Stream which passes to the west and south of Martha Pit prior to flowing into the Ohinemuri River.

### 2.1.2 Land Cover

The urban area of Waihi covers a total area of approximately 250 hectares and includes established residential and commercial development near Martha Pit. Low density residential development has been established to the north-west of Martha Pit and transitions into rural lifestyle and rural development which extends into the lower foothills of the Coromandel Range.

The southern edge of Martha Pit skirts the periphery of Waihi's town centre and includes a narrow area of elevated open space along the existing pit rim which accommodates the relocated Cornish Pumphouse. The character of Waihi is strongly influenced by mining activity and includes several mining artefacts dispersed throughout the town and along the pit rim. Beyond the area adjoining the north wall, the pit rim walkway typically extends beyond the perimeter of Martha Pit, in places overlooking the existing mine.

The rural land use surrounding Waihi predominantly comprises of a patchwork of exotic pasture and cropping interspersed with shelter planting and orchard trees. Mining activity associated with the Process Plant and tailings storage facilities also contributes to the established land cover within the area to the east of the township beyond Union Hill. Vegetation established on Union and Black Hills and riparian planting established along the Ohinemuri River is also apparent near Waihi.

#### **Historic Gardens**

Three properties owned by OGNZL on the northern end of Mines Place adjacent to Martha Pit accommodate residual garden areas which have continued to be maintained following previous houses having been removed. Garden remnants include several fruiting trees, camellias, magnolia, rimu and a large kauri combined with areas of lawn and garden beds. This area is locally referred to as the "Historic Gardens" however has no formal statutory recognition.

## 2.2 Summary of Context and Character

The existing character of Waihi is influenced by its proximity to established mining activity. This includes references to mining artefacts, utilitarian influences and recreation opportunities established along the pit rim. Despite the physical proximity of mining, there are limited views of mining activity from nearby urban areas.

At a broader scale, the township of Waihi occupies a transition from the foothills of the Coromandel Range into the productive lowlands which extend to the south-east. The resulting landscape is characterised by undulating and flattened topography and contains an established mix of working land uses and sequence of elevated vegetated hills. No outstanding natural landscapes or features or amenity landscapes have been identified within or surrounding Waihi.

## 3.0 Proposed Development

In landscape terms, the relevant aspects of Project Martha are primarily limited to the proposed mining operation associated with Martha Pit (see **Figure 1**). This also includes reconfigured noise mitigation along the north wall and a new vehicle access to the existing magazine building from within the operational mine. Above ground expressions of underground mining will be limited to one fresh air portal, one air return ventilation shaft and one air return portal constructed within the southern confines of Martha Pit (see **Figure 5**). The ventilation shaft and return air portal will discharge the emissions from development blasting and the operation of underground vehicles associated with the Martha Underground Project. The fresh air portal will also serve as an escape way.

The overall mining operation (hereinafter referred to as the Proposed Development) is proposed to occur over a period of approximately 11 years. Material extracted during mining will be used to backfill underground mining operations or disposed of in tailings storage facilities and associated rock storage areas to the east of the existing Process Plant. As illustrated on **Figure 3**, above ground changes in Martha Pit will not occur all at once and involve a gradual process during which mining associated with the north wall will occur. During the initial stage of the project, enabling works will entail the construction of noise mitigation along the edge of the pit and the diversion of part of Cambridge Road.

During the initial stage of the operation, proposed mining activity extends into a small area of existing residential development along the edge of the existing pit rim (see **Figure 4**). This encompasses land to the north of Miners Place and includes parts of two residential properties at the eastern end of Pitt Street, parts of two low density residentially zoned properties south of Cambridge Road, the remaining area of Bulltown Road and part of the northern pit rim zoned Martha Mineral Zone. It also includes part of the existing alignment of Cambridge Road which will be diverted as part of this project.

As the proposed mining activity continues, ongoing mining activity will extend deeper along the walls of Martha Pit. The existing slip will gradually be replaced by terraced batters characteristic of the existing surrounding mine workings. The batters of the mine will be formed at a similar gradient to adjoining areas within the mine and support a new 20-metre wide haul road providing access to the base of the mine. Within the confines of Martha Pit, stockpiles of material associated with the proposed extension of underground mining will also occur during the later stages of the mining operation.

Beyond Martha Pit, changes in the composition of stockpiled material will also occur at the existing Process Plant from waste rock and ore material transported from underground mining and Martha Pit via the existing conveyor. It is understood that such use will remain consistent with the existing consented operation with no material change in landscape or visual effects anticipated because of this work. Following the life of this project, rehabilitation of the mine will

be guided by the established Closure Plan. This will also require diverting high flows from the Ohinemuri River to hasten the establishment of Martha Lake as part of this rehabilitation process. An outlet water structure will also be required into Mangatoetoe stream to assist with managing resultant lake levels over the longer term.

## 4.0 Statutory Planning Context

### 4.1 Resource Management Act

The relevant sections addressed in this report will be in respect of:

**Section 6(a)** – *The preservation of the natural character of... wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development*

**Section 7(c)** – *the maintenance and enhancement of amenity values*

**Section 7(f)** – *maintenance and enhancement of the quality of the environment*

### 4.2 Waikato Regional Policy Statement

The Waikato Regional Policy Statement (RPS) became operative on the 20<sup>th</sup> of May 2016 and provides the basis through which integrated management of the region's natural and physical resources will be achieved.

Chapter 4 relates to integrated management including Policy 4.4 which relates specifically to regionally significant industry and primary production. This requires that:

*The management of natural and physical resources provides for the continued operation and development of regionally significant industry and primary production activities by:*

- c) *ensuring the adverse effects of regionally significant industry and primary production are avoided, remedied or mitigated;*
- g) *promoting positive environmental outcomes.*

Chapter 12 sets out the relevant policies in relation to landscape, natural character and amenity. Policy 12.1 relates to outstanding natural features and landscapes, none of which have been identified or likely to occur within the site or adjoining working landscapes at either the regional or district levels.

Policy 12.2 relates to preserving natural character and seeks to ensure that activities within the coastal environment, wetlands, and lakes and rivers and their margins are appropriate in relation to the level of natural character. The following specific policy is provided:

- a) *where natural character is pristine or outstanding, activities should avoid adverse effects on natural character;*
- b) *where natural elements/influences are dominant, activities should avoid significant adverse effects and avoid, remedy or mitigate other adverse effects on natural character;*
- c) *where man-made elements/influences are dominant, it may be appropriate that activities result in further adverse effects on natural character, though opportunities to remedy or mitigate adverse effects should still be considered;*

- d) *promote the enhancement, restoration, and rehabilitation of the natural character of the coastal environment, wetlands and lakes and rivers and their margins; and*
- e) *regard is given to the functional necessity of activities being located in or near the coastal environment, wetlands, lakes, or rivers and their margins where no reasonably practicable alternative locations exist.*

Policy 12.3 seeks to maintain and enhance areas of amenity value. This policy also identifies that such areas may include:

- a) *areas within the coastal environment and along inland water bodies;*
- b) *scenic, scientific, recreational or historic areas;*
- c) *areas of spiritual or cultural significance;*
- d) *other landscapes or seascapes or natural features; and*
- e) *areas adjacent to outstanding natural landscapes and features that are visible from a road or other public place.*

### 4.3 Waikato Regional Plan

The Waikato Regional Plan was made operative on the 28<sup>th</sup> of September 2007 to provide direction regarding the use, development and protection of natural and physical resources in the Waikato Region.

Chapter 3 of the Regional Plan sets out policies relevant to the region's water resources which includes Policy 3 relevant to natural character. This states:

*Recognise, and where relevant provide for, the following characteristics when considering the preservation of the natural character of lakes and rivers and their margins and the protection of them from inappropriate use and development:*

- a) *Diversity and composition of aquatic and riparian habitat.*
- b) *Topography and physical composition of river and lake beds and the course of the river.*
- d) *Any significant natural features of the lakes and rivers and their margins.*

Chapter 4 of the Regional Plan sets out policies relevant to river and lake bed management relevant to inlet and outlet structures proposed along the respective Ohinemuri River and Mangatoetoe Streams. This includes the following relevant policies:

**Policy 1: Enable Low Impact Structures**

*Enable through permitted activity rules the use, erection, reconstruction, placement, alteration, extension, removal or demolition of structures, in, on, under or over the beds of rivers or lakes which:*

- d. *do not adversely affect the natural character of river and lake beds (including caves)*

**Policy 2: Management of Structures**

*Control through resource consents the use, erection, reconstruction, placement, alteration, extension, removal and demolition of those structures in, on, under or over river and lake beds that:*

- (e) *may cause significant adverse effects on the natural character of river and lake beds (including caves)*

### **Policy 5: Natural Character**

*Recognise and, where relevant, provide for the following characteristics when considering the preservation of the natural character of river and lake beds and their margins and the protection of them from the inappropriate use, erection, reconstruction, placement, extension, removal or demolition of structures in, on, under or over river and lake beds:*

- a. *Diversity and composition of aquatic and riparian habitat.*
- b. *Topography and physical composition of river and lake beds and the course of the river.*
- d. *Any significant natural features of the bed or banks.*

## 4.4 Hauraki District Plan

The Hauraki District Plan was made operative on the 26<sup>th</sup> September 2014 and forms the relevant statutory document for managing land use and development across the District. The zoning relevant to this assessment identified in the Hauraki District Plan is illustrated on **Figure 4**.

Section 5.6.3 is relevant to all urban areas which includes areas zoned residential and low density residential within which the extension to Martha Pit is proposed. The following relevant objectives and policies apply:

### **Objective 2**

*To achieve an urban form for each urban area that maintains and enhances the existing character and identity, minimises reliance on fossil fuel use, protects areas of significant natural quality, ecological, heritage and cultural values and does not create or increase natural hazard risk.*

#### **Policies**

- (a)(iii) *Ensure the location and development of residential and business activities is free from natural hazard constraints and minimises adverse effects on natural character, ecological, heritage and cultural values.*

### **Objective 3**

*Urban areas and towns recognised as hubs for community, cultural, economic and education purposes and continue to be a desirable place to 'live, work and play'*

#### **Policies**

- (a)(iv) *Maintain key residential amenity attributes such as privacy and access to sunlight, and minimise nuisance effects such as noise, dust, smell and vibration.*

Section 5.6.4 sets out objectives and policies specific to Waihi's urban areas, the following of which are relevant to this assessment:

### **Objective 1**

*To enable the people and community of Waihi to provide for its service town role to the surrounding rural area, as well as its role in the mining and tourist industries, at the same time as maintaining an attractive residential environment.*

#### **Policies**

- (a)(vi) *Protect the amenity of residential environments from adverse effects of commercial, mining and industrial activities.*

## **Objective 2**

*To enable and encourage development that responds to and enhances the distinctive natural and built character of Waihi.*

### **Policies**

- (a)(i) *Enhance the main street historic mining character of the central area in respect of the form, scale, bulk, location, heritage and architecture of buildings and infrastructure.*
- (a)(ii) *Respect the existing townscape character of Waihi (street layout, existing residential character, cottages) in new development and encourage visual and physical linkages to local features such as the Pumphouse, Waitete Stream, Ohinemuri River, and hills of the Coromandel Range (to the north of Waihi).*
- (a)(iii) *Enhance the presence of town centre heritage / character buildings and local landmarks through streetscape design and any redevelopment / development initiatives that may affect the viewing quality and appreciation of these buildings / features.*

Section 5.7 sets out objectives and policies relevant to the Residential Zone. The following objectives and policies are relevant:

## **Objective 1**

*To provide for residential development that maintains and enhances neighbourhood amenities and qualities consistent with the aspirations of the individual communities within those areas.*

### **Policies**

- (a)(i) *Require activities in residential areas to be sited, designed and operated in such a way that avoids, remedies or mitigates adverse noise, privacy and traffic effects on health, safety and amenity values.*
- (a)(v) *Provide flexibility for the development and operation of a range of non-residential activities which are not incompatible in scale, intensity and character with the residential area in which they are located.*

## **Objective 3**

*To avoid, remedy or mitigate any adverse effect of residential and non-residential developments on the environment and character of the locality.*

### **Policies**

- (a)(i) *Ensure development and subdivision is designed and located to:*
  - (1) *integrate well with the immediate locality;*
  - (2) *contribute positively to the streetscape;*
  - (3) *provide occupants of dwellings with a reasonable outlook, access to sufficient open space and reasonable aural and visual privacy.*

Section 5.8 relates to the Low Density Residential Zone within which Objective 2 and Policy (a)(iii) are relevant which state:

## **Objective 2**

*To provide areas that are attractive for low density residential development and can be serviced to appropriate standards, and which minimise reverse sensitivity effects on existing lawfully established rural based activities.*

### **Policies**

- (a)(iii) Protect and enhance the rural-residential amenities of the zone (eg privacy, space, quiet) by controlling the scale, location and type of activities compatible with the environment they are located within.*

Section 5.17 applies across the Martha Mineral Zone, recognising that the Martha Pit has been operating as an open pit gold and silver mine in Waihi since 1988. The following relevant objectives and policies apply to this zone:

## **Objective 1**

*To provide for the utilisation of the mineral resource in a sustainable manner.*

### **Policies**

- (a)(i) Recognise the development of the mine and its processing areas, its ongoing rehabilitation and its longer term likely uses.*
- (ii) Provide for the social, economic and cultural well-being of the people of the District and for their health and safety.*
- (iii) Ensure that the amenity values of Waihi and the wider community are protected.*
- (iv) Recognise that the risks associated with the historic underground working areas require a mixture of approaches to avoid, remedy or mitigate those hazards and provide for appropriate longer term land use activities.*

Section 7.8 relates to Excavations and Placement of Fill (earthworks) which apply across the entirety of the Proposed Development, the following of which are relevant to this assessment:

## **Objective 1**

*To ensure site earthworks associated with land use and subdivision activities avoid, remedy or mitigate adverse visual effects and off-site effects.*

### **Policies**

- (a)(iv) Limit the scale and location of earthworks to: minimise the risk of instability and damage to other properties, network utilities and the environment; not increase the risk of potential flooding or reduce the function of ponding areas, overland flow paths, and spillways; minimise amenity and public safety impacts.*
- (v) Limit the scale and location of earthworks to avoid, remedy or mitigate adverse visual effects, particularly in sensitive zones and in areas of outstanding and high amenity and/or natural character values.*

## 4.5 Summary of Statutory Planning Context

Most of the above ground mining associated with the Proposed Development is zoned Martha Mineral Zone, which recognises the development of mineral resources alongside their ongoing

rehabilitation and longer term likely uses. Such development should also ensure that the amenity values of Waihi and the wider community are protected.

A small part of the proposed Martha Pit will extend along the edge of an adjoining urban area beyond the Martha Mineral zone. In such areas, the District Plan seeks to minimise adverse effects on natural character, ecological, heritage and cultural values through ensuring the existing character and identity of such areas is maintained. This includes protecting the amenity of residential environments within Waihi from adverse effects of mining activities and enabling and encouraging development that responds to and enhances the distinctive natural and built character.

Within the Residential Zone, activities must be sited, designed and operated in such a way that avoids, remedies or mitigates adverse effects on amenity values. This outcome also enables flexibility for the development and operation of a range of non-residential activities which are not incompatible in scale, intensity and character with the residential area in which they are located provided adverse effects of such non-residential development address the environment and character of the locality.

Within the Low Density Residential Zone located to the north-west of the pit, new development must protect and enhance the rural-residential amenities of the zone (e.g. privacy, space, quiet) by controlling the scale, location and type of activities compatible with the environment they are located within. In addition, the scale and location of site earthworks should be limited in all areas to avoid, remedy or mitigate adverse visual effects, particularly in sensitive zones and in areas of outstanding and high amenity and/or natural character values.

Once the proposed mining activity is complete, low key water inlet and outlet structures will be required along the respective Ohinemuri River and Mangatoetoe Streams. Such structures must avoid, remedy or mitigate adverse effects including recognising and providing for streambed and riparian characteristics which contribute to natural character where relevant.

## 5.0 Assessment of Landscape and Visual Effects

Landscape and visual assessments are separate, although linked, procedures. The existing landscape and its existing visual context all contribute to the existing 'baseline' for landscape and visual assessments. The assessment of potential effects on landscape is carried out as an effect on an environmental resource, i.e. effects on physical landscape features and effects on landscape character. Visual effects are assessed as one of the interrelated effects on people. In addition, this assessment also considers natural character impacts in terms of modification on lakes, rivers, wetlands and their margins.

The nature of effects can be summarised as follows:

**Physical Effects:**

Effects of changes in the physical landscape, including landform and land cover

**Visual Effects:**

Effects of change to specific views which may change the visual amenity experienced by people

**Landscape Character Effects:**

Effects of changes to the characteristics, qualities and values of the landscape

**Natural Character Effects:**

Effects of changes in the level of natural character along lakes, rivers and their margins

It should also be emphasised that a change in a landscape or view does not, of itself, necessarily constitute an adverse landscape or visual effect. The assessment of effects has also considered the nature of effects in terms of whether this will be positive (beneficial) or negative (adverse) in the context within which it occurs. Neutral effects can also occur where landscape or visual change is benign in the context of where it occurs. The findings of this assessment are set out in Section 6 of this report with further detail about how levels of effect have been determined included in **Appendix 1**.

The overall conclusion has adopted the following seven-point scale to determine the overall level of effect:

Very Low	Low	Moderate - Low	Moderate	Moderate - High	High	Very High
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In summary, the assessment of landscape and visual effects aims to:

- Systematically identify and assess the sensitivity of the landscape resource and viewing audience;
- Assess the potential magnitude of landscape and visual change which will result from the Proposed Development;
- Indicate the measures proposed to avoid, remedy or mitigate those effects where required; and
- Provide an overall assessment and professional judgement as to the level of the anticipated physical, landscape, natural character and visual effects, considering the proposed opportunities for mitigation.

## 5.1 Physical Effects

To assess the level and nature of physical effects associated with the Proposed Development, the assessment has considered the sensitivity of the physical landscape features undergoing change together with the magnitude of change proposed. For this project, this may include changes to the landform, vegetation, watercourses and access disrupted by mining activity and / or its associated rehabilitation. Above ground changes associated with underground mining are limited to two portals and a ventilation shaft constructed within the confines of Martha Pit and changes in composition of stockpiles at portal entrances and the existing Process Plant.

In physical terms, the Proposed Development will increase the overall footprint of Martha Pit by approximately 2.4 hectares from the existing mine's open footprint of approximately 54 hectares; only 0.28 ha of which extends beyond the Martha Mineral zone. This will increase the overall volume of material extracted from within the mine to approximately 43 million m<sup>3</sup> and reinstate access to underground mining activity. The relocation of the existing noise bund along the north-west edge of the pit will require an additional 0.6 hectares and involves the diversion of part of Cambridge Road and relocating an existing noise bund and pit rim walkway previously established in this area.

At the completion of mining activity, there will also be changes associated with transforming Martha Pit into a lake as required by the existing Closure Plan. This will include a new intake structure to divert high water from the Ohinemuri River and an outlet pipe flowing into the Mangatoetoe Stream at the southern end of Martha Pit.

### **Landform**

Most of the proposed modification to Martha Pit will occur within the enclosure of the existing open pit mine. As a result, much of the modification to the original form of Martha Hill has already occurred, reflecting the existing mining operation. A further 3 hectares of land will be modified along the existing pit rim, however this area is already strongly associated with the

adjoining mine and includes modified areas including an existing noise bund and roading, skirting along part of an existing low density residential edge.

The elevation of mining activity along the northern pit rim will increase by approximately 2 metres to 166 masl, culminating near a local high point which rises to the south of William Street. Given the adjoining mining activity already apparent in this area and the progressive changes in landform which will continue lower within the mine through the life of the project, such change in landform is unlikely to remain apparent from beyond the immediate context.

Within the mine, steep cut faces and benches will replace the existing slip along the north wall and generate a more ordered and benched appearance consistent with a working mine. Haul roads established in association with mining will also reinstate the previous level of access which occurred into the base of the mine.

Overall, changes to the existing landform will be local and visually well contained and remain largely associated with the existing open pit generating **low adverse** effects.

### ***Vegetation***

The extension of Martha Pit will disrupt areas of existing vegetation established along the pit rim. This includes areas of planting established by OGNZL along the former pit rim walkway and exotic tree planting established in adjoining residential gardens and part of the north wall. Further to the north, the southern end of a larger band of exotic conifers will also be removed to the south of William Street. No significant trees listed in the District Plan have been identified in this area of the mine.

To the south-west of the proposed extension of the pit rim, and north of Miners Place, much of the existing “Historic Gardens” will remain and provide an opportunity to reinstate the pit rim walkway through this area. Following preparatory works, including relocation of the existing noise bund, the amended landform provides an opportunity to extend replacement planting in association with the realigned pit rim walkway and soften the resulting interface within adjoining residential areas. While the footprint of the relocated noise bund will traverse the eastern edge of the “Historic Gardens” the effects will be low and can be satisfactorily managed as outlined in the indicative landscape mitigation plan (see **Figure 6: Landscape Mitigation**).

Overall the effect of extending Martha Pit will result in the loss of some existing vegetation along the pit rim, primarily near Bulltown Road. Such planting previously contributed to the character of the former pit rim walkway however this is now predominantly inaccessible given the walkway diversion following the slip along the north wall in 2016. Given the limited removal of vegetation combined with the ability to replace this during mine operation, **low neutral** effects are anticipated as a result of this change.

### ***Pit Rim Walkway***

Presently the Pit Rim Walkway extends along Savage Road and Cambridge Road when walking around the western perimeter of the open pit. This moves the experience of the pit rim walkway away from the mine and along the margins of public roads. As a consequence of this project, the Pit Rim Walkway will be reinstated along the crest of proposed noise mitigation bunds constructed along the margins of the pit rim, and will reinstate part of this important recreation experience and lookout opportunities into the mine from this area. This outcome will generate **moderate beneficial** effects.

### ***Lake Intake / Outlet Structures***

As part of the rehabilitation process and filling Martha Pit to form Martha Lake, water will be diverted from the Ohinemuri River between Winner Hill and Black Hill (see **Figure 2**). This will likely entail a small inlet and weir structure designed to extract water during high flows together with a pump structure connecting with an existing outlet pipe already established in this area. Any modification along the margins of the Ohinemuri River will remain low key within a modified working rural environment and have limited effect on the condition or character of the larger stream environment.

Similarly, once Martha Lake is filled, a water outlet structure will be required beneath Moresby Avenue which connects into the existing Mangatoetoe Stream at its southern end (see **Figures 1 and 2**). This culvert will remain embedded below Moresby Avenue within existing urban influences including the footbridge east of Walker Street (goat track) and can be readily enclosed by planting established within adjoining riparian areas. Given the low-key nature of these structures combined with the level of modification already apparent, localised **low adverse** effects are anticipated as a result of re-consenting existing structures located in these areas.

### 5.1.1 Physical Effects Summary

Based on the above assessment, physical effects associated with Martha Pit can be summarised as follows:

	Description of Effect	Level of Effect <sup>2</sup>	Nature of Effect <sup>3</sup>
<b>Physical effects on landform</b>	<ul style="list-style-type: none"> <li>Extension of north-western edge of the Martha pit rim beyond the existing alignment of Cambridge Road</li> <li>Reduction in parts of the modified northern pit wall</li> <li>Relocation and extension of existing noise bund and realignment of Cambridge Road along the north-western pit edge.</li> </ul>	Low	Adverse
<b>Physical effects on vegetation</b>	<ul style="list-style-type: none"> <li>Removal of existing inaccessible planting established along the pit rim</li> <li>Replacement planting extending in association with the realigned pit rim walkway reinstated along the pit rim</li> </ul>	Low	Neutral
<b>Physical effects on the pit rim walkway</b>	<ul style="list-style-type: none"> <li>Reinstate the pit rim walkway and associated look out opportunities along the pit rim</li> </ul>	Moderate	Beneficial
<b>Lake Intake / Outlet Structures</b>	<ul style="list-style-type: none"> <li>New water intake structure including weir and pump station associated with existing outlet structure along the margins of the Ohinemuri River</li> <li>New water outlet structure beneath Moresby Avenue into Mangatoetoe Stream</li> </ul>	Low	Adverse

## 5.2 Visual Effects

To assess the overall level and nature of visual effects, the potential visual sensitivity of the available viewing audience is considered together with the overall magnitude of change which will result from the Proposed Development. It should also be emphasised that the visibility of a change or modification does not necessarily equate to an adverse visual effect. Visual impact is not always negative and consequently a change in view may not be automatically unacceptable.

The method used to identify and assess potential views towards the project has included a Zone of Theoretical Visibility (ZTV) analysis and fieldwork to identify the location and sensitivity of potential viewing audiences and worse case representative viewpoints from the nearest available public locations to determine the likely magnitude of change. It has not included access to private property for the purpose of this assessment.

<sup>2</sup> Level of Effect assessed as: Very High, High, Moderate-High, Moderate, Moderate-Low, Low, Very Low

<sup>3</sup> Nature of Effect assessed as: Adverse, Neutral or Beneficial

To understand and assess the proposed magnitude of visual change, visual simulations have been produced in accordance with NZILA Best Practice<sup>4</sup>. While visual simulations illustrate a two-dimensional view as depicted in a photograph from a viewpoint, they are not a three-dimensional image or 'real life view' as seen in the landscape with the human eye. Notwithstanding this, visual simulations are very accurate and useful tools to assist in the assessment and decision-making process. The primary purpose of a visual simulation is to accurately portray views of the proposed activity or change within its landscape context.

The visual simulations are based on georeferenced panoramic photographs aligned using current contour information and taken to capture a 124° field of view representative of the human eye. Visual simulations have been reproduced as a single A3 sheet to compare the existing and proposed views. The accuracy of visual simulations using the techniques above has previously been tested by comparing pre-consented images with post construction images from the same viewpoints.

### 5.2.1 Viewing Audience and Representative Viewpoints

Despite the proximity to urban areas, views of the Proposed Development will remain limited. The proposed changes along the rim of Martha Pit have the greatest potential to generate visual effects from immediately adjoining areas. Such changes, however, typically avoid direct visual effects associated with exposing an operational mine and involve reconfiguring existing pit rim elements including existing noise mitigation.

Beyond the pit rim, views are generally concealed by intervening landform and established areas of vegetation or otherwise significantly reduced by substantial viewing distances. From low-density residential development to the north-west of Waihi there may be some opportunities to observe enabling works associated with proposed mining activity such as realigning Cambridge Road and forming the adjacent noise bund. Beyond this, proposed mining activity will remain concealed below the pit rim as work continues to extend deeper within the operational mine.

From remaining areas along the pit rim walkway to the south and east of Martha Pit, proposed changes along the north wall will be apparent. Where visible, such changes will be seen in the context of the larger established open pit mine and represent reconfiguration of the existing raw appearance along the north wall. Beyond the pit rim, intervening topography and vegetation will continue to conceal views from most adjoining urban areas with no additional potential views identified from Waihi's Town Centre.

To the east of Martha Pit there is potential to observe the north wall from land which rises to the north-east of Waihi including elevated areas on Union and Black Hills through gaps in vegetation. From such areas, however, existing mining activity associated with the north wall is already apparent with any changes associated with the Proposed Development involving reconfiguring the existing slip associated with the north wall and lowering vegetation seen against a backdrop of the Coromandel Range.

Whilst underground mining activity will remain concealed, water vapour may also be visible rising from one portal and one ventilation shaft accessing underground mining during cold mornings, however this will be an ephemeral effect similar to smoke from chimneys generated from adjoining urban areas during such times. Similarly, the composition of consented waste rock and ore stockpiles will change, however this will generate no material change in the nature or scale of such activity.

To assess visual change, two worst case representative viewpoints have been identified from Cambridge Road to the west and along the pit rim walkway adjoining the Pump House to the south-east (see **Figure 5**). A brief description of the visual changes shown between viewpoint photography and visual simulations generated from these areas is set out below:

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<sup>4</sup> Best Practice Guide: Visual Simulations BPG 10.2, NZILA

## **Viewpoint 1: Cambridge Road**

### *Existing View*

This viewpoint is taken along Cambridge Road adjoining the north-west area of Martha Pit and is representative of the area where the proposed extension of the pit rim and diversion of Cambridge Road is proposed. Existing dwellings are visible at 12 Cambridge Road and 11 Cambridge Road on the respective left-hand and right-hand sides of the photograph alongside fencing and amenity planting consistent with the low density residential character of this area. In the centre of the photograph, an existing noise bund covered in rank grass is presently visible along the skyline adjoining Cambridge Road beyond which mining activity within Martha Pit remains concealed.

### *View During Operation*

During operation, the existing bund adjoining the realigned section of Cambridge Road will be replaced by a lower bund and a 1.8 to 2 metre fence seen along the skyline. Vegetation established along the skyline in the vicinity of Bulltown Road and beyond the intervening dwelling at 11 Cambridge Road will be removed during operation from this area with part of the replacement noise bund visible from this location. Beyond this, no material difference in mining activity within Martha Pit will be apparent.

## **Viewpoint 2: Pit Rim Walkway adjoining the Pump House**

### *Existing View*

From here views across the wider void of Martha Pit are made available. Such views include the existing slip which formed along the north wall on the opposite side of the mine, seen in the context of surrounding benching and haul roads characteristic of the mine.

### *View During Operation (Years 3 and 10)*

During operation, the north wall will gradually be replaced by mining activity which reinstates benching deeper within the mine. Above the north wall, a sliver of land and associated vegetation will be removed along the pit crest. The reconfigured noise bund and fencing seen over approximately 750 metres will unlikely be noticed in the context of the larger mine seen from this viewpoint which remains below a broader backdrop of the Coromandel Range.

Based on the likely viewing audience and changes described from representative viewpoints an assessment of potential visual effects has been undertaken from the following areas:

- Cambridge Road / Bulltown Road - Low Density Residential Area
- Pit Rim Walkway - Recreation Area
- North-east Waihi - Residential Area
- Union Hill and Black Hill - Recreation Areas

## Cambridge Road / Bulltown Road - Low Density Residential Area

This viewing audience extends immediately to the north-west of Martha Pit and includes adjoining low density residential dwellings near the proposed extension to Martha Pit. From here, views are generally focussed to the north-west and away from the operational pit as the underlying land slopes down towards Mangatoetoe Stream before rising towards the Coromandel Range. The combination of intervening landform and vegetation typically obscure views of the mine from beyond the immediate vicinity of the pit rim.

At the time of reporting, OGNZL was negotiating the sale and purchase of 77 Bulltown Road to facilitate part of the realignment of Cambridge Road. This assessment assumes a successful

sale and subsequent relocation of the current owners of that property. The adjoining properties at 10 and 12 Cambridge Road, as identified above, are already under the ownership of OGNZL from which effects can be disregarded.

In the limited near distant views which remain, changes in the configuration of noise mitigation and associated planting may be visible, including a residential dwelling at 14 Pitt Street. Such work will occur during the initial stage of the project during which the greatest potential for adverse visual effects will occur. Once noise bunds are constructed, planting will be re-established on embankments to achieve a low level cohesive vegetated cover in association with diverting the pit rim walkway back along the pit rim. Beyond the pit rim, ongoing mining activity will remain concealed as it progresses deeper into the mine.

*Level of Effect = Moderate - Low*

*Nature of Effect = Adverse*

### Pit Rim Walkway

This viewing audience includes existing recreation users along areas of the pit rim which overlook Martha Pit. From such areas, the north wall typically forms an integral part of the larger mine. Within lower areas along the southern edge of the mine, air portals, a ventilation shaft and stockpiles associated with underground mining activity may also be observed during later stages of the operation, seen within the context of operational mining activity. The inclusion of trucks and machinery on internal haul roads will also become apparent and form transient elements of interest which would normally be expected within an operational mine.

*Level of Effect = Low*

*Nature of Effect = Neutral*

### North-East Waihi - Residential Area

This viewing audience includes the residential area which extends to the north-east of Waihi. Most of views towards Martha Pit in this area are concealed by existing development and vegetation which occurs near Barry Road. Beyond this, changes along the northern pit wall may be visible from some residential dwellings extending east of Walmsley Road. From such areas, the north wall is visible in long distance views below a more distant backdrop of the Coromandel Range. Given this context, any change which occurs will appear no worse than adverse effects already generated by the exposed north wall.

*Level of Effect = Low*

*Nature of Effect = Neutral*

### Union Hill and Black Hill – Recreation Areas

These viewing audiences represent recreation users accessing elevated landforms that rise to the east of Waihi. These landforms typically include a dense cover of vegetation which encloses recreational tracks, however lookout opportunities are afforded in some areas including the summit of Black Hill. From such areas, changes associated with existing views of the north wall will barely be discernible in very long-distance views, seen against a broader backdrop of the Coromandel Range.

*Level of Effect = Very Low*

*Nature of Effect = Neutral*

## 5.2.2 Summary of Visual Effects

For most people living in Waihi, the Proposed Development will remain visually concealed. This occurs because of both intervening landform and vegetation and the underground nature of the remaining works which helps ensure there will be no discernible increase in visual effects.

Views from adjoining residential dwellings to the north-west of Martha Pit may observe the proposed noise mitigation bund constructed along the modified pit rim. Beyond this, however views of mining activity will remain concealed by intervening landform and vegetation which slopes away from the pit rim. Where such construction is visible from adjoining dwellings, temporary moderate-low adverse visual effects are anticipated however such effects will be progressively mitigated by planting established on the intervening noise bund along the pit rim.

From areas to the south-east of Waihi including the Town Centre, there will be no noticeable changes beyond views afforded along the pit rim walkway. Where visible from the pit rim walkway, views towards the Proposed Development will entail reconfiguring the existing slip visible along the north wall with batters and haul roads normally expected within an operational mine. Such views are considered benign in the context of the wider mine which is visible, generating low neutral effects.

To the north-east and further south-east of Waihi any views of the north wall will remain long distance and predominantly obscured beyond intervening vegetation seen against a backdrop of the Coromandel Range and result in low and very low neutral effects. Similarly, any views of water vapour generated from underground mining activity will be limited and will appear like surrounding domestic influences including smoke from home fires typical in this area.

## 5.3 Effects on Landscape and Natural Character

Assessing effects on landscape or natural character provides a judgement of the impact of changes to the characteristics and qualities of the landscape and its associated levels of natural character. This includes consideration of the sensitivity of the landscape to the Proposed Development together with the size or scale of the effect, the geographical extent of the area influenced and the duration of the effect where possible, including whether this is reversible.

Open pit mining, by its very nature necessitates widespread landscape change and inevitably results in significant effects on landscape character. In the context of the existing Martha Pit however, such effects are already apparent and reduce the sensitivity to change within this area of landscape.

Within the foothills of the Coromandel Range, the extension of Martha Pit will represent a very limited expansion of an existing substantially modified landform. Whilst the configuration of part of the pit rim will be further modified, the resultant mining operation will remain visually well contained and limit the potential for any more significant landscape character effects. Given this established context within which additional landscape change will occur, landscape character effects during operation will generate **very low adverse** effects.

The proximity of Martha Pit to Waihi will continue to influence the character of this landscape during operation. Despite its close physical relationship with the township, the extended mining operation will continue to have very limited direct visual presence with views primarily limited to areas of access enabled along the existing pit rim to overlook the mine. From within Waihi, Martha Pit will remain largely contained and reflect an enduring aspect of Waihi's townscape. During operation, this will generate **low neutral** effects in terms of landscape character, essentially reinstating an operational mine which previously stopped because of a slip which occurred the north wall.

As part of the project closure, a water inlet structure will be constructed along the Ohinemuri River to assist with filling Martha Pit to form Martha Lake. This will reflect a localised disruption associated with a reconsented inlet structure and existing outlet pipe within a modified rural area. Similarly, once the lake is filled, a reconsented outlet pipe will be constructed beneath

Moresby Avenue and enable overflow into Mangatoetoe Stream. In both instances, disturbance to the existing river bed will be minimised with built structures remaining low key and able to be embedded within surrounding areas of vegetation. Accordingly, no more than **low adverse** natural character effects are anticipated in the context of the existing levels of natural character apparent in these areas.

At completion, the extension of Martha Pit will continue to be supported by an appropriate closure plan which will seek to enhance the recreation and habitat opportunities associated with a new mine lake and modifications along the extended pit rim walkway. This will further improve the context and character associated with mining activity and generate long term beneficial outcomes.

## 6.0 Landscape Mitigation

During operation, local effects associated with the extended open pit can be readily addressed through implementation and maintenance of an appropriate landscape plan. This should ensure the following outcomes, including planting developed in accordance with the Landscape Mitigation included as **Figure 6**:

- Relocate the Pit Rim Walkway along the pit rim between Miners Place and Cambridge Road
- Establish and plant noise mitigation along the adjoining pit rim edge so that this becomes assimilated within its surroundings
- Ensure any new water inlet and outlet structures minimise disturbance along stream beds and soften any necessary built elements with planting which appears integrated within adjoining riparian areas

To ensure such landscaping associated with the Proposed Development is effective the following condition of consent should be applied:

*Prior to the project commencing, a landscape plan shall be submitted to the Manager Resource Consents for approval in general accordance with the landscape mitigation concept plan included with the resource consent application. This plan shall detail the following:*

- *Relocation of the Pit Rim Walkway between Miners Place and Cambridge Road;*
- *Ensure all disturbed areas outside the operational mine are planted to soften changes in landform and complement adjoining areas of vegetation;*
- *Ensure water inlet and outlet structures minimise disturbance along stream beds and soften any necessary built elements with planting which appears integrated within adjoining riparian areas;*
- *Indicate the species, size and number of proposed plants within identified planting areas; and*
- *Outline maintenance and replacement requirements for the first 3 years following establishment to promote plant survival*

*The approved landscape plan shall be implemented within the first available planting season following completion of preparatory works and maintained in accordance with the approved plan.*

## 6.1 Rehabilitation and Closure Plan

The existing conditions of consent require the preparation of a Rehabilitation and Closure Plan that is updated on an annual basis.

The original closure concept plan for the Martha Pit envisaged a recreational lake with a park located to the East. After the Barry Road collapse and identification of hazard zones by GNS, a Master Rehabilitation and Closure Concept Plan was developed in 2006 by mining company staff, Waikato University, Department of Conservation, Waihi Community Vision, the Landscape Design Company along with tourism and marketing advisors. The Master Rehabilitation and Closure Concept Plan forms Figure 1 of the Rehabilitation and Closure Plan 2017.

While this review necessitated changes to the original Eastern Lakeside Park Concept, the fundamental principles and obligations previously established at the commencement of the open pit mining operation have been maintained. The Rehabilitation and Closure Plan 2017 envisages the creation of a pit lake with a surface level of around 1104m and the development of an integrated parkland around the lake focussing on an extensive area accessible to the lake edge on its eastern side. Revegetation and amenity plantings along with extensive walkways and recreational features are incorporated within the revised updated Draft Closure Concept Plan that forms Figure 2 of the Rehabilitation and Closure Plan 2017.

As noted above, the landscape and visual effects of the current application are primarily confined to the restoration of the area adjoining the north wall, accordingly there will be no effects on the updated Draft Closure Concept Plan that forms Figure 2 of the Rehabilitation and Closure Plan 2017, other than some confined earthworks and the provision of a noise bund along a section of the north wall extending generally from the "Historic Gardens" area to the south of Pitt Street to the realigned section of Cambridge Road. These works will provide an opportunity to relocate the Pit Rim Walkway from its current temporary alignment along Savage and Cambridge Roads, back to a more appropriate pit edge location on the proposed noise bund from its current alignment along public roads following the 2015/16 north wall slip and complement the wider closure plan.

## 7.0 Statutory Consideration

The proposed extension of Martha Pit will not occupy any identified outstanding natural features and landscapes or amenity landscapes at the regional or district levels and supports the continued operation and development of a regionally significant industry and primary production activities.

Most of the above ground mining activity is contained within land zoned Martha Mineral Zone. This zoning enables mining activity within Martha Pit to continue to occur in association with existing long-term rehabilitation opportunities. During operation, mining activity will remain enclosed within the existing mine and maintain the surrounding amenity values of Waihi's wider community.

The proposed Martha Pit extension will occupy the margins of adjoining residential areas and cover approximately 0.28 ha beyond the Martha Mineral zone. Given the nature of the landform which slopes away from the open pit and minimal extension beyond the existing pit rim, mining activity will continue to minimise adverse effects on the existing character and identity of this area. Bunding and planting established along the pit rim will further mitigate any potential for adverse effects and respond to the amenity of adjoining residential environments.

Overall, the effects of the extension of mining activity into adjoining residential zones will remain limited. This also acknowledges that the District Plan enables flexibility for the development and operation of a range of non-residential activities provided these remain compatible in scale,

intensity and character within such areas. Noise mitigation and associated fencing will retain an appropriate residential scale and supports a realigned pit rim walkway and associated planting to enhance the existing amenity values and pit rim experience along this area.

## 8.0 Summary and Conclusion

Above ground landscape change associated with the Proposed Development predominantly results from remedying an existing slip along the north wall of Martha Pit which requires earthworks and the associated removal of a narrow strip of vegetation along the periphery of an adjoining residential area. While this will generate some adverse physical and landscape effects, including traversing the margins of an adjoining area of “Historic Gardens” and re-consenting existing water inlet and outlet structures along adjoining water courses, such effects will be low and occur in a relatively short period of time. Landscape mitigation will ensure the resultant changes along the pit rim are softened by planting and retain an appropriate residential scale and integrate development within existing levels of modification.

At the commencement of the project, moderate-low adverse visual effects may occur from adjoining residential properties as earthworks, road realignment and associated noise mitigation is established. Once operational, the potential for adverse visual effects will reduce as planting is re-established along this area of the pit rim and mining within the open pit remains visually well contained below the pit rim. Beyond the pit rim, views of the Proposed Development will remain limited generating ephemeral low or very low adverse effects. Realigning the Pit Rim Walkway to a more appropriate ‘pit edge’ location will also generate beneficial effects during operation and does not conflict with broader opportunities identified within the Rehabilitation and Closure Plan Concept.



# Appendix 1: Landscape and Visual Effects Assessment Methodology Guidance

17 May 2018

## Introduction

The landscape and visual effects assessment process provides a framework for assessing and identifying the nature and level of likely effects that may result from a proposed development. Such effects can occur in relation to changes to physical elements, the existing character of the landscape and the experience of it. In addition, the landscape assessment method may include an iterative design development processes which may include stakeholder involvement. The outcome of any assessment approach should seek to integrate development into its context and avoid, remedy or mitigate adverse effects (see **Figure 1**).

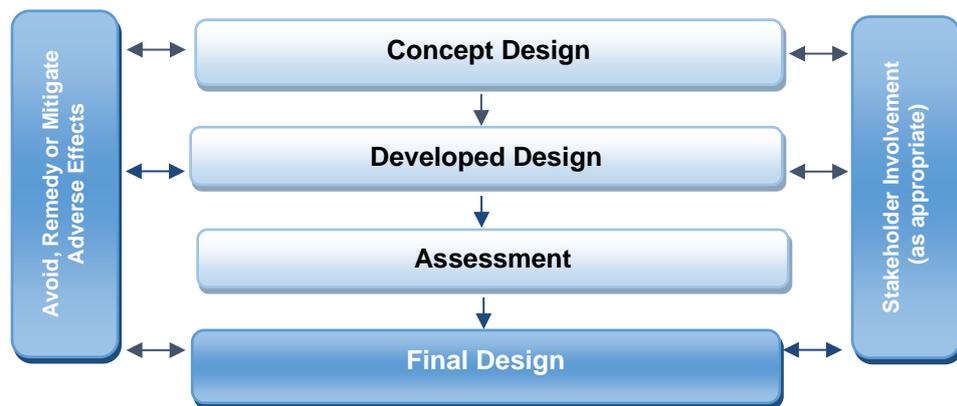


Figure 1: Design feedback loop

When undertaking landscape and visual effects assessments, it is important that a structured and consistent approach is used to ensure that findings are clear and objective. Judgement should always be based on skills and experience, and be supported by explicit evidence and reasoned argument.

While landscape and visual effects assessments are closely related, they form separate procedures. The assessment of the potential effect on the landscape forms the first step in this process and is carried out as an effect on an environmental resource (i.e. landscape elements, features and character). The assessment of visual effects considers how changes to the physical landscape affect the viewing audience. The types of effects can be summarised as follows:

**Landscape effect:**

*Change in the physical landscape, which may change its characteristics or qualities.*

**Visual effect:**

*Change to views which may change the visual amenity experienced by people.*

The policy context, existing landscape resource and locations from which a development or change is visible all inform the 'baseline' for landscape and visual effects assessments. To assess effects, the landscape must first be described, including an understanding of the key landscape characteristics and qualities. This process, known as landscape characterisation, is the basic tool for understanding landscape character and may involve subdividing the landscape into character areas or types. The condition of the landscape (i.e. the state of an individual area of landscape or landscape feature) should also be described alongside a judgement made on the value or importance of the potentially affected landscape.

This outline of the landscape and visual effects assessment methodology has been undertaken with reference to the Quality Planning Landscape Guidance Note<sup>5</sup> and its signposts to examples of best practice which include the UK guidelines for landscape and visual impact assessment<sup>6</sup> and the New Zealand Landscape Institute Guidelines for Landscape Assessment<sup>7</sup>.

## Landscape Effects

Assessing landscape effects requires an understanding of the nature of the landscape resource and the magnitude of change which results from a proposed development to determine the overall level of landscape effects.

### Nature of the landscape resource

Assessing the nature of the landscape resource considers both the susceptibility of an area of landscape to change and the value of the landscape. This will vary upon the following factors:

- Physical elements such as topography / hydrology / soils / vegetation;
- Existing land use;
- The pattern and scale of the landscape;
- Visual enclosure / openness of views and distribution of the viewing audience;
- The zoning of the land and its associated anticipated level of development;
- The value or importance placed on the landscape, particularly those confirmed in statutory documents; and
- The scope for mitigation, appropriate to the existing landscape.

The susceptibility to change takes account of both the attributes of the receiving environment and the characteristics of the proposed development. It considers the ability of a specific type of change occurring without generating adverse effects and/or achievement of landscape planning policies and strategies.

Landscape value derives from the importance that people and communities, including tangata whenua, attach to particular landscapes and landscape attributes. This may include the classification of Outstanding Natural Landscape (RMA s.6(b)) based on important biophysical, sensory/ aesthetic and associative landscape attributes, which have potential to be affected by a proposed development.

### Magnitude of Landscape Change

The magnitude of landscape change judges the amount of change that is likely to occur to existing areas of landscape, landscape features, or key landscape attributes. In undertaking this assessment, it is important that the size or scale of the change is considered within the geographical extent of the area influenced and the duration of change, including whether the change is reversible. In some situations, the loss /change or enhancement to existing landscape elements such as vegetation or earthworks should also be quantified.

When assessing the level of landscape effects, it is important to be clear about what factors have been considered when making professional judgements. This can include consideration of any benefits which result from a proposed development. **Table 1** overleaf helps to explain this process. The tabulating of effects is only intended to inform overall judgements.

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<sup>5</sup> <http://www.qualityplanning.org.nz/index.php/planning-tools/land/landscape>

<sup>6</sup> Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)

<sup>7</sup> Best Practice Note Landscape Assessment and Sustainable Management 10.1, NZILA

Contributing Factors		Higher	Lower
Nature of Landscape Resource	<b>Susceptibility to change</b>	The landscape context has limited existing landscape detractors which make it highly vulnerable to the type of change which would result from the proposed development.	The landscape context has many detractors and can easily accommodate the proposed development without undue consequences to landscape character.
	<b>The value of the landscape</b>	The landscape includes important biophysical, sensory and associative attributes. The landscape requires protection as a matter of national importance (ONF/L).	The landscape lacks any important biophysical, sensory or associative attributes. The landscape is of low or local importance.
Magnitude of Change	<b>Size or scale</b>	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 aesthetic or perceptual change apparent.
	<b>Geographical extent</b>	Wider landscape scale.	Site scale, immediate setting.
	<b>Duration and reversibility</b>	Permanent. Long term (over 10 years).	Reversible. Short Term (0-5 years).

Table 1: Determining the level of landscape effects

## Visual Effects

To assess the visual effects of a proposed development on a landscape, a visual baseline must first be defined. The visual 'baseline' forms a technical exercise which identifies the area where the development may be visible, the potential viewing audience, and the key representative public viewpoints from which visual effects are assessed.

The viewing audience comprises the individuals or groups of people occupying or using the properties, roads, footpaths and public open spaces that lie within the visual envelope or 'zone of visual influence' of the site and proposal. Where possible, computer modelling can assist to determine the theoretical extent of visibility together with field work undertaken to confirm this. Where appropriate, key representative viewpoints should be agreed with the relevant local authority.

### Nature of the viewing audience

The nature of the viewing audience is assessed in terms of the susceptibility of the viewing audience to change and the value attached to views. The susceptibility of the viewing audience is determined by assessing the occupation or activity of people experiencing the view at particular locations and the extent to which their interest or activity may be focussed on views of the surrounding landscape. This relies on a landscape architect's judgement in respect of visual amenity and reaction of people who may be affected by a proposal. This should also recognise that people more susceptible to change generally include: residents at home, people engaged in outdoor recreation whose attention or interest is likely to be focussed on the landscape and on particular views; visitors to heritage assets or other important visitor attractions; and communities where views contribute to the landscape setting.

The value or importance attached to particular views may be determined with respect to its popularity or numbers of people affected or reference to planning instruments such as viewshafts or view corridors. Important viewpoints are also likely to appear in guide books or tourist maps and may include facilities provided for its enjoyment. There may also be references to this in literature or art, which also acknowledge a level of recognition and importance.

### Magnitude of Visual Change

The assessment of visual effects also considers the potential magnitude of change which will result from views of a proposed development. This takes account of the size or scale of the effect, the geographical extent of views and the duration of visual change which may distinguish between temporary (often associated with construction) and permanent effects where relevant.

Preparation of any simulations of visual change to assist this process should be guided by best practice as identified by the NZILA<sup>8</sup>.

When determining the overall level of visual effect, the nature of the viewing audience is considered together with the magnitude of change resulting from the proposed development.

**Table 2** has been prepared to help guide this process:

Contributing Factors		Higher	Lower
Nature of the Viewing Audience	<b>Ability to absorb change</b>	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. Views from transport corridors.
	<b>Value attached to views</b>	Viewpoint is recognised by the community such as an important view shaft, 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	<b>Size or scale</b>	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.
	<b>Geographical extent</b>	Front on views. Near distance views; Change visible across a wide area.	Oblique views. Long distance views. Small portion of change visible.
	<b>Duration and reversibility</b>	Permanent. Long term (over 15 years).	Transient / temporary. Short Term (0-5 years).

Table 2: Determining the level of visual effects

## Nature of Effects

In combination with assessing the level of effects, the landscape and visual effects assessment also considers the nature of effects in terms of whether this will be positive (beneficial) or negative (adverse) in the context within which it occurs. Neutral effects can also occur where landscape or visual change is benign.

It should also be emphasised that a change in a landscape or view does not, of itself, necessarily constitute an adverse landscape or visual effect. Landscape is dynamic and is constantly changing over time in both subtle and more dramatic transformational ways, these changes are both natural and human induced. What is important in managing landscape change is that adverse effects are avoided or sufficiently mitigated to ameliorate the effects of the change in land use. The aim is to provide a high amenity environment through appropriate design outcomes.

This assessment of the nature effects can be further guided by **Table 3** set out below:

Nature of effect	Use and Definition
<b>Adverse (negative):</b>	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 / or visual amenity values
<b>Neutral (benign):</b>	The proposed development would complement (or blend in with) the scale, landform and pattern of the landscape maintaining existing landscape and / or visual amenity values
<b>Beneficial (positive):</b>	The proposed development would enhance the landscape and / or visual amenity through removal of restoration of existing degraded landscapes uses and / or addition of positive elements or features

Table 3: Determining the Nature of Effects

<sup>8</sup> Best Practice Guide: Visual Simulations BPG 10.2, NZILA

## Determining the Overall Level of Effects

The landscape and visual effects assessment concludes with an overall assessment of the likely level of landscape and visual effects. This step also takes account of the nature of effects and the effectiveness of any proposed mitigation.

This step informs an overall judgement identifying what level of effects are likely to be generated as indicated in **Table 4** below. This table which can be used to guide the level of landscape and visual effects uses an adapted seven-point scale derived from NZILA's Best Practice Note.

Effect Rating	Use and Definition
<b>Very High:</b>	Complete modification of key elements / features / characteristics, i.e. amounts to a complete change of landscape character.
<b>High:</b>	Major modification or loss of most key elements / features / characteristics, i.e. little of the pre-development landscape character remains. <i>Concise Oxford English Dictionary Definition</i> <i>High: adjective- Great in amount, value, size, or intensity.</i>
<b>Moderate- High:</b>	Modifications of several key elements / features / characteristics of the baseline, i.e. the pre-development landscape character remains evident but materially changed.
<b>Moderate:</b>	Partial modification to key elements / features / characteristics of the baseline, i.e. new elements may be prominent but not necessarily uncharacteristic within the receiving landscape. <i>Concise Oxford English Dictionary Definition</i> <i>Moderate: adjective- average in amount, intensity, quality or degree</i>
<b>Moderate - Low:</b>	Limited modification to one or more key elements / features / characteristics, i.e. new elements are not prominent or uncharacteristic within the receiving landscape.
<b>Low:</b>	No material loss of or modification to key elements / features / characteristics. i.e. modification or change is not uncharacteristic and absorbed within the receiving landscape. <i>Concise Oxford English Dictionary Definition</i> <i>Low: adjective- 1. Below average in amount, extent, or intensity.</i>
<b>Very Low:</b>	Little or no change to or modification to key elements/ features/ characteristics of the baseline, i.e. approximating a 'no change' situation.

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



# Figures

**Figure 1:** Site Context

**Figure 2:** Site Location

**Figure 3:** Proposed Development

**Figure 4:** Statutory Context

**Figure 5:** View Point Locations

**Figure 6:** Landscape Mitigation





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Year 0 (Existing)



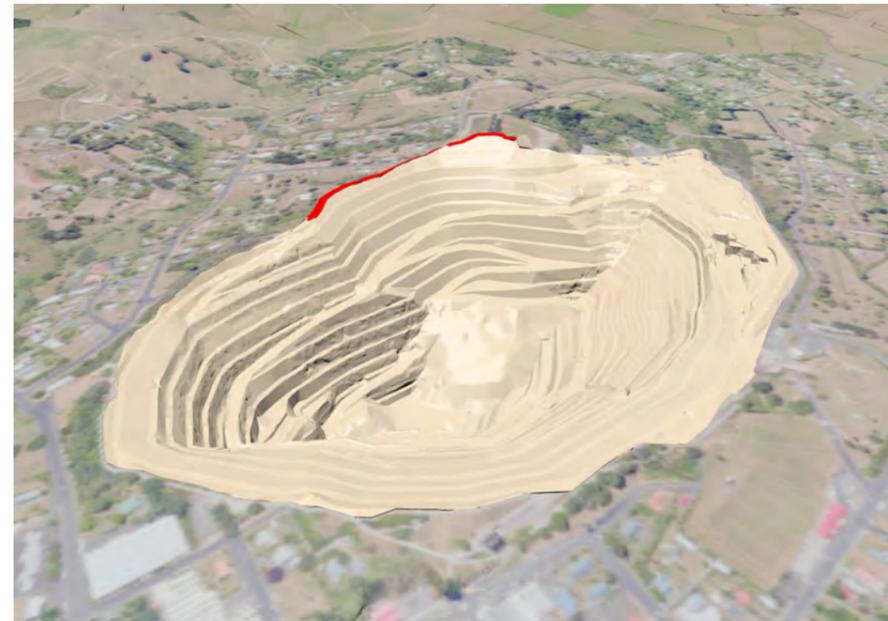
Year 3



Year 5



Year 6



Year 8



Year 10

 Proposed noise mitigation

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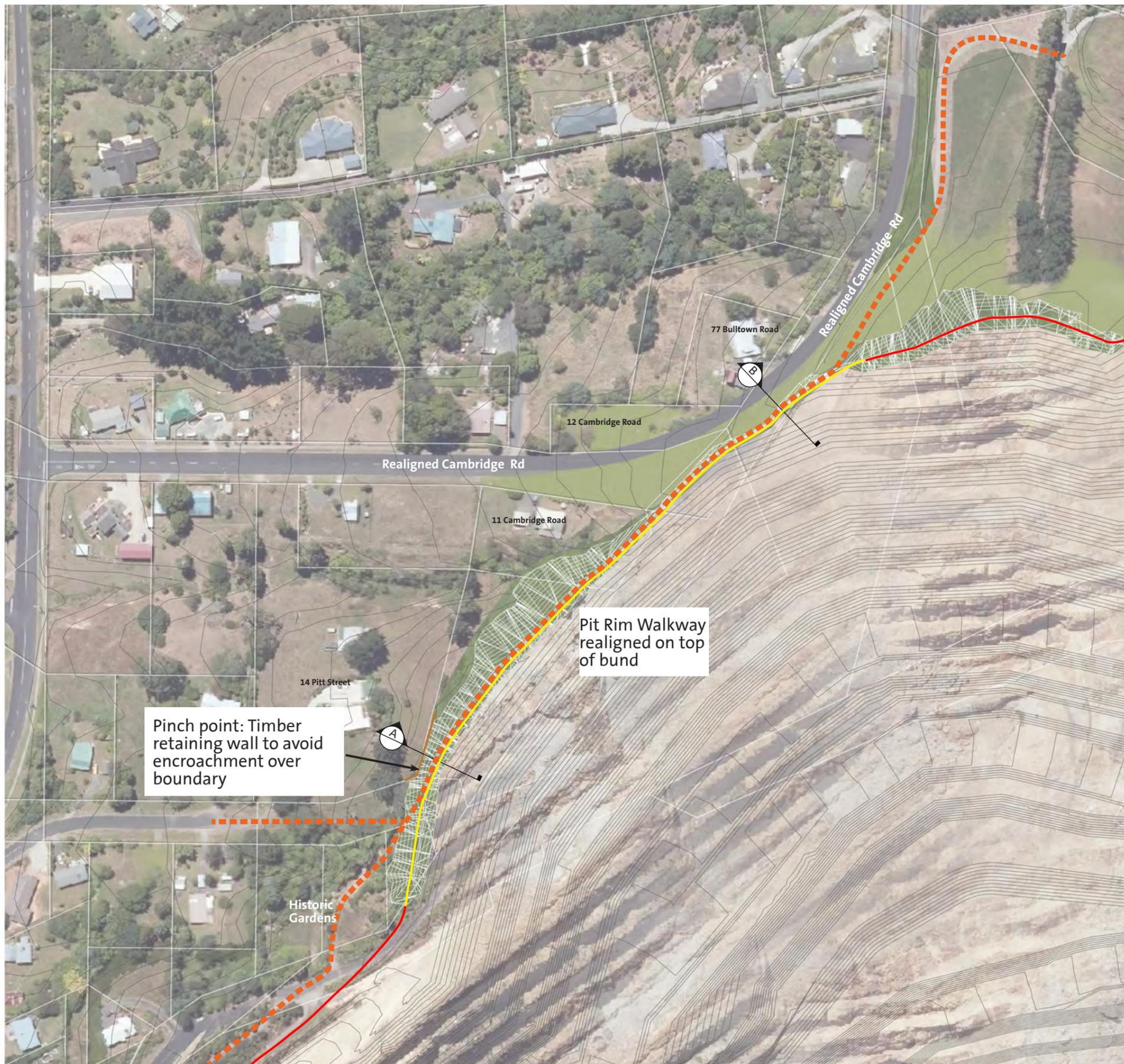


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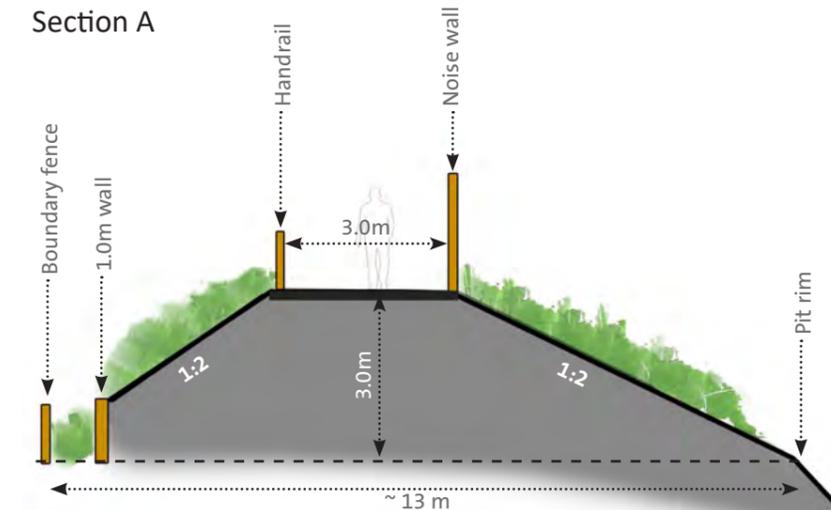


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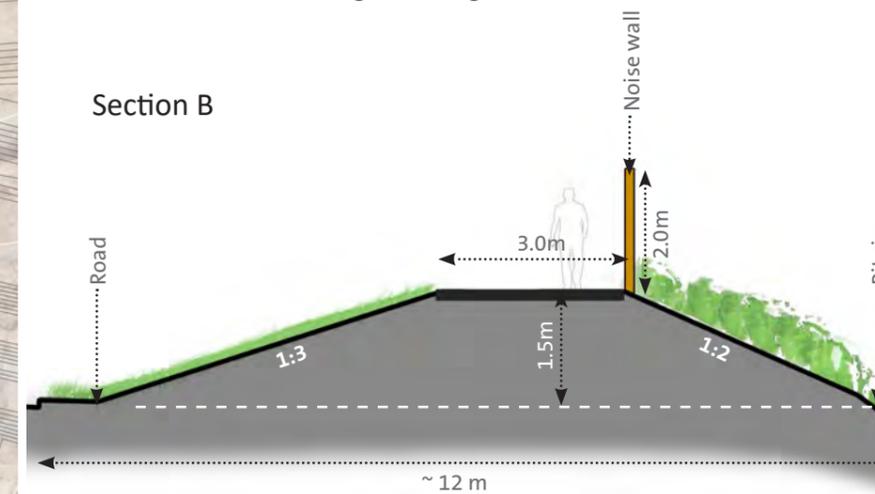


**Section A**



- A cantilevered timber retaining wall may be required to avoid encroachment over boundary. A 3m offset from the boundary is optimal
- 3.0m path along top of bund ( Pit Rim Walkway)
- Security fence / noise wall on pit side of path enabling viewing opportunities
- NOTE: Final noise mitigation height TBC.

**Section B**



Using a combined bund and noisewall approach minimises visual impact of the noisewall.

- 1:3 batter up from road
- 3.0m path along top of bund ( Pit Rim Walkway)
- Noise wall on pit side of path with glass/perspex viewing holes
- NOTE: Final noise mitigation height TBC.

# Visual Simulations

**Viewpoint 1:** Cambridge Road

**Viewpoint 2:** Pit Rim Walkway





Existing View



View During Operation

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Existing View



View During Operation (Year 3)

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Existing View



View During Operation (Year 10)

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