LANDMATTERS

Porirua City Council
20 NOV 2020
Customer Service

SUBMISSION – Porirua Proposed District Plan

KAKAHO – GRAY LANDS
Camborne, Porirua

Client: The Neil Group Limited & Gray Family - November 2020

LANDMATTERS

SUBMISSION FOR: The Neil Group Limited & Gray Family

Prepared by:

Bryce S Holmes
Principal Planner and Director

Date: November 2020
Version: FINAL
Job Ref: J000

RMA FORM 5

Submission on publicly notified Proposed Porirua District Plan

Clause 6 of the First Schedule, Resource Management Act 1991

To: Porirua City Council

1. **Submitter details:**

Full Name			
Company/Organisation *if applicable*	The Neil Group Limited and Gray Family		
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2. This is a ***submission*** on the **Proposed District Plan** for Porirua.

3. I could not gain an advantage in trade competition through this submission.

   If **you could** gain an advantage in trade competition through this submission please complete point four below:

4. I am directly affected by an effect of the subject matter of the submission that:
   (a) adversely affects the environment; and

(b) does not relate to trade competition or the effects of trade competition.

Note:
If you are a person who could gain an advantage in trade competition through the submission, your right to make a submission may be limited by clause 6(4) of Part 1 of Schedule 1 of the Resource Management Act 1991.

5. I wish to be heard in support of my submission.

6. I will not consider presenting a joint case with other submitters, who make a similar submission, at a hearing.

Please complete section below (insert additional boxes per provision you are submitting on):

The specific provision of the proposal that my submission relates to:
See part 3.
Do you: Support? Oppose? Amend?
See part 3.
What decision are you seeking from Council? **What action would you like: Retain? Amend? Add? Delete?**
Reasons: See part 3.

1. BACKGROUND AND INTRODUCTION

Porirua City Council (PCC) has reviewed its Growth Strategy to guide how the City changes over the next 30 years. The Growth Strategy includes a review of the Northern Growth Area 2014 (NGA). Porirua City Council is looking to implement its Growth Strategy through its new District Plan. The Proposed District Plan is open for submission. This document is a submission on Porirua's Proposed District Plan.

The Kakaho property is north of the Pauatahanui Inlet and Grays Road. The Gray family have had a long association with the local area and wider Porirua City.

The land has been intergenerationally farmed by the Gray family however it is no longer viable as an economic unit since been split between family members into it's current size. More recently the Gray family have entered into an agreement with the Neil Group (NGL) to look at how best to develop the property and to assist Council with it's endeavours to grow the city. The NGL are land and property developers undertaking land development and residential and commercial building mainly in the Auckland, Northland and Bay of Plenty Regions and has been operating for over 60 years. The NGL are providing development expertise and funding for the land including the Resource Management Act 1991 (RMA) process.

Farming is becoming a marginal land use in this area and it is expected the planned urban expansion of the Plimmerton and Camborne suburbs is going to further erode the economics of farming. The Gray family and the NGL therefore generally support the intent of Porirua City Council (PCC) to investigate land use changes through its Growth Strategy 2048 and the Proposed District Plan.

This document briefly describes the land, the general parts of the Proposed District Plan wish to have amended, and gives reasons for the requested amendments.

2. THE LAND

The land is located north of the Pauatahanui Inlet and east of Camborne in Porirua. The plans **attached** to this submission shows the general location of the subject land. The property details are:

- Address: 93 Grays Road, Camborne Porirua
- Legal Description: Lot 1 DP 408158 & Pt Sec 82 Porirua DIS BLK VIII PAEKAKARIKI SD
- Area: 47.2940ha & 5.1754ha

3. THE SUBMISSION AND CHANGES SOUGHT

The submitters generally **supports** the following parts of the Proposed District Plan:

1. Showing part of the land as appropriate for **Urban Development** on the Planning Maps.

The NGL generally **opposes** the following parts of the Proposed District Plan:

1. Identification of the land as part of the Future Urban Zone (FUZ);
2. Identification of part of the land as Rural Lifestyle Zone (RLZ);
3. The extent of the Pauatahanui Special Amenity Landscape Area (SALA);
4. The location of the Stream Corridor Flood Hazard;
5. The restrictive nature of the planning provisions in the FUZ including the objectives, policies and rules.

A. **Amendments to the planning maps** to either identify the subject land as part of the General Residential Zone (GRZ) and Settlement Zone **or** create a Specific Precinct (Kakaho) within the General Residential Zone to give effect to the Structure Plan prepared by 4Sight Consulting on behalf of the NGL.

***Reasons**: The NGL have undertaken extensive research consistent with the intent of policy FUZ-P2 1 and the guidelines in APP22 that has culminated in a structure plan prepared by 4Sight. Although future refinement may be needed as more information becomes available, the NGL have commissioned appropriate planning, urban design, geotechnical, landscape, ecological and infrastructure experts to prepare its structure planning for the land. The structure plan is **attached** to this submission. The land has been identified for many years as a future residential area and its development will compliment and expand on the existing Camborne suburb.*

B. **Amend the FUZ provisions** to provide for a more flexible approach to development including the possibility of consenting new residential areas (discretionary activity) and a more flexible approach under policy FUZ-P1.

***Reason**: A key principle in policy FUZ-P1 is to ensure residential areas are serviced by existing or planned infrastructure. However, the Proposed District Plan does not provide for flexibility and private investment into servicing. The land can be effectively serviced according to the NGL's infrastructure experts and that infrastructure report (by Cuttriss) is **attached** to this submission. The policy direction to require land owners to go through a second plan change process to enable urban expansion is inefficient and will 'sterilise' investment for growth and giving effect to the Growth Strategy.*

C. **Amendment to the planning map** to better reflect the extent of the SALA in accordance with the attached 4Sight report.

***Reason**: The Proposed District Plan shows a significant portion of the subject land in the Pauatahanui SALA. However, the NGL have commissioned a site specific Landscape and Visual Assessment that has considered this issue more fully than previous studies. The report is **attached** for the benefit of Council to better consider landscape values.*

D. **Without limiting the general opposition in A, B and C above,** the specific parts of the

plan the submitter seeks changes are in the following table:

Plan Provision	Support/ Oppose	Reason	Relief Sought
Part 2 – Strategic Objectives: UFD-02 and UFD-04	**Support**	**It is important for Council to make provision for new urban development where it can be serviced.**	*Retain the objectives as proposed.*
Part 2 – Natural Environment Values	**Oppose**	**The submitter opposes this section of the Proposed District Plan as it relates to SALA's. If a SALA is to be identified for within the District Plan, the provisions need to reflect that they exist within context of a growing city.**	*Amend the provisions of the Natural Environment Values part of the plan to the following (or similar intent):* ***NFL-02*** ***The identified characteristics and values of the Special Amenity Landscapes are maintained and, where practicable, enhanced within context of growth of the City.*** ***NFL-P3*** ***Except … where it:*** *1. Avoids significant adverse effects … Outstanding Natural Features and Landscapes ~~and SCHED 10 – Special Amenity Landscapes~~; and* *2. Can demonstrate …* *e. How buildings …* *ii. Maintain the identified characteristics and values in SCHED10 – Special Amenity Landscapes within context of anticipated growth of the City;* ***NFL-P5*** ***Subdivision in the Rural Lifestyle Zone, Settlement Zone, or a Precinct Area and within a Special Amenity***

			Landscape *Control subdivision in the Rural Lifestyle Zone, Settlement Zone or a Precinct Area and within a Special Amenity Landscape to ensure that the size of any allotment and the location of a building platform:* *1. Maintains the identified characteristics and values of the Special Amenity Landscape described in SCHED10 – Special Amenity Landscapes within context of form and anticipated growth of the City.* ***NFL-P5 Subdivision in the Rural Lifestyle Zone, Settlement Zone or Precinct Area within a Special Amenity Landscape*** *Control subdivision in the Rural Lifestyle Zone, Settlement Zone or Precinct Area within a Special Amenity Landscape to ensure that the size of any allotment and the location of a building platform:* *1. Maintains the identified characteristics and values of the Special Amenity Landscape described in SCHED10 – Special Amenity Landscapes within context form of the City and anticipated growth;* ***NFL-P6 Earthworks*** *~~Only~~ allow earthworks ...* ***NFL-P8 Special Amenity Landscapes (in the coastal environment)*** *~~Only~~ allow subdivision ... having regard to:*

			1. *The compatibility of scale, location and design of built form with the identified characteristics and values within context form of the City and anticipated growth;* ***NFL-R1 Earthworks or land disturbance within … or Special Amenity Landscape*** ~~***All Zones** 3. Activity Status: **Non-complying***~~ *Delete this non-complying rule and replace it with a discretionary activity rule for Special Amenity Landscape Areas.* ~~***NFL-R12 Any activity not otherwise listed as permitted, controlled, restricted discretionary, discretionary or non-complying***~~ ~~***All zones** 1. Activity Status: **Non-complying***~~ *Delete this non-complying rule and replace it with a discretionary activity rule for Special Amenity Landscape Areas.*
Part 2 – Subdivision: SUB-04	**Oppose**	**If Council is going to continue with a FUZ the objectives and policies need to provide for flexibility for investment/funding options for landowners/developers. The objective should also reflect that services can be provided where the impact on current infrastructure can be minimized.**	*Amend Objective SUB-04 to (or similar intent):* *Subdivision within the Future Urban Zone to support investment and funding of new urban development including* ~~*does not result in the fragmentation of sites that would compromise the potential of*~~*: 1. The Judgeford Hills and Northern Growth Areas of the Future Urban Zone to accommodate* ~~*integrated*~~ *service*~~*d*~~*s* ~~*and*~~ *primarily for residential urban development:*

Part 2 – Subdivision: SUB-P5	**Oppose**	**Parts 1, 3 and 5 of the policy do not promote innovation or alternate means of infrastructure provision. The policy would be improved with some flexibility.**	*Amend Policy SUB-P5 to (or similar intent):* *~~Require~~ Encourage infrastructure to be provided in an integrated and comprehensive manner by: 1. Ensuring infrastructure meets Council standards and has the capacity to accommodate the development or anticipated future development in accordance with the purpose of the zone, and is in place, provided for or funded at the time of allotment creation; 3. Generally Requiring reticulated wastewater, reticulated water and stormwater management systems in all Urban Zones to meet the performance criteria of the Wellington Water's Regional Water Standard May 2019. Alternative solutions for infrastructure will be supported where information is provided that proposals meet a similar level of performance. 5. Ensuring telecommunications and power supply is provided to all allotments, including consideration of wireless solutions for telecommunication.*
Part 2 – Subdivision: SUB-P7	**Oppose**	**The policy has been formulated in a rigid manner and is can be improved through provision of flexibility.**	*Amend Policy SUB-P7 to (or similar intent):* *~~Avoid~~ Manage subdivision within the Future Urban Zone so that ~~may result in~~ one or more of the following does not occur: 2. The need for significant upgrades, provisions or extensions to the reticulated wastewater, reticulated water supply or stormwater networks, or other infrastructure in advance of integrated urban development where that infrastructure is not otherwise*

			provided for within the development and/or contributed to through fair funding;
Part 2 – Subdivision: SUB-R1 & SUB-S1 Future Urban Zone 7.	**Oppose**	**A non-complying activity rule and the standards requiring a 40ha minimum lot size is restrictive and will not provide a planning frameworks to encourage necessary investment for development funding.**	*Amend the rules and standards for the FUZ to match the General Rural Zone. Delete non-complying activities as they relate to the FUZ and replace with Discretionary Activity rules.*
Part 3 – Future Urban Zone (FUZ). Entire Chapter provisions FUZ-01 to FUZ-S7. Including APP11 – Future Urban Zone Structure Plan Guidance and planning maps as they relate to the land that the submitter has an interest in.	**Oppose**	**The suite of provisions relating to the FUZ are essentially monopolizing future urban land supply to one area of the City. This approach does not provide appropriate market forces and choice on the land supply side.**	*Delete the Future Urban Zone provisions from the District Plan and provide for the submitters land interest in the General Residential Zone: **or** (in the alternative); Identify the submitters land interest as 'The Kakaho Precinct' and adopt provisions similar to Proposed Plan Change 18 for the precinct for relevant parts of the land: **or** (in the alternative): amend the objectives, polices and rules to provide a resource consenting path for urban development in the FUZ including (but not limited to)-* ***FUZ-01*** ***The Future Urban Zone allows ...*** *1. The ... Northern Growth Area to accommodate ~~integrated~~, serviced and primarily residential urban development;* *FUZ-02* *The Future Urban Zone supports appropriate rural use and development, and maintains the character and amenity values of the General Rural Zone until such time as it is rezoned or consented for urban purposes.* *FUZ-P1* *Identify areas for future urban development as the Future*

			Urban Zone where these: *2. Are of a size, scale and location which could accommodate comprehensive and integrated future development that:* *1. Is serviced by infrastructure or planned to be serviced by infrastructure in the Council's Long Term Plan or the effects on existing infrastructure can be mitigated through provision of new services within the development site;* *2. Is connected to or planned to be connected to the transportation network where the effects on the network are minor and/or can be mitigated.* *FUZ-P2* *~~Only~~ provide for urban development within a Future Urban Zone when:* *1. A comprehensive structure plan for the area has been developed in general accordance with the guidelines contained in APP11 – Future Urban Zone Structure Plan Guidance ~~and adopted by Porirua City Council~~; and* *2. The area has been rezoned or consented as a Development Area which enables urban development.* *FUZ-R16A Subdivision and Development in the Kakaho Precinct Area* *1. Activity Status: Discretionary* *Notification and Natural Hazards:*

			• *An application under this rule is precluded from being publicly notified in accordance with section 95A of the RMA.* • *Activities considered under this rule are exempt from the rules relating to Natural Hazards (NH) and those District Wide Matters will be considered under section 106 of the RMA.* *APP11 – Future Urban Zone Structure Plan Guidance* *Where applicable, relevant and appropriate a structure plan is to identify, investigate and address the matters set out below.*

In general, there is an opportunity to master plan the Gray property for the benefit of Council and stakeholders with an interest in Te Awarua-o-Porirua Harbour (Pauatahanui Arm). We consider the opportunity to manage over 50ha of the Harbour catchment through a structure plan is a strategic decision in line with the overall intent of the Growth Strategy. Potential outcomes can include catchment protection, environmental enhancement through planting, and controls on future land use to manage landscape values.

The general thrust of this submission is to enable the subject land to be developed as part of the residential zone and is supported by the following technical information. This land has long been identified by Council as being suitable for urban development and it is capable of being serviced with the necessary infrastructure to support the residential density and yields as shown on the precinct Plan **attached**:

Appendix 1:	*Kakaho Precinct Plan and Landscape/visual assessment (4Sight Consulting Limited)*
Appendix 2:	*Preliminary Geotechnical Investigation and Natural Hazard Assessment (CMW Geosciences)*
Appendix 3:	*Transport Review (Harriet Fraser Traffic Engineering & Transportation Planning)*
Appendix 4:	*Civil Engineering and Infrastructure Report (Cuttriss Consulting)*
Appendix 5:	*Kakaho – Preliminary Ecology Survey (RMA Ecology)*

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APPENDIX 1

MEMO

File Ref:	n/a
To:	**Bryce Holmes, Land Matters**
From:	Melissa Davis – Technical Director Landscape Architecture, 4Sight Consulting
Date:	20 November 2020
Subject:	Kakaho SAL Review ADDENDUM

1 INTRODUCTION

This addendum to the overview visual assessment SAL Review ('HG Review') dated April 2019 is provided in response to the Isthmus Memorandum ('Isthmus memo') dated 20 November 2020.

This memorandum was requested by Porirua City council to review HG Review assessment of the proposed SAL boundaries in specific context for the 93 Grays Road, Camborne submission. Isthmus' memo also noted they had provided additional work for the Porirua City Council reviewing the 2018 Draft Porirua Landscape Evaluation. This led to minor amendments to both the Pauatahanui SAL (within which part of 93 Grays Road falls) and the adjacent Kakaho SAL.

The Isthmus memorandum recommended clarification and further work from the applicant in the following areas outlined below:

a) Provision of technically correct placement of draft/proposed SAL boundaries on graphic images, using GIS information;

b) Inclusion of further viewpoints from the coastal edge around the inlet to support any analysis that ridgeline and other factors contributing to landscape values be maintained;

c) Inclusion of graphic images of areas of proposed rural-residential development; and proposed residential areas to provide a clearer understanding of density of proposed development in relation to SAL ridgeline/landform backdrop values;

d) Provision of stitched photographs with nominated reading distance, in line with NZILA best practice note 10.2;

e) Further assessment of the values of the area proposed for removal (from the SAL) against the values of the SAL. Include consideration of values that contribute to values other than views, for example streams and unmodified landforms;

f) Assessment in reference to the updated Draft Porirua Landscape Evaluation (2019), and the updated values for the Pauatahanui SAL;

g) Assessment of the development proposed against proposed provisions of the draft District Plan. Density of rural-residential density proposed in HG assessment is not in line with that proposed by PCC (minimum lot size of 1ha); and

h) Inclusion of the draft Kakaho SAL in assessment and consideration of effects of the proposal removal [proposed change to the SAL boundary] on cohesiveness between the Kakaho and Pauatahanui Inlet as values between these areas are inter-related.

2 PRELIMINARY DEVELOPMENT CONCEPT

In regards to the preliminary development concept provided to Isthmus for their review, their response included general support for the following:

- the SAL boundaries are a 'zone of transition';
- use of rural-residential density at the boundary as a way of maintaining/enhancing SAL values;
- Use of a variety of lots sizes to respond to contours; and
- Use of vegetation and design controls to integrate development into the landscape.

Comments were made in regards to the proposed access road with concerns for resulting adverse effects on landform, stream values inside the SAL and on sensitive inlet values

Advisory comment that the development of a structure plan with related provisions for inclusion in the district plan would provide an approach consistent with that taken by Plimmerton Farm for development inside the Kakaho SAL.

3 DEVELOPMENT CONCEPT REVIEW & ACTIONS

Taking all these comments into account, the applicants have reviewed their proposal/request for the SAL boundary to be relocated, and have incorporated the 'zone of transition' as a progression from landscape sensitive development to typical urban development as the basis for the latest preliminary design layout revision. This revised plan is Appendix A – Proposed Structure Plan and Precinct Framework.

Therefore, the assessment emphasis has changed slightly in some respects with the SAL boundary change no longer being sought. This report assesses the effects of the latest design proposal against the identified SAL values and against proposed provisions for SALs as identified in the Isthmus report, which supersedes the Boffa Miskell report.

The main changes to the layout are as follows:

- Redesign of larger lots that respond to contours and landform within the SAL;
- More intensive development to the northern portion of the site, including two areas of medium-density residential adjacent to the northern boundary;
- Relocated access road;
- Retained all gully systems where possible; and
- Substantially reduced earthworks, and cut and fill.

This work has resulted in a positive response to the landscape issues raised by PCC. From a planning perspective it better achieves what PCC are looking to achieve in its draft District Plan. The reduction in earthworks (and maintaining a cut/fill balance) will work from a construction perspective and also be beneficial from a regional plan consideration.

4 SCOPE OF THIS ASSESSMENT

The scope of this assessment is to provide additional information in response to the updated proposed structure plan for the site at 93 Grays Road.

This report provides a review of the agreed viewpoints around the Pauatahanui Inlet in relation to the landscape and visual perspective and specifically addresses the following aspects:

- further assessment of the values of the proposal against the values of the SAL to include consideration of values that contribute to values other than views, for example streams and unmodified landforms;
- Inclusion of graphic images of areas of proposed rural-residential development; and proposed residential areas to provide a clearer understanding of density of proposed development in relation to SAL ridgeline/landform backdrop values.;
- consideration of effects of the proposal on cohesiveness between the Kakaho and Pauatahanui Inlet as values between these areas are inter-related;
- analysis that ridgeline and other factors contributing to landscape values be maintained; and
- Recommendations/proposals for any mitigation that may be required.

5 METHODOLOGY

5.1 Site visit and Site Photographs

A site meeting between Nick Taylor, Surveyor (Cuttriss), Melissa Davis and the PCC specialist landscape architect Rose Armstrong took place on Wednesday 11 March to review and confirm the representative viewpoints, in particular the locations around Pauatahanui Inlet. The viewpoints were rephotographed using 50mm lens and surveyed by Nick Taylor from Cuttriss.

5.2 The assessment of effects ranking used for this review is the New Zealand Institute of Landscape Architects "Landscape Assessment and Sustainable Management" practice note. **Appendix D** provides the table of effects summary for that effects ranking and their relative RMA equivalent.

5.3 The 3D digital terrain model was created using verified survey data which is in terms of NZGD2000 Wellington Circuit, and Mean Sea Level Wellington 1953. The viewpoints were also surveyed in the same height datum and coordinate system. The roading and earthworks design was completed in an engineering software package (12d) which enabled the generation of a 3D wireframe design surface. Each viewpoint was then registered within 12d using surveyed coordinates to generate an image file showing the design from each viewpoint. For each simulation (completed using photoshop), a number of surveyed reference points were used for georeferencing, allowing the 3D wireframe model to be superimposed accurately over the photograph. Where tree removal and earthworks meant the background needed to be modelled, the topography in the distance was used to create a best estimate of the landscape beyond the site.

5.4 Indicative building platforms were located within the SAL as part of the preliminary base work for house placement in the 3D model.

5.5 Visibility mapping was completed by identifying the houses visible from each viewpoint, and hatching the entire lot. A threshold of approx. 33% of the house was used to identify the houses that were deemed to

have a visual influence. As such, any lots where more than 33% (approx.) of the modelled house is visible are shown hatched on the viewpoint map.

6 RELEVANT STATUTORY CONTEXT

The relevant resource consent documents in relation to this additional assessment of landscape and visual effects of this proposal are:

- New Zealand Coastal Policy Statement 2010;
- Greater Wellington Operative Regional Policy Statement;
- Porirua District Plan (Operative)

6.1 New Zealand Coastal Policy Statement 2010

The proposed site is within the "Coastal Environment" as defined in the Proposed District Plan. The proposal is therefore required to be assessed against the NZCPS Policy 6 "Activities in the Coastal Environment" with reference to the following policies:

- Policy 7: Strategic Planning
- Policy 13: Preservation of Natural Character
- Policy 15: Natural Features and Natural Landscapes

6.2 Greater Wellington Operative Regional Policy Statement

- Natural Resources Overlay
- Catchment overlay
- Landuse
- Chapter 4: Policies 27 and 28

6.3 Porirua District Plan (Operative)

C4	Rural Zone Objectives and Policies
C6	Subdivision Objectives and Policies
C09	Landscape and Ecology Objectives and Policies
C10	Coastal Objectives and Policies

7 RELEVANT NON STATUTORY CONTEXT

Relevant non-statutory context

7.1 Porirua District Plan (Draft) Part 2 District Wide Matters

CE-01	Natural character of the coastal environment
CE-02	Indigenous biodiversity
CE-03	Natural features in the Landscape

NFL–P3 Subdivision, use and development

Only allow subdivision, use and development within an identified Outstanding Natural Features and Landscapes or Special Amenity Landscape where it:

1. Avoids significant adverse effects and avoids, remedies or mitigates any other adverse effects on the identified characteristics and landscape values; and

2. Can demonstrate that it is appropriate by taking into account:
   a) How the identified values and characteristics described in APP9 - Schedule of outstanding natural features and landscapes and APP10 - Schedule of special amenity landscapes will be;
      i. Protected in the case of Outstanding Natural Features and Landscapes; or,
      ii. Maintained or enhanced in the case of Special Amenity Landscapes;
   b) The sensitivity or vulnerability of the landscape to change, or capacity to accommodate change, without compromising the identified characteristics and values described in APP9 - Schedule of outstanding natural features and landscapes and APP10 - Schedule of special amenity landscapes;
   c) The scale of modification to the landscape, including indigenous vegetation removal, and its effect on the identified characteristics and values described in APP9 - Schedule of outstanding natural features and landscapes and APP10 - Schedule of special amenity landscapes;
   d) The duration, frequency and cumulative effect on the identified characteristics and values described in APP9 - Schedule of outstanding natural features and landscapes and APP10 - Schedule of special amenity landscapes;
   e) Whether there are any:
      i. Practicable alternative locations for the subdivision, use or development; and
      ii. Any alternative designs or methods of implementing the subdivision, use or development;
   f) The purpose of the activity and whether there is a functional or operational need in the identified location;
   g) The measures proposed to mitigate the effects on the characteristics and values, including:
      i. The location, design and scale of any buildings or structures;
      ii. The visibility, reflectivity and colour of any buildings or structures;
      iii. Any associated earthworks and access or driveway construction;
      iv. Landscaping and fencing;
      v. Visibility and similarity with surrounding colours, textures, patterns and forms.
   h) Whether it can be integrated into the landscape, to:
      i. Protect the dominant natural components over the influence of human activity and the identified values of the Outstanding Natural Features and Landscape; or
      ii. Maintain the identified characteristics and values of the Special Amenity Landscape;
   i) The extent to which the proposed activity recognises and provides for Tangata Whenua cultural and spiritual values and practices;
   j) In the case of a subdivision within an Outstanding Natural Feature and Landscape, whether it creates further development potential in keeping with its identified characteristics and values described in APP9 - Schedule of outstanding natural features and landscapes.

7.2 Porirua District Plan (Draft) Part 3 Rural Lifestyle Zone

7.3 Porirua City Council Draft Landscape Evaluation 2019 by IGL

7.4 Porirua City Council Draft Landscape Evaluation 2018 by BML

8 SITE ATTRIBUTES

8.1 Site Context

The site context has previously been described in the HG SAL Review.

8.2 Existing Landscape Character

The existing landscape character of the site is one of a predominant landform consisting of several spurs, incised by steep gully features and a steep escarpment to the south forms the backdrop to the harbour foreshore below. Due to the pastoral activity there is a strong rural character overlay which is consistent with much of the land to the north of the Pauatahunui harbour. The site is bounded by

the established subdivision of Camborne to the west and Mo Road to the very north-west. The property shares a boundary with the Plimmerton Farms land that is the subject of a substantial land use change through Plan Change 18 (Streamlined Planning Process). The east is bounded by a continuation of a similar land form and use. The land use category as mapped by Greater Wellington Regional Council is Grassland – Low Producing.

8.3 Vegetation

The majority of the site is pastoral farm land. There is limited vegetation on site. This consists of mainly scrubby low vegetation within some of the gullies, and areas of more mature vegetation on the escarpment along the southern boundary. There is a large stand of mature macrocarpa in the north western portion of the site adjacent to the existing dwelling. Existing vegetation has been mapped and categorised in the Preliminary Ecological Assessment map dated 19 May 2019, and further discussed in 8.6 Ecology below.

8.4 Landform and Topography

As noted in the Geotech report, topographically the land falls towards the south. Several spurs, oriented North-South, are bound by steep gully features. Land to the south falls steeply to the road and harbour foreshore below. The property is mainly pastoral grasslands except a small area near the existing dwelling which is covered in trees and mainly exotic vegetation. The block rises from the Porirua Harbour to the south to elevations up to approximately RL145m. The north-eastern part of the property rises elevations up to RL145m (Wellington Datum 1953).

8.5 Drainage and Hydrology

The land currently drains into the existing gully systems throughout the site. The Proposed Structure Plan maps in **Appendix A** show the intent to retain the majority of the main gully systems, particularly those which fall to the south.

8.6 Ecology

A memorandum dated 9 May 2019 prepared by RMA Ecology details the ecological survey results undertaken on 3 April 2019, by Nelmac Ltd. The findings were also identified on an ecological features map as part of that assessment work. This information has been updated by Cuttriss Ltd on the most recent Proposed Structure Plan as shown in **Appendix A Ecological Assessment Map**.

The key points from this report are:

- All areas of significant vegetation occur on the southern escarpments of the property. The mapped information shows the majority of this vegetation is located outside of proposed development lots.
- The two stream catchments also occur on the southern portion of the site. The mapped information shows majority these stream catchments fall outside of the proposed development lots.
- There is significant opportunity for restoration and enhancement of the streams through the exclusion of stock and by providing for appropriate riparian planting.
- The areas shown as induced wetlands are considered novel systems (ie not natural) and it is unclear whether they should meet the definition of a 'Natural Wetland' in the Proposed Natural Resources Plan.

- The wetlands onsite are highly degraded through stock damage, and their biodiversity values are low (botanically and in terms of wildlife). However, they all retain some function in terms of regulating water flow and quality, and offer an opportunity for enhancement.
- The survey has excluded areas that are permanently or intermittently wet and are dominated by pasture grass as these areas clearly meet the exceptions listed in the RPS of a natural wetland.
- Where areas of the site are determined to be wetlands and streams, and where Council determines that removal of them is able to take place, it is likely that Council will require some form of ecological offsetting. That is most likely to involve protection, stock exclusion, revegetation and enhancement in general of wetlands and/or streams elsewhere.
- There are some relatively small areas of boulderfields that provide suitable habitat for native skinks where identified and mapped as shown in Appendix A Ecological Assessment Map. This habitat is outside of the proposed structure plan and development lots.

9 PROPOSED DEVELOPMENT

Refer to **Appendix A Proposed Structure Plan 22153 P3 rev D** as prepared by Cuttriss Ltd.

The subdivision is now roughly delineated into two types of development: higher density residential lots (approx. 25 hectares in total area) to the north (the area between the SAL transition zone and Plimmerton Farms boundary) and lower density lifestyle sections (approx. 15 hectares in total area) towards the south. Higher density residential lot sizes range upwards of 400m2 and lower density lots within the SAL and transition area range from approx. 800m2-2.4Ha.

The more intensive development that will be constrained to the more northern aspect of the site is generally at a lower contour than that within the SAL boundary. The proposal is to transition between the larger lots to the south of the proposed SAL boundary and the north with typical residential lots (min. 400m2) and moving to medium-density scale lots (100m2-400m2) adjacent to the northern boundary.

A key point of this revised layout are that most of the existing gullies and landform will be retained within the SAL area. The major gully systems have been preserved with the intention to be used for stormwater treatment, enhance recreation amenity and ecological values through appropriate planting and land management strategies.

Alignment and grade of roads revised to maximise views to Mana Island to the West, and enhanced pedestrian linkages between the roads connecting to green space.

The proposal now estimates 358,000m2 of earthworks which is reduced from the previous proposal at total cut volume of 673,000m3 and total fill of 676,000m3. This is an overall reduction in earthworks of 45%, resulting in minimal earthworks and increased protection of the gully systems within the SAL.

Stormwater flow paths will be directed to the main gully system at site entrance which minimises the volume entering the Taupo swamp catchment and provides a water sensitive design approach for the proposal. This design approach incorporates the preservation of wetlands and main gully systems as critical considerations of the existing landform and hydrology of the site.

The revised proposal, which has a significant reduction in earthworks and a greater protection of the landform and gully systems, creates a large lot which provides a large buffer between the Pauatahanui Inlet and the proposed development. The size and shape of this lot would provide a suitable amenity reserve to be vested in council which will allow the ongoing protection and management of any

wetlands and gully landform, particularly if these systems are part of the site's overall hydrology. Public ownership will also allow pedestrian linkages from the development to the inlet which will contribute to the shared network of boardwalks and tracks in the area.

10 FURTHER VISUAL ASSESSMENT

The key consideration for this additional visual assessment is two-fold.

Firstly, to provide graphic material of areas of proposed rural-residential development and proposed residential areas to provide a clearer understanding of density of proposed development in relation to SAL ridgeline/landform backdrop values.

Secondly, this consideration of effects of the proposal on cohesiveness between the Kakaho and Pauatahanui Inlet as values between these areas are inter-related.

As discussed in the methodology section earlier in the document, the viewpoints in Appendix X have been visited and agreed by both landscape architects. These viewpoints were surveyed by Cuttriss, who then also prepared the 3d model and accompanying visual material.

The housing typology selected was based a mix of one and two storey with an average house size of 200m2. Appendix B also shows the plan of what lots were selected as representative for the 3d model. Review of the existing topography and proposed layout identified possible building platforms for placement of the houses. Only the indicative house locations have been modelled. The roading framework has not been modelled for these simulations.

10.1 Viewpoint 1: Motukaraka Point
Ref: Appendix B – Viewpoint 1

Current View

This viewing audience is made up of visitors to Motukaraka Point. This viewpoint is taken from an elevation only slightly above sea-level and is approximately 1 km away from the site. The HG SAL review identified this as a critical viewpoint to maintain the landform and protect the SAL sensory, shared and recognised values. The ridgeline and landform is dominant against the coastal edge.

Visual Changes

The modelled view indicate that approximately 9 lots may be visible. This view shows no discernible sign of development. The landform and ridgeline remain the dominant features against the coastal edge. From this viewpoint, it is anticipated the proposed development would not result in a noticeable change to the wider view, and would have a low level effect on the receiving environment. Therefore it is considered that the proposed development will result in **low** visual effects.

10.2 Viewpoint 2: Estuary Walkway at Pauatahanui
Ref: Appendix B – Viewpoint 2

Current View

The viewing audience is considered limited to pedestrians walking northwards. This viewpoint is taken from an elevation only slightly above sea-level and is approximately 2.5 km away. This is an additional viewpoint and was not assessed in the HG SAL Review. This view is distant and in the background. It is not visible from the main road or the Paekakariki shops.

Visual Changes

The modelled view indicate that approximately 14 lots may be visible from this location. The development appears dispersed in an uneven manner that relates to the topographical nature of the site. The established neighbourhood of Camborne begins to become more visible. The proposal has some visibility and recognisable change, however the landform and ridgeline remain the dominant features. The skyline is not compromised by the proposal. From this viewpoint, it is anticipated the proposed development would not detract from the overall quality of the wider view, and would have a low level effect on the receiving environment. Therefore it is considered that the proposed development will result in **low** visual effects.

10.3 Viewpoint 3: Paremata Haywards Road
Ref: Appendix B – Viewpoint 3

Current View

This viewing audience is made up of motorists, cyclists and pedestrians travelling west on SH58 (Paremata Haywards Road). This viewpoint is taken from an elevation only slightly above sea-level and is approximately 3 km away from the site. This is an additional viewpoint and was not assessed in the HG SAL Review. This view is distant and in the background. Generally the views from the road will be transitory and oblique.

Visual Changes

The modelled view indicate that approximately 18 lots may be visible from this location. The proposed development responds to the topographical nature of the site and appears informal and scattered throughout the landscape. The established neighbourhood of Camborne begins to become more visible. Although the proposal has some visibility and recognisable change, the landform and ridgeline remain the dominant features. The skyline is not compromised by the proposal, and the northern hills of Hongoeka/Wairaka can be seen in the far background. From this viewpoint, it is anticipated the proposed development would not detract from the overall quality of the wider view, and would have a low level effect on the receiving environment. Therefore it is considered that the proposed development will result in **low** visual effects.

10.4 Viewpoint 4: Paremata Haywards Road
Ref: Appendix B – Viewpoint 4

Current View

This viewing audience is made up of motorists, cyclists and pedestrians travelling west on SH58 (Paremata Haywards Road). This viewpoint is taken from an elevation at approximately 4m above sea-level and is approximately 2 km from the site. This is an additional viewpoint and was not assessed in the HG SAL Review. This view is in the midground. Generally the views from the road will be transitory and oblique.

Visual Changes

The modelled view indicate that approximately 31 lots may be visible from this location. The proposed development responds to the topographical nature of the site and continues to appear informal and scattered throughout the landscape. The proposal has some visibility and recognisable change, with more lots towards the north east becoming visible, however the visual fabric of Camborne helps the integration of development. The landform remains the dominant feature. The skyline is not compromised as the ridgeline of the proposal is now framed by the more prominent northern hills of

Hongoeka/Wairaka in the background. From this viewpoint, it is anticipated the proposed development would not detract from the overall quality of the wider view, and would have a low level effect on the receiving environment. Therefore it is considered that the proposed development will result in **low** visual effects.

10.5 Viewpoint 5: Bradleys Bay
Ref: Appendix B – Viewpoint 5

Current View

This viewing audience is made up of motorists, cyclists and pedestrians travelling west on SH58 (Paremata Haywards Road) and users of Bradley Bay Park . This viewpoint is taken from an elevation at approximately 4m above sea-level and is just under 2 km from the site. This viewpoint was assessed in the HG SAL Review and considered this view as prominent for users travelling west towards Plimmerton, but only oblique views for road users travelling east.

Visual Changes

The modelled view indicate that approximately 30 lots may be visible from this location. The proposed development generally continues to appear as an organic arrangement that responds to the landform, particularly throughout the southern and eastern portion of the site. The proposal has some visibility and recognisable change, with more lots towards the north east becoming visible and clustered. However, this part of the proposal connects readily with the visual fabric of Camborne. The landform remains the dominant feature against the coastal edge. The ridgeline of the proposal is now framed by the more prominent northern hills of Hongoeka/Wairaka in the background to the north west. The skyline of the site continues unhindered by development towards the east.

From this viewpoint, it is anticipated the proposed development will have a low-moderate effect on the character of the receiving environment. Therefore it is considered that the proposed development will result in **low-moderate** visual effects.

10.6 Viewpoint 6: Browns Bay
Ref: Appendix B – Viewpoint 6

Current View

This viewing audience is made up of motorists, cyclists and pedestrians travelling west on SH58 (Paremata Road). This viewpoint is taken from an elevation at approximately 3.8m above sea-level and is 1.8km from the site. This viewpoint was not assessed in the HG SAL Review. The view as considered oblique and transitory for road users travelling east. Views to the site from Browns Bay Park are obscured due to the prominent headland to the west of Browns Bay.

Visual Changes

The modelled view indicate that approximately 33 lots may be visible from this location. The views are oriented north into the site and the proposed development generally continues to appear as an organic arrangement that responds to the landform particularly to the east of the site. The proposal has some visibility and recognisable change, with more lots towards the north east becoming visible but nestled into the surrounding environment and visually connected to the established Camborne neighbourhood. The landform remains the dominant feature against the coastal edge. The ridgeline of the proposal is now framed by the more prominent northern hills of Hongoeka/Wairaka in the background to the north west. The skyline of the site continues unhindered by development towards the east, and visually connects with the wider rural landform.

From this viewpoint, it is anticipated the proposed development will have a **low** effect on the character of the receiving environment. Therefore it is considered that the proposed development will result in **low** visual effects.

10.7 Viewpoint 7: Ivey Bay
Ref: Appendix B – Viewpoint 7

Current View

This viewing audience is made up of motorists, cyclists and pedestrians travelling west on SH58 (Paremata Road). This viewpoint is taken from an elevation at approximately 3.8m above sea-level and is 1.8km from the site. This viewpoint was not assessed in the HG SAL Review. The view is considered to be in the distant background and would be transitory and oblique for vehicle users in both directions along this section of road. For pedestrians and cyclists, the views are oblique while there are more static views from the foreshore and associated buildings in Ivey Bay.

Visual Changes

The modelled view indicate that approximately 32 lots may be visible from this location. The views are oriented north-east into the site and the proposed development generally continues to appear low in density and connected to the residential developments that frame this view. The map of modelled lots illustrate that the more intensive development proposed for the northern portion of the site will not be discernible to this view. The landform remains the dominant feature against the coastal edge. The ridgelines of the site merge naturally with the continually rising landform in the background. The proposed development is not disparate to the existing character of urban development with a rural backdrop.

From this viewpoint, it is anticipated the proposed development will have a low effect on the character of the receiving environment. Therefore it is considered that the proposed development will result in **low** visual effects.

10.8 Viewpoint 8: Dolly Varden Beach Park
Ref: Appendix B – Viewpoint 8

Current View

This viewing audience is made up of visitors to Dolly Varden Beach which lies on the eastern side of SH1. This viewpoint is taken from an elevation at approximately 1.6m above sea-level and is 1.7km from the site. This viewpoint was not assessed in the HG SAL Review. The views are north east into the southern portion of the site. The northern portion of the site is mainly obscured by the existing residential neighbourhood of Camborne.

Visual Changes

The modelled view indicate that approximately 16 lots may be visible from this location. The views are oriented north-east into the site and the proposed development is very low in density and well-nestled into the landform, particularly the larger lots to the south of the site. The smaller lots closer to the middle of the site are obscured by the residential neighbourhood of Camborne and existing landform. The modelled lots that can be seen connect visually to Camborne and comprise only an insignificant component to the wider view. The landform remains the dominant feature against the coastal edge. The ridgelines of the site merge naturally with the continually rising landform in the background. The proposed development is not disparate to the existing character of urban development with a rural backdrop from this view.

From this viewpoint, it is anticipated the awareness of the proposed development will have a very low level of effect on the character and or key attributes of the receiving environment. Therefore it is considered that the proposed development will result in **very low** visual effects.

10.9 Viewpoint 9: Paramata Railway Station car park and SH1 northbound shoulder
Ref: Appendix B – Viewpoint 9

Current View

This viewing audience is mainly motorists travelling north on SH1. This viewpoint was specifically requested by Porirua City Council specialist landscape architects to analyse the view for motorists travelling north on this stretch of road. This location was considered to be the safest and most representative location for assessment. This viewpoint is taken from an elevation at approximately 4.4m above sea-level and is 2.5km from the site. This viewpoint was not assessed in the HG SAL Review. The views for motorists are oblique, fleeting and mainly obscured by vertical elements of motorway infrastructure, and the intervening landform of the existing residential neighbourhood of Camborne. It is difficult to discern the location of the site from this view.

Visual Changes

The modelled view indicate that approximately 9 lots may be visible from this location. The site and modelled lots are difficult to distinguish amongst the visual paraphernalia of vertical structures alongside the motorway. From this view point, the modelling shows the proposal will have no effect on the character or detract from the surrounding elevated hills and rolling landform.

Therefore it is considered that the proposed development will result in **no** visual effects.

11 ASSESSMENT OF LANDSCAPE AND VISUAL EFFECTS

The assessment shows that the revised development proposal meets the criteria of the draft District Plan in Part 2 District Wide Matters, and specifically NFL–P3 Subdivision, use and development which is commented on below. The criteria of these objectives and policies have been used as assessment criteria as they relate to the landscape characteristics and values as identified for the Pauatahanui SAL.

Objectives and Policies	
NFL–P3 Subdivision, use and development Only allow subdivision, use and development within an identified Outstanding Natural Features and Landscapes or Special Amenity Landscape where it:	
1. **Avoids significant adverse effects and avoids, remedies or mitigates any other adverse effects on the identified characteristics and landscape values; and**	
Landscape comment	The development proposal avoids adverse effects on the identified characteristics and landscape values by the incorporating the design approaches as below: ▪ The proposed layout is informed by the landform. The elevation and topography of the site allow for development to occur resulting in an organic and non-linear outcome. ▪ The variety in lot sizes maintains the open character and landform;

	▪ Identified wetlands and the major gully systems are excluded from development in the southern portion of the site. Additional recommendations to avoid, remedy or mitigate possible adverse effects include: ▪ Opportunities for wetlands and gully network to be enhanced through appropriate planting that reflects the recognised and shared values of these landforms ▪ Street framework planting strategy is provided that aligns with the planted gully network and organic landform ▪ Boundary treatments are provided for through design guidelines to avoid urban style fencing on southern portion of site ▪ Roading footprint (other than main collector or access road) avoids kerb and channelling and is designed with a rural/lane approach
2. Can demonstrate that it is appropriate by taking into account: a) How the identified values and characteristics described in APP9 - Schedule of outstanding natural features and landscapes and APP10 - Schedule of special amenity landscapes will be; i. Protected in the case of Outstanding Natural Features and Landscapes; or, **ii. Maintained or enhanced in the case of Special Amenity Landscapes;**	
Landscape comment	The supporting visual information supplied and landscape responses in the tables in section **12 Further Assessment of Landscape Values** demonstrates the proposed development is appropriate for this site, and takes into account those identified values of Special Amenity Landscapes.
b) The sensitivity or vulnerability of the landscape to change, or capacity to accommodate change, without compromising the identified characteristics and values described in APP9 - Schedule of outstanding natural features and landscapes and **APP10 - Schedule of special amenity landscapes;**	
Landscape comment	The visual simulations of the proposed development show the site has capacity to accommodate change without compromising the identified characteristics and values for the Pauatahanui SAL. The sensitivity and vulnerability of the highly visible edge and backdrop landscape to the Pauatahanui Inlet are recognised and retained in the proposed development layout.
c) The scale of modification to the landscape, including indigenous vegetation removal, and its effect on the identified characteristics and values described in APP9 - Schedule of outstanding natural features and landscapes and **APP10 - Schedule of special amenity landscapes;**	
Landscape comment	The ecology report and mapping indicate there is no indigenous vegetation removal required for development to occur on site. There is a large stand of mature exotic pine/macrocarpa on site adjacent to the existing house. It is likely these trees would require removal regardless of development due to the age of this small plantation. This is not an unexpected activity in the current land use environment. The scale of modification is expected to be more intense (refer to Appendix A – Proposed Structure Plan & Precinct Framework – Cut/Fill plan by Cuttriss) at the northern portion of the site, and a lower level required for the larger lots and access on the southern portion of the site. Some modification will be required for access and dwellings, however consider that all earthworked/exposed areas should be top-soiled and grassed/revegetated or otherwise permanently stabilised and vegetated to retain

	the landscape character. Additionally, the use of JOALS or lanes is encouraged for access within the southern area of the development to reduce roading footprint. Where the effects of development may have an impact on the existing character of the site is the boundaries of the lots, particularly to the south of the site where development is shown to be most visible from a wide range of viewpoints. However, this can be mitigated through the use of design guidelines for fencing which should be limited in height and in style. It is also recommended that boundary planting could detract from the existing character and consider that only constructed rural style fencing such as post and rail or post and wire be permitted along common boundaries. It is expected that there will be different kinds of landscape planting associated along road frontages and around dwellings.
d) The duration, frequency and cumulative effect on the identified characteristics and values described in APP9 - Schedule of outstanding natural features and landscapes and **APP10 - Schedule of special amenity landscapes;**	
Landscape comment	The proposed development is likely to be undertaken over a number of years in a staged manner. The visual simulations show development is likely to result in **low** landscape and visual effects.
e) Whether there are any: iii. Practicable alternative locations for the subdivision, use or development; and iv. Any alternative designs or methods of implementing the subdivision, use or development;	
Landscape comment	The current land use is identified as Grasslands – Low Production. A number of iterations of the proposed development have been undertaken. Through this process, the proposed layout has been refined and amended to encapsulate and retain the key landscape values such as protection of landform and natural character.
f) The purpose of the activity and whether there is a functional or operational need in the identified location;	
Landscape comment	As reported in the Property Development Overview for the Porirua City Council For Kakaho, 93 Grays Road, Camborne (dated 4 12 2018), The Northern Growth Area (NGA) assessment development work undertaken by the PCC between 2014 and 2016, which included a number of Community information meetings, using multiple dimensions identified North Camborne as the highest ranked/highest potential growth area within the NGA. Camborne North presents a unique opportunity for local residents to remain in the area, for new residents to settle in the area and it also provides a limited number of lifestyle lots with spectacular views that will all strongly contribute to Porirua City's growth.
g) The measures proposed to mitigate the effects on the characteristics and values, including: i. The location, design and scale of any buildings or structures; ii. The visibility, reflectivity and colour of any buildings or structures; iii. Any associated earthworks and access or driveway construction; iv. Landscaping and fencing; v. Visibility and similarity with surrounding colours, textures, patterns and forms.	

Landscape comment	The recommended mitigation measures are proposed as follows: ▪ Development proposal density allows for residential scale buildings. Encourage use of precinct overlay to enable less than 1ha minimum lot size. ▪ Encourage use of design guidelines for building platforms, landscape planting, materials and colour palette for lot development for example: – All external walls, joinery, trims and attachments, gutters, spouting, downpipes, chimney, flues, satellite dishes and solar panels shall be coloured in the natural hues of green, brown or grey with a LRV of between 7% and 27%. – The roofing materials of all buildings shall be in dark recessive tones of grey, green or brown with a LRV of between 7% and 27% and have a matt finish, if painted – All ancillary structures (for example: garden sheds and garages) shall be clad and coloured to match the principal dwelling. ▪ Encourage use of JOALS or access lanes within the southern area of the development to reduce roading footprint; ▪ All earthworked/exposed areas shall be top-soiled and grassed/revegetated or otherwise permanently stabilised and vegetated to blend into the rural pastoral character. ▪ Recommend any boundary treatment for lots over 1000m2 in area within SAL are to be standard rural character fence only, being timber post and rail and/or post and wire. All fences may reach a maximum height of 1.2m. Mesh fencing may be used for pest management purposes. ▪ Gates shall be consistent with traditional rural elements and not be monumental in character. ▪ A street tree framework be provided prior to development ▪ Water sensitive design is utilised throughout the site ▪ Identified wetlands and gullies are maintained and enhanced through ecologically and visually appropriate planting, and stock excluded ▪ A revegetation or planting strategy and plan be provided prior to development for wetland and gully planting ▪ Encourage Lot 53 be vested as open space reserve to retain existing natural character and landscape backdrop for Pauatahanui Inlet.
h) **Whether it can be integrated into the landscape, to:** i. Protect the dominant natural components over the influence of human activity and the identified values of the Outstanding Natural Features and Landscape; or *ii.* **Maintain the identified characteristics and values of the Special Amenity Landscape;**	
Landscape comment	The visual simulations show the landform and existing rural/natural character remains dominant, and the proposal as a low density development within the SAL overlay area. These simulations also show that while the site is highly visible from the selected representative viewpoints, development here can be integrated into the landscape due to the natural landform topography that varies throughout the site. Effects on the SAL characteristics are considered to be **low** as although there may be a some change to existing character it will only be apparent as a minor component within the wider landscape view.
i) The extent to which the proposed activity recognises and provides for Tangata Whenua cultural and spiritual values and practices;	
Landscape comment	Propose the vegetation/landscape strategy for the site utilises a fully indigenous range of plants appropriate to retaining sensory, shared and recognised values of existing native vegetation on site. Consider the notion of street groves (as opposed to specimen trees) that will create a more appropriate linkage to wetlands and gully

	systems with enhanced biodiversity outcomes. Specific species selection should be confirmed in consultation with local Iwi and ecologist.
j) In the case of a subdivision within an Outstanding Natural Feature and Landscape, whether it creates further development potential in keeping with its identified characteristics and values described in APP9 - Schedule of outstanding natural features and landscapes.	
Landscape comment	This objective is not applicable to this site.

12 FURTHER ASSESSMENT OF LANDSCAPE VALUES

Refer to Appendix 3 – Special Amenity Landscapes (SAL)

This section provides further assessment of the values of the proposal against the values of the SAL to include consideration of values that contribute to values other than views, for example streams and unmodified landforms. This also considers the effects of the development proposal on cohesiveness between the Kakaho and Pauatahanui Inlet as values between these areas are inter-related. The graphics in Appendix 3 illustrate the relationship of the site and both the Pauatahanui and Kakaho SALs.

In points 12.1and 12.2 below, the factors and descriptions are taken from the Draft Porirua Landscape Evaluation 2019, and the Landscape Effects of Development lists assessment response to the factors.

12.1 Pauatahanui SAL

Factors	Description	Landscape and Visual Effects of Development
Natural Sciences	• Gently rolling hills and valley flats/eroded river gullies - a good example of an ancient drowned river system with branching valleys and marshy flats where streams flow into the inlet; • A modified landscape with mixed landcover including exotic shelterbelts, pasture, and areas of indigenous vegetation; • Pauatahanui Wildlife Reserve is inhabited by many local bird species and migratory bird species (caspian tern, pukeko, pied stilt, kingfisher, black shag, bar-tailed godwit); pockets of inlet edge vegetation largely intact in the Reserve; • Provides water catchment for the Pauatahanui Inlet; • The adjacent Pauatahanui Inlet is a nationally significant estuary with a diverse range of significant habitats for threatened and At Risk species; and is a nationally significant site for geological features; • The only large estuarine wetland in the lower half of New Zealand's North Island and only area of salt marsh and seagrass in the Wellington region.	Evaluation of ecological report and mapping of development proposal against these values indicates proposed subdivision maintains the natural science values through using the existing landform for site hydrology, maintaining and enhancing existing wetlands and streams where possible.
Sensory	• A low-density settled landscape comprising a small village surrounded by lifestyle lots in a rural setting connected to the Pauatahanui Inlet; • Structures are generally well-integrated with few discordant elements; • Land-water edge is modified with roading, but still	Evaluation of development proposal against these values indicates proposed subdivision is consistent with these values. Modelled viewpoints show that the residential density:

	provides a vivid and dynamic interplay between land and water; • Natural landform and natural elements remain dominant overall; • Highly visible edge and backdrop landscape to the Pauatahanui Inlet; seen from extensive residential areas and State Highway 1 heading north; • Sunlight on hills creates dramatic patterns of shifting light with transient values enhanced by presence of wildlife, seasonal browning of hills and tidal patterns within the inlet; • Adjacent Inlet waters and inter-tidal areas provide a context with strong naturalness and scenic/picturesque qualities, • including reflections of surrounding landforms and other transient values relating to the changing character of the waters.	• is well-integrated through acknowledging landform and associated values, • maintains elements of naturalness and open character against the inlet, • retains a more open character in the SAL catchment • the natural landform and natural elements remain dominant • edge and backdrop landscape to Pauatahanui Inlet remains highly visible and intact • maintains transient values of sunlight and dynamic light patterns on hills/landform • development is unlikely to impact on existing sensory values associated with the inlet waters due to density, elevation and retained edge landform
Shared and Recognised	• The inlet has occupied a central place in Ngāti Toa's livelihood and identity as a people since their arrival in Porirua; • The area around the inlet has been inhabited for at least the last 600 years and is rich with wāhi tapu, sites and historic places, with several well-known Ngāti Toa pā sites with strategic importance; • An important mahinga kai, with areas of extensive cultivations at Motukaraka Pā, and the uncovered mud flats vital for the abundance of shell-fish they provided; the abundance of kai moana provided by the Inlet is renowned by Māori and recorded in legend; • Matai-taua Pā (on the site now occupied by St Albans church) was the only pā in the region to be built specifically for gun fighting, and was the scene of fighting between Ngāti Toa and the Crown; • The Horokiri Wildlife Reserve is near the beginning of the tapu track called Purehurehu, a route used by Ngāti Toa Rangatira to travel between the Hutt Valley and Porirua; • The Inlet has vast potential for environmental restoration and this is highly valued by Ngāti Toa; • Highly recognised for its land/water connection; boardwalks and several tracks within Pauatahanui Wildlife Reserve enhance recreation opportunities along the margins off the inlet; • Changing light on the rolling hills and through the seasons are often the subject depicted in paintings and are frequently photographed; • The special character and qualities of the Pauatahanui Village Zone are recognised in the Porirua City Council District Plan; • •Historic highway north around inlet with Pauatahanui Village Hotel and staging post. • Inlet waters provide a widely recognised setting to the landform; • The Inlet has vast potential for environmental restoration and this is highly valued by Ngāti Toa.	An archaeological or cultural report for the site is not available at the time of writing this technical memo, therefore has not been specifically assessed. However, the development proposal maintains the existing land/water connection and provides potential to add to the recreational opportunities of the area.

12.2 Kakaho SAL

Factors	Description	Landscape Effects of Development
Natural Sciences	• Highly representative of open rolling landform characteristic of much of Porirua's rural hinterland; • Predominantly unmodified landform; • Primarily managed as pasture with low ecological value; • Indigenous revegetation in a number of gullies identified as Significant Natural Areas.	It is unlikely that the proposed development will have any effects on the natural science values of this adjacent SAL catchment due to the location of the site at a lower physical and visual level.
Sensory	• Landform remains largely open and intact with few incongruous elements; minor farm tracks, pylons and a single block of exotic forest; • Folded landform creates a vivid 'rumpled blanket' effect which remains highly visible from State Highway 1 at the Paremata Road Bridge and large areas of Porirua's existing northern residential areas; • Despite extensive pastoral use, landform remains relatively natural with limited modification; • Distinctive valleys and open rolling tops highlight bold changes in shadow and light.	The modelled viewpoints show that the proposed development will have very-low – low visual effect on this adjacent SAL catchment. All sensory values associated with this SAL are retained. The backdrop landform of the Kakaho SAL is not compromised by development on the site.
Shared and Recognised	• Contained inland forested areas with important resources for Māori and associated with Pā and mahinga kai at Taupo; • Provides a highly recognisable local backdrop, visible from State Highway 1 and residential areas to the south of Pauatahanui Inlet between Paremata and Whitby; • Changing light on the hills and through the seasons are often the subject depicted in paintings and are frequently photographed as part of the backdrop to Pauatahanui Inlet.	The modelled viewpoints show that the proposed development will have neglible effects on this adjacent SAL catchment. All sensory values associated with this SAL are retained.

13 CONCLUSION

The visual simulations show the landform and existing rural/natural character remains dominant, and the proposal as a low density development within the SAL overlay area. These simulations also show that while the site is highly visible from the selected representative viewpoints, development here can be integrated into the landscape due to the natural landform topography that varies throughout the site. Effects on the SAL characteristics are considered overall to be **low to low-moderate** as although there may be a some change to existing character it will only be apparent as a minor component within the wider landscape view.

Evaluation of ecological report and mapping of development proposal against these values indicates proposed subdivision maintains the natural science values through using the existing landform for site hydrology, maintaining and enhancing existing wetlands and streams where possible.

The modelled viewpoints show that the proposed development will have very-low – low visual effect on this adjacent SAL catchment. All sensory values associated with this SAL are retained. The backdrop landform of the Kakaho SAL is not compromised by development on the site.

Evaluation of development proposal against these values indicates proposed subdivision is consistent with these values. Modelled viewpoints show that the residential density:

- is well-integrated through acknowledging landform and associated values,
- maintains elements of naturalness and open character against the inlet,
- retains a more open character in the SAL catchment
- the natural landform and natural elements remain dominant
- edge and backdrop landscape to Pauatahanui Inlet remains highly visible and intact
- maintains transient values of sunlight and dynamic light patterns on hills/landform
- development is unlikely to impact on existing sensory values associated with the inlet waters due to density, elevation and retained edge landform

The findings of this additional assessment work and preparation of 3d modelled visual simulations support the proposed development as shown on the Cuttriss drawing **Proposed Structure Plan 22153 P3 rev D**.

14 RECOMMENDATIONS

I recommend the following to manage proposed development effects on the identified landscape and visual values:

1) Water sensitive design is utilised throughout the site
2) Identified wetlands and gullies are maintained and enhanced through ecologically and visually appropriate planting, and stock excluded
3) A revegetation or planting strategy and plan be provided prior to development for wetland and gully planting
4) A street tree/scape framework be provided at the time of resource consent
5) Gates shall be consistent with traditional rural elements and not be monumental in character (predominantly timber would be appropriate).
6) All earthworked/exposed areas shall be top-soiled and grassed/revegetated or otherwise permanently stabilised and vegetated to blend into the rural pastoral character.
7) Within the SAL encourage the use of JOALS or lanes for access within the southern area of the development to reduce roading footprint
8) Within the SAL encourage the use of design guidelines for building platforms, landscape planting, materials and colour palette for lot development for example:
   - All external walls, joinery, trims and attachments, gutters, spouting, downpipes, chimney, flues, satellite dishes and solar panels shall be coloured in the natural hues of green, brown or grey with a LRV of between 7% and 27%.
   - The roofing materials of all buildings shall be in dark recessive tones of grey, green or brown with a LRV of between 7% and 27% and have a matt finish, if painted
   - All ancillary structures (for example: garden sheds and garages) shall be clad and coloured to match the principal dwelling.
9) Encourage use of precinct overlay to enable less than 1ha minimum lot size
10) Recommend any boundary treatment for lots over 1000m2 in area within SAL are to be standard rural character fence only, being timber post and rail and/or post and wire. All fences may reach a maximum height of 1.2m. Mesh fencing may be used for pest management purposes.
11) Encourage Lot 503 be vested as open space reserve to retain existing natural character and landscape backdrop for Pauatahanui Inlet. This will provide increased pedestrian walkway network opportunities from proposed development to coast.

List of Appendices

Appendix A:

Cuttriss Plans

AMENDMENT	NAME	DATE
A LEVELS REVISED	NHT	02/20
B REVISED TO ADDRESS LANDSCAPE CONCERNS	NHT	04/20
C POSSIBLE WORKS IN GULLIES IDENTIFIED	NHT	06/20
D LOT AREAS ADDED	NHT	07/20

1. THIS PLAN IS TO BE USED FOR DISCUSSION PURPOSES ONLY AND NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
2. BOUNDARIES SHOWN HAVE BEEN TAKEN FROM LINZ RECORDS AND HAVE NOT BEEN VERIFIED ON SITE.
3. IMAGES CAPTURED USING EBEE PLUS (RTK) 26-02-2019.
4. SURVEYED BY N. TAYLOR, A. MORRISON & S. TURKINGTON FEBRUARY & MARCH 2019 USING TRIMBLE R10 GNSS & S7 TOTAL STATION.
5. CONTOUR INTERVALS ARE 2m.
6. LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON DATUM 1953.
7. SURVEY DATUM: NZGD2000 WELLINGTON CIRCUIT
8. ORIGIN OF SURVEY AND LEVELS: MOTUKARAKA POINT RL = 1.13 (LINZ COORDINATE CONVERSION 15-02-2019).
9. REFER TO RECORDS OF TITLE FOR EASEMENT AND COVENANT INFORMATION.
10. UNLESS STATED OTHERWISE, SERVICES ARE FROM RECORDS WHICH MAY BE INCOMPLETE AND HAVE NOT BEEN VERIFIED ON SITE.

LEGEND
- BOUNDARY
- EASEMENT
- EXISTING PARCEL BOUNDARY
- PROPOSED COASTAL ENVIRONMENT INLAND EXTENT
- SEISMIC LINE

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CLIENT
THE NEIL GROUP

PROJECT
KAKAHO
LOT 1 DP 408158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE

DRAWING TITLE
PROPOSED STRUCTURE PLAN & PRECINCT FRAMEWORK - OVERVIEW

SCALE	REDUCED SCALE
A1 1:2000	1:4000 - A3

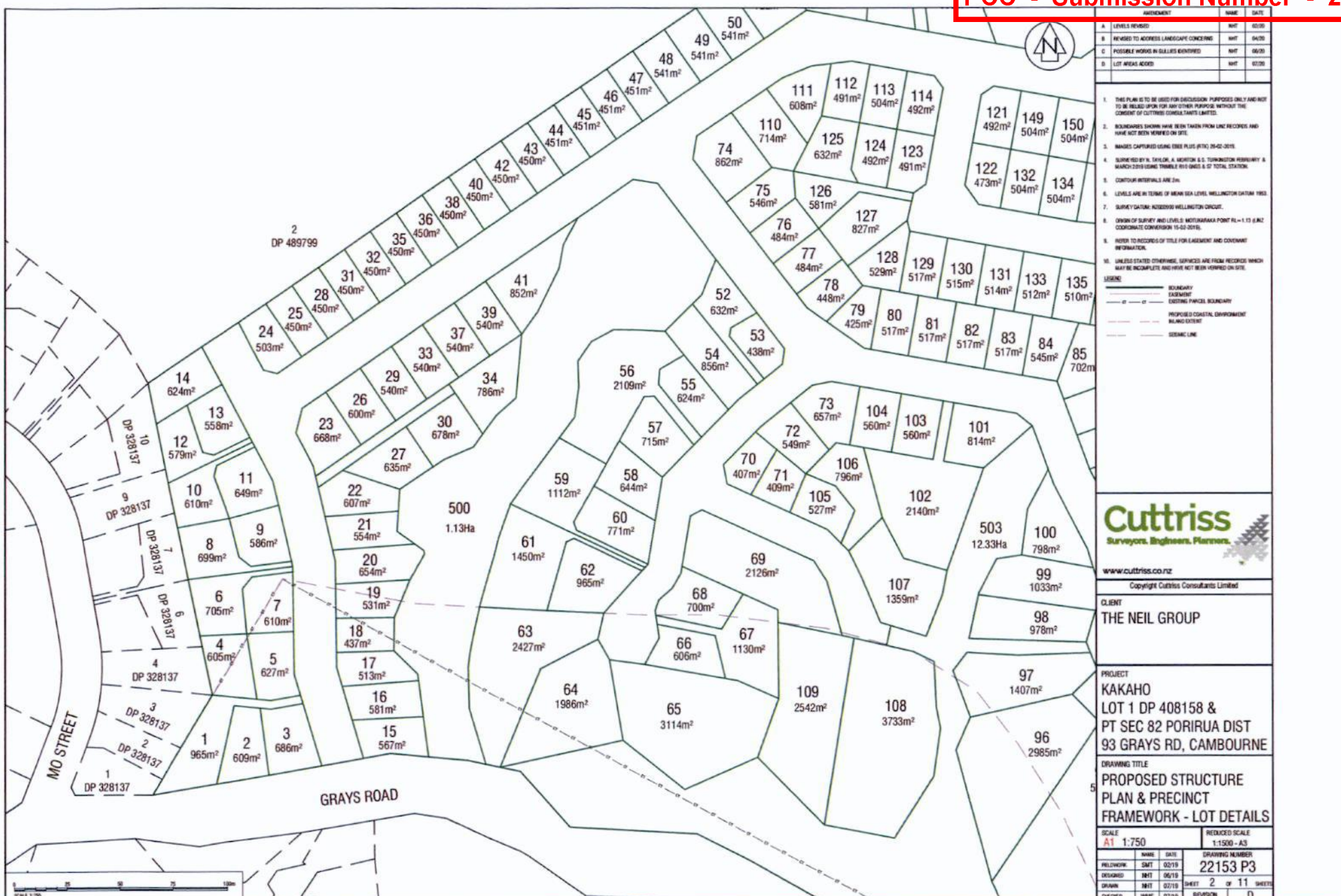
	NAME	DATE
FIELDWORK	SMT	02/19
DESIGNED	NHT	06/19
DRAWN	NHT	01/20
CHECKED	WME	01/20

DRAWING NUMBER 22153 P3
SHEET 1 OF 11 SHEETS
REVISION D

Appendix A – Proposed Structure Plan and Precinct Framework – Overview
Kakaho Proposed Development - LVA Addendum

Date: 10th July 2020
Job No: A7241
Dwg Ref: 22153 P3 1
Revision: V1.0
Drawn by: NHT Checked by: MD

4SIGHT CONSULTING

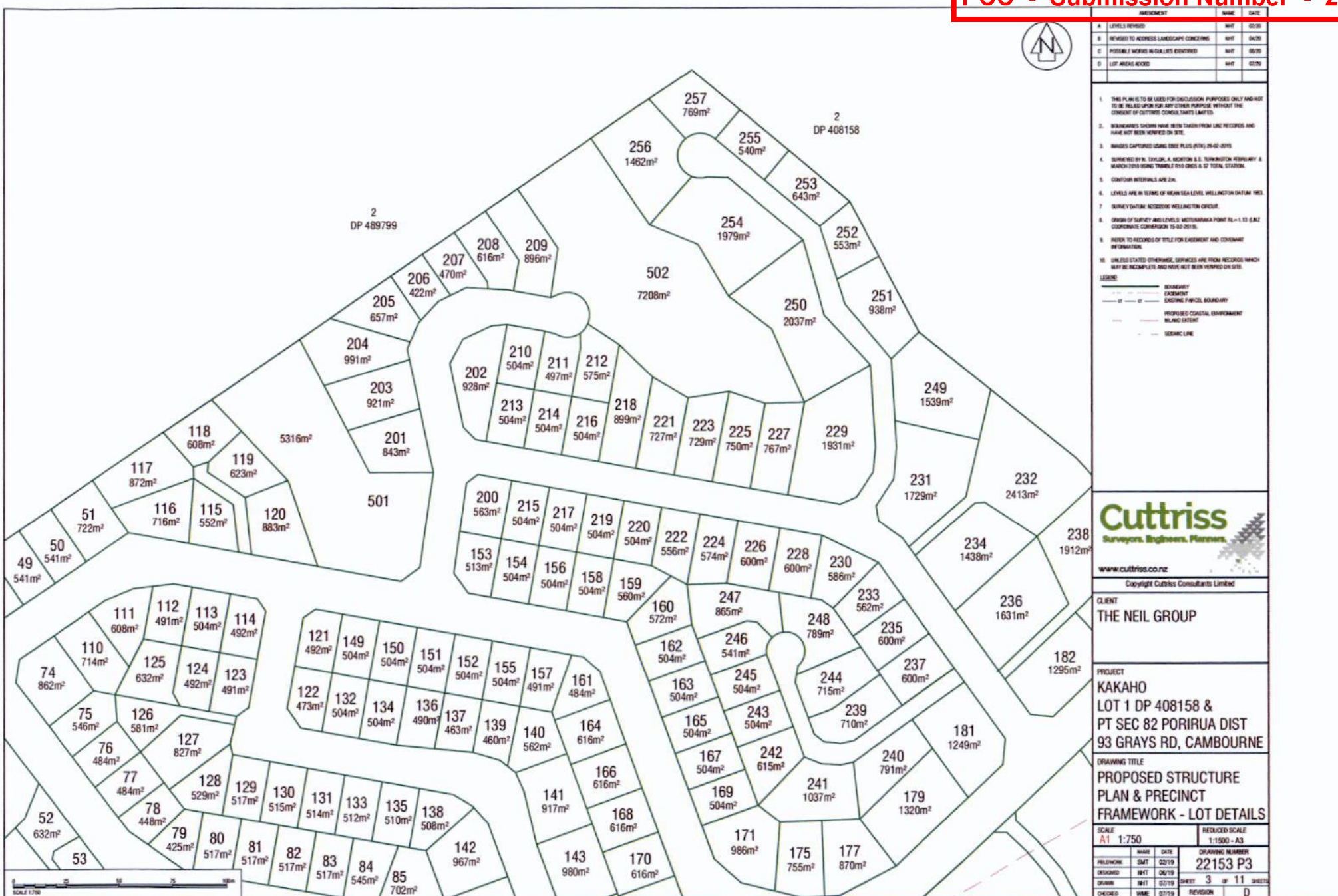


Appendix A – Proposed Structure Plan and Precinct Framework – Lot Details

Kakaho Proposed Development - LVA Addendum

Date: 10th July 2020
Job No: A7241
Dwg Ref: 22153 P3 2
Revision: V1.0
Drawn by: NHT Checked by: MD

4SIGHT CONSULTING



AMENDMENT	NAME	DATE
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B REVISED TO ADDRESS LANDSCAPE CONCERNS	NHT	04/20
C POSSIBLE WORKS IN GULLIES IDENTIFIED	NHT	06/20
D LOT AREAS ADDED	NHT	07/20

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3. IMAGES CAPTURED USING EBEE PLUS (RTK) 26-02-2019.
4. SURVEYED BY N. TAYLOR, K. MORTON & G. TURNINGTON FEBRUARY & MARCH 2019 USING TRIMBLE R10 GNSS & S7 TOTAL STATION.
5. CONTOUR INTERVALS ARE 2m.
6. LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON DATUM 1953.
7. SURVEY DATUM: M2222000 WELLINGTON CIRCUIT.
8. ORIGIN OF SURVEY AND LEVELS: MOTUMAWAKA POINT RL=1.13 (LINZ COORDINATE CONVERSION 15-02-2019).
9. REFER TO RECORDS OF TITLE FOR EASEMENT AND COVENANT INFORMATION.
10. UNLESS STATED OTHERWISE, SERVICES ARE FROM RECORDS WHICH MAY BE INCOMPLETE AND HAVE NOT BEEN VERIFIED ON SITE.

LEGEND
BOUNDARY
EASEMENT
EXISTING PARCEL BOUNDARY
PROPOSED COASTAL ENVIRONMENT INLAND EXTENT
SEISMIC LINE

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CLIENT
THE NEIL GROUP

PROJECT
KAKAHO
LOT 1 DP 408158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE

DRAWING TITLE
PROPOSED STRUCTURE PLAN & PRECINCT FRAMEWORK - LOT DETAILS

SCALE	REDUCED SCALE
A1 1:750	1:1500 - A3

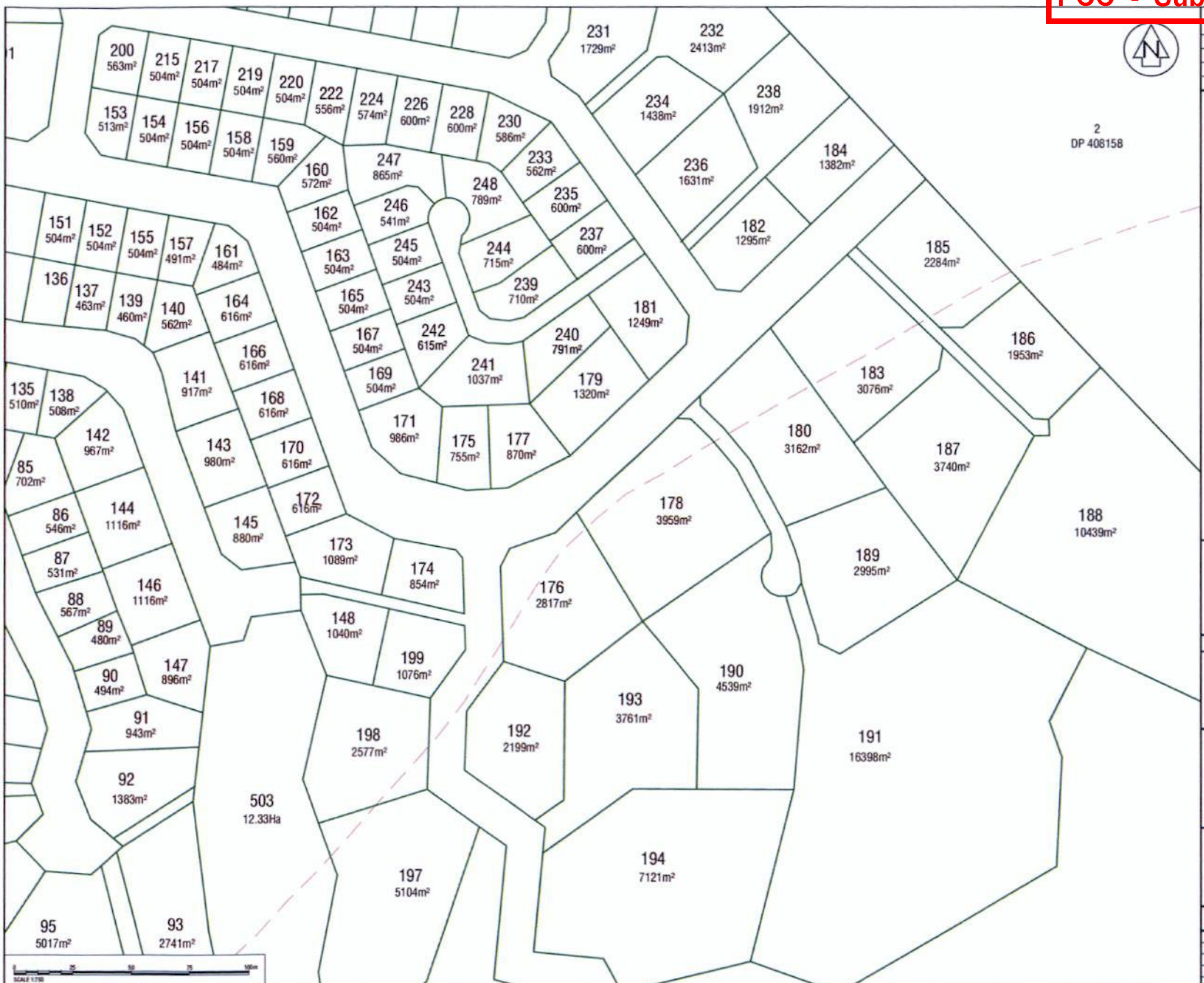
	NAME	DATE
FIELDWORK	SMT	02/19
DESIGNED	NHT	06/19
DRAWN	NHT	07/19
CHECKED	MME	07/19

DRAWING NUMBER 22153 P3
SHEET 3 OF 11 SHEETS
REVISION D

Appendix A – Proposed Structure Plan and Precinct Framework – Lot Details
Kakaho Proposed Development - LVA Addendum

Date: 10th July 2020
Job No: A7241
Dwg Ref: 22153 P3 3
Revision: V1.0
Drawn by: NHT Checked by: MD

4SIGHT CONSULTING



AMENDMENT		NAME	DATE
A	LEVELS REVISED	NHT	02/20
B	REVISED TO ADDRESS LANDSCAPE CONCERNS	NHT	04/20
C	POSSIBLE WORKS IN GULLIES IDENTIFIED	NHT	05/20
D	LOT AREAS ADDED	NHT	07/20

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3. IMAGES CAPTURED USING EDGE PLUS (RTK) 26-02-2019.
4. SURVEYED BY N. TAYLOR, A. MORTON & S. TURKINGTON FEBRUARY & MARCH 2019 USING TRIMBLE R10 GNSS & S7 TOTAL STATION.
5. CONTOUR INTERVALS ARE 2m.
6. LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON DATUM 1953.
7. SURVEY DATUM: NZGD2000 WELLINGTON CIRCUIT.
8. ORIGIN OF SURVEY AND LEVELS: MOTUKARAKA POINT RL=1.12 (LINZ COORDINATE CONVERSION 15-02-2019).
9. REFER TO RECORDS OF TITLE FOR EASEMENT AND COVENANT INFORMATION.
10. UNLESS STATED OTHERWISE, SERVICES ARE FROM RECORDS WHICH MAY BE INCOMPLETE AND HAVE NOT BEEN VERIFIED ON SITE.

LEGEND
BOUNDARY
EASEMENT
EXISTING PARCEL BOUNDARY
PROPOSED COASTAL ENVIRONMENT INLAND EXTENT
SEISMIC LINE

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PROJECT
KAKAHO
LOT 1 DP 408158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE

DRAWING TITLE
PROPOSED STRUCTURE PLAN & PRECINCT FRAMEWORK - LOT DETAILS

SCALE	REDUCED SCALE
A1 1:750	1:1500 - A3

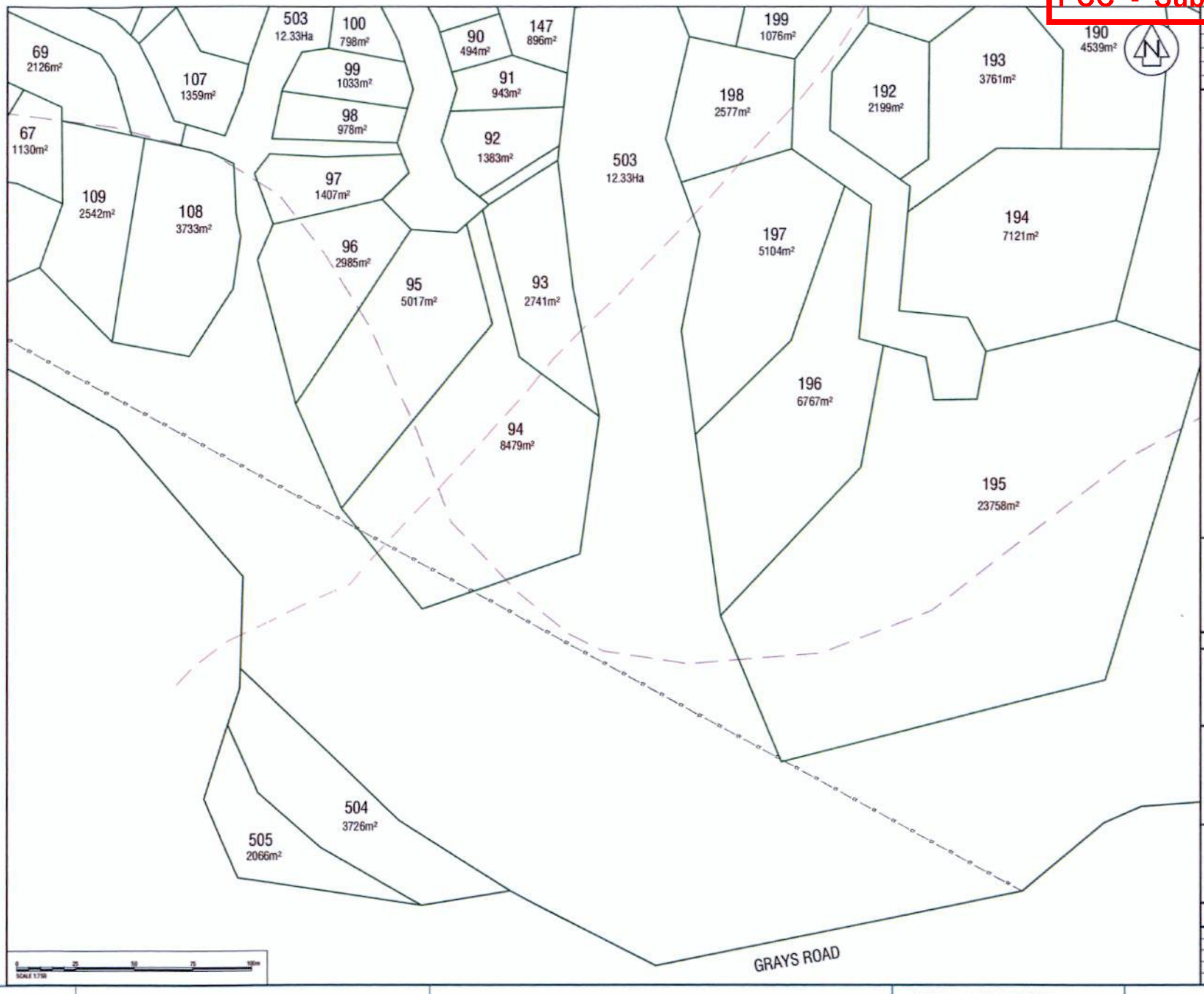
	NAME	DATE
FIELDWORK	SMT	02/19
DESIGNED	NHT	06/19
DRAWN	NHT	07/19
CHECKED	WME	07/19

DRAWING NUMBER 22153 P3
SHEET 4 OF 11 SHEETS
REVISION D

Appendix A – Proposed Structure Plan and Precinct Framework – Lot Details
Kakaho Proposed Development - LVA Addendum

Date: 10th July 2020
Job No: A7241
Dwg Ref: 22153 P3 4
Revision: V1.0
Drawn by: NHT Checked by: MD

4SIGHT CONSULTING



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3. IMAGES CAPTURED USING EBEE PLUS (RTK) 26-02-2019.
4. SURVEYED BY R. TAYLOR, A. MORTON & S. TURKINGTON FEBRUARY & MARCH 2019 USING TRIMBLE R10 GNSS & S7 TOTAL STATION.
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LEGEND

BOUNDARY
EASEMENT
EXISTING PARCEL BOUNDARY
PROPOSED COASTAL ENVIRONMENT INLAND EXTENT
SEISMIC LINE

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PROJECT
KAKAHO
LOT 1 DP 408158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE

DRAWING TITLE
PROPOSED STRUCTURE PLAN & PRECINCT FRAMEWORK - LOT DETAILS

SCALE A1 1:750
REDUCED SCALE 1:1500 - A3

	NAME	DATE
REDRAWN	GMT	02/19
DESIGNED	NHT	06/19
DRAWN	NHT	07/19
CHECKED	MME	05/19

DRAWING NUMBER 22153 P3
SHEET 5 OF 11 SHEETS
REVISION D

Appendix A – Proposed Structure Plan and Precinct Framework – Lot Details
Kakaho Proposed Development - LVA Addendum

Date: 10th July 2020
Job No: A7241
Dwg Ref: 22153 P3 5
Revision: V1.0
Drawn by: NHT Checked by: MD

4SIGHT CONSULTING

Appendix A – Proposed Structure Plan and Precinct Framework – Contours

Kakaho Proposed Development - LVA Addendum

Date: 10th July 2020
Job No: A7241
Dwg Ref: 22153 P3 6
Revision: V1.0
Drawn by: NHT Checked by: MD

4SIGHT CONSULTING

Appendix A – Proposed Structure Plan and Precinct Framework – Contours

Kakaho Proposed Development - LVA Addendum

Date: 10th July 2020
Job No: A7241
Dwg Ref: 22153 P3 7
Revision: V1.0
Drawn by: NHT Checked by: MD

4SIGHT CONSULTING

AMENDMENT		NAME	DATE
A	LEVELS REVISED	NHT	02/20
B	REVISED TO ADDRESS LANDSCAPE CONCERNS	NHT	04/20
C	POSSIBLE WORKS IN GULLIES IDENTIFIED	NHT	06/20
D	LOT AREAS ADDED	NHT	07/20

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LEGEND

BOUNDARY
EASEMENT
EXISTING PARCEL BOUNDARY
MAJOR DESIGN CONTOUR
MINOR DESIGN CONTOUR
MAJOR EXISTING CONTOUR
MINOR EXISTING CONTOUR

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PROJECT
KAKAHO
LOT 1 DP 408158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE

DRAWING TITLE
PROPOSED STRUCTURE PLAN & PRECINCT FRAMEWORK - CONTOURS

SCALE A1 1:750
REDUCED SCALE 1:1500 - A3

	NAME	DATE
FIELDWORK	SMT	02/19
DESIGNED	NHT	06/19
DRAWN	NHT	07/19
CHECKED	WME	07/19

DRAWING NUMBER 22153 P3
SHEET 8 OF 11 SHEETS
REVISION D

Appendix A – Proposed Structure Plan and Precinct Framework – Contours
Kakaho Proposed Development - LVA Addendum

Date: 10th July 2020
Job No: A7241
Dwg Ref: 22153 P3 8
Revision: V1.0
Drawn by: NHT Checked by: MD

4SIGHT CONSULTING

AMENDMENT	NAME	DATE
A LEVELS REVISED	NHT	02/20
B REVISED TO ADDRESS LANDSCAPE CONCERNS	NHT	04/20
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LEGEND
BOUNDARY
EASEMENT
EXISTING PARCEL BOUNDARY
MAJOR DESIGN CONTOUR
MINOR DESIGN CONTOUR
MAJOR EXISTING CONTOUR
MINOR EXISTING CONTOUR

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PROJECT
KAKAHO
LOT 1 DP 408158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE

DRAWING TITLE
PROPOSED STRUCTURE PLAN & PRECINCT FRAMEWORK - CONTOURS

SCALE A1 1:750
REDUCED SCALE 1:1500 - A3

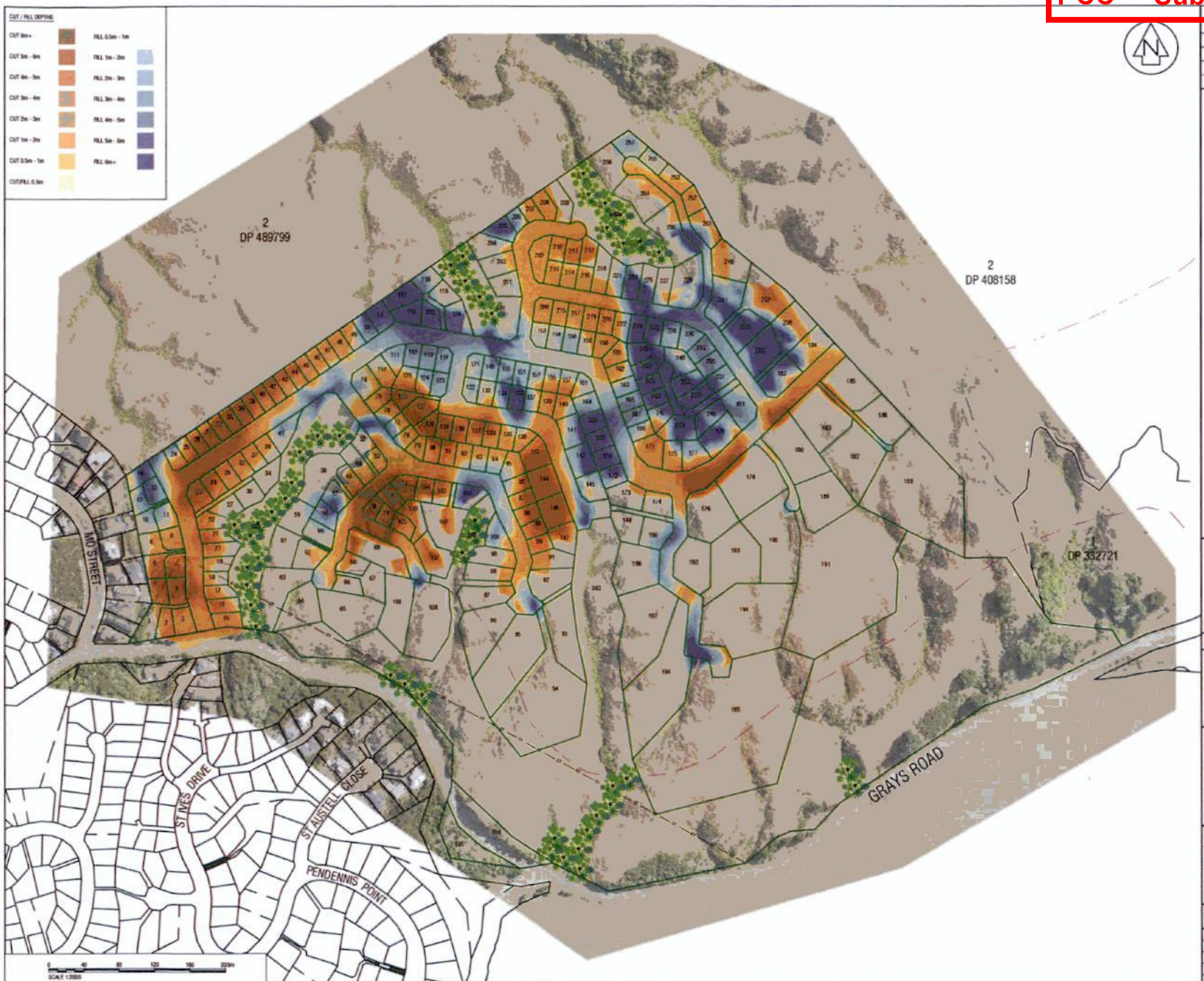
	NAME	DATE
REDRAWN	SMT	02/19
DESIGNED	NHT	06/19
DRAWN	NHT	07/19
CHECKED	MME	06/19

DRAWING NUMBER 22153 P3
SHEET 9 OF 11 SHEETS
REVISION D

Appendix A – Proposed Structure Plan and Precinct Framework – Contours
Kakaho Proposed Development - LVA Addendum

Date: 10th July 2020
Job No: A7241
Dwg Ref: 22153 P3 9
Revision: V1.0
Drawn by: NHT Checked by: MD

4SIGHT CONSULTING



AMENDMENT	NAME	DATE
A LEVELS REVISED	NHT	02/20
B REVISED TO ADDRESS LANDSCAPE CONCERNS	NHT	04/20
C POSSIBLE WORKS IN GULLIES IDENTIFIED	NHT	05/20
D LOT AREAS ADDED	NHT	07/20

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9. REFER TO RECORDS OF TITLE FOR EASEMENT AND COVENANT INFORMATION.
10. UNLESS STATED OTHERWISE, SERVICES ARE FROM RECORDS WHICH MAY BE INCOMPLETE AND HAVE NOT BEEN VERIFIED ON SITE.
11. EARTHWORKS VOLUMES
PROPOSED CUT = 356,700m³
PROPOSED FILL = 323,100m³

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PROJECT
KAKAHO
LOT 1 DP 408158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE

DRAWING TITLE
PROPOSED STRUCTURE PLAN & PRECINCT FRAMEWORK - CUT/FILL

SCALE	REDUCED SCALE
A1 1:750	1:1500 - A3

	NAME	DATE
FIELDWORK	SMT	02/19
DESIGNED	NHT	06/19
DRAWN	NHT	07/19
CHECKED	MME	07/19

DRAWING NUMBER 22153 P3
SHEET 10 OF 11 SHEETS
REVISION D

Appendix A – Proposed Structure Plan and Precinct Framework – Cut/Fill
Kakaho Proposed Development - LVA Addendum

Date: 10th July 2020
Job No: A7241
Dwg Ref: 22153 P3 10
Revision: V1.0
Drawn by: NHT Checked by: MD

4SIGHT CONSULTING

AMENDMENT	NAME	DATE
A LEVELS REVISED	NHT	02/20
B REVISED TO ADDRESS LANDSCAPE CONCERNS	NHT	04/20
C POSSIBLE WORKS IN GULLIES IDENTIFIED	NHT	06/20
D LOT AREAS ADDED	NHT	07/20

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7. SURVEY DATUM: NZGD2000 WELLINGTON CIRCUIT.
8. ORIGIN OF SURVEY AND LEVELS: MOTUKARAKA POINT RL=1.13 (LINZ COORDINATE CONVERSION 15-02-2019).
9. REFER TO RECORDS OF TITLE FOR EASEMENT AND COVENANT INFORMATION.
10. UNLESS STATED OTHERWISE, SERVICES ARE FROM RECORDS WHICH MAY BE INCOMPLETE AND HAVE NOT BEEN VERIFIED ON SITE.
11. ECOLOGICAL FEATURES HAVE BEEN DEFINED BY RMA ECOLOGY, REFER TO RMA ECOLOGY MEMO DATED 6 MAY 2019.

LEGEND
BOUNDARY
EASEMENT
EXISTING PARCEL BOUNDARY
POTENTIAL STREAM
STREAM < 1m
STREAM > 1m
INDUCED WETLAND
SIGNIFICANT VEGETATION
LIZARD HABITAT

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PROJECT
KAKAHO
LOT 1 DP 408158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE

DRAWING TITLE
PROPOSED STRUCTURE PLAN & PRECINCT FRAMEWORK - ECOLOGY

SCALE	REDUCED SCALE
A1 1:750	1:1500 - A3

	NAME	DATE
FIELDWORK	SMT	02/19
DESIGNED	NHT	06/19
DRAWN	NHT	07/19
CHECKED	WME	07/19

DRAWING NUMBER 22153 P3
SHEET 11 OF 11 SHEETS
REVISION D

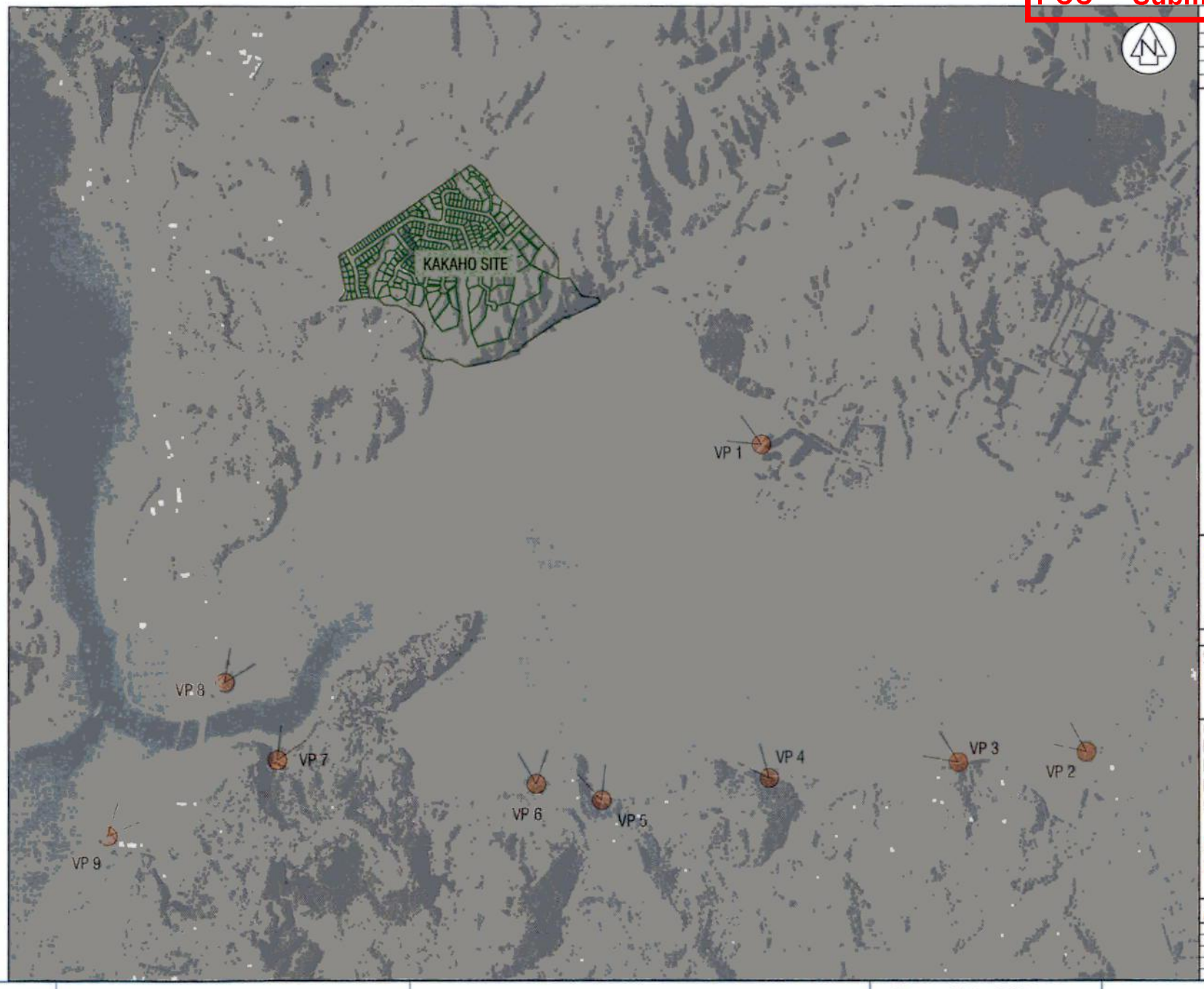
Appendix A – Proposed Structure Plan and Precinct Framework – Ecology
Kakaho Proposed Development - LVA Addendum

Date: 10th July 2020
Job No: A7241
Dwg Ref: 22153 P3 11
Revision: V1.0
Drawn by: NHT Checked by: MD

4SIGHT CONSULTING

Appendix B:

Viewpoints and Modelled Information



REVISION DETAILS	NAME	DATE
A REVISED LAYOUT	MHT	05/20

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PROJECT
KAKAHO
LOT 1 DP 408158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE

PROPOSED DEVELOPMENT
VIEWPOINTS OVERVIEW

SCALE	REDUCED SCALE
A1 - 1:7500	A3 - 1:15000

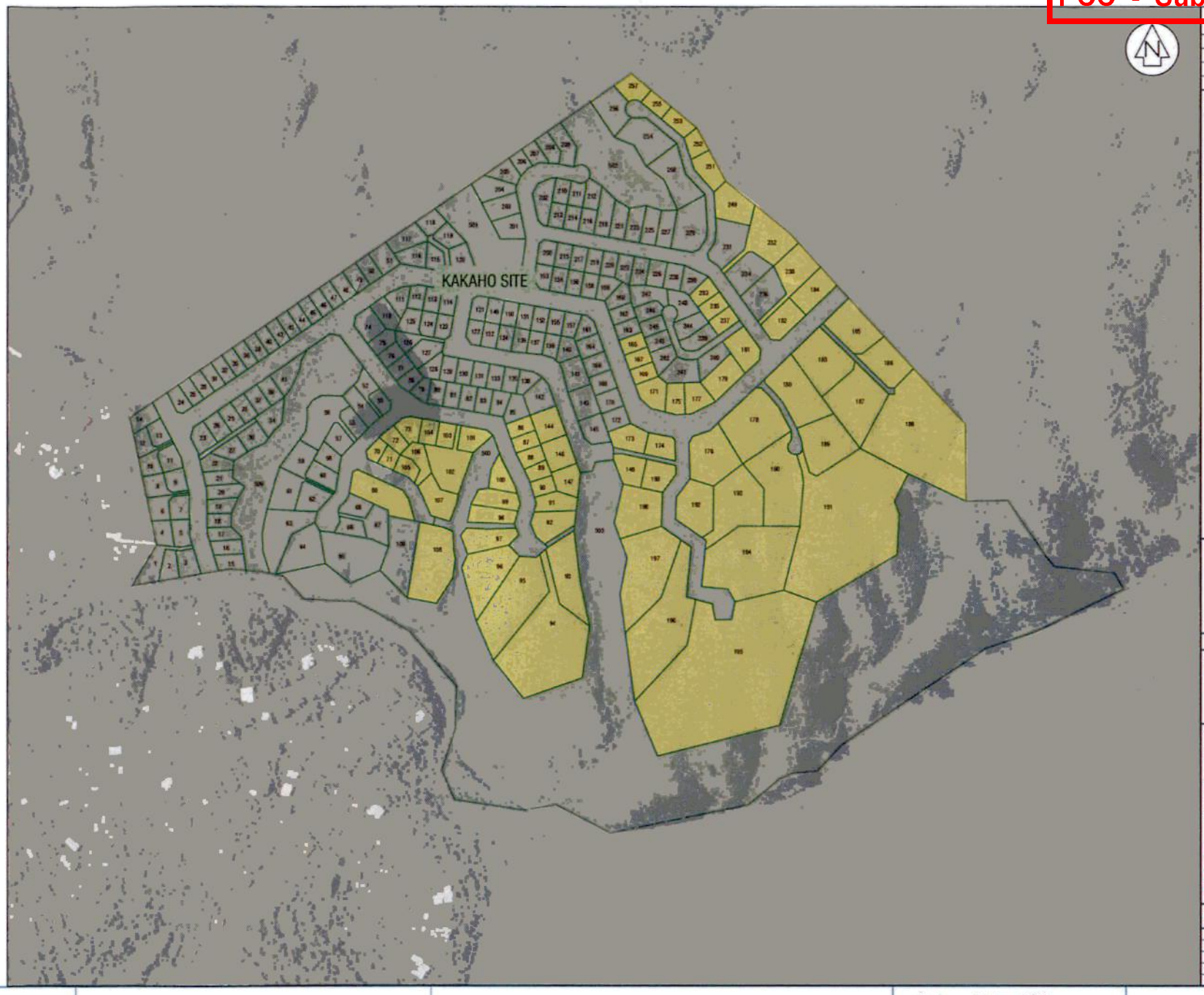
	NAME	DATE
FIELDWORK		
DESIGNED		
DRAWN	SSB	04/20
CHECKED	MHT	04/20

DRAWING NUMBER
22153 VP
SHEET 1 OF 11 SHEETS
REVISION A

Appendix B – Viewpoint Location Map
Kakaho Proposed Development - LVA Addendum

Date: 9th June 2020
Job No: A7241
Dwg Ref: 222153 VP 1
Revision: V1.0
Drawn by: SSB Checked by: MD

4SIGHT CONSULTING



REVISION DETAILS		NAME	DATE
A	REVISED LAYOUT	NHT	05/20

NOTES:

1. THIS PLAN IS TO BE USED FOR CONSENTING PURPOSES ONLY & IS NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
2. BOUNDARIES SHOWN ON THIS PLAN WILL BE SUBJECT TO CHANGE.
3. COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC 2000 DATUM, WELLINGTON CIRCUIT.
4. VIEWPOINTS SURVEYED BY N. TAYLOR 11th MARCH 2020. TOPOGRAPHY SURVEYED BY N. TAYLOR, A. MORTON & S. TURKINGTON FEBRUARY & MARCH 2019 USING TRIMBLE R10 GNSS & S7 TOTAL STATION.
5. LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON DATUM 1953, ORIGIN OF SURVEY AND LEVELS: MOTUKARAKA POINT RL = 1.13 (LINZ COORDINATE CONVERSION 15-02-2019).
6. BOUNDARY INFORMATION HAS BEEN SOURCED FROM INFORMATION PROVIDED BY LINZ ISM, & HAS NOT BEEN VERIFIED ON SITE.
7. VIEWPOINTS FOR ANALYSIS WERE DETERMINED IN CONJUNCTION WITH PORIRUA CITY COUNCIL'S LANDSCAPING CONSULTANT. AS SUCH, NOT ALL BUILDINGS IN THE PROPOSED DEVELOPMENT HAVE BEEN MODELLED.
8. ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES.

LEGEND

BOUNDARY

SITE

LOTS MODELLED FOR INDICATIVE DEVELOPMENT SIMULATIONS

Cuttriss
Surveyors. Engineers. Planners.
www.cuttriss.co.nz

CLIENT
THE NEIL GROUP

PROJECT
KAKAHO
LOT 1 DP 408158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE

PROPOSED DEVELOPMENT
LOTS MODELLED
FOR SIMULATION

SCALE	REDUCED SCALE
A1 - 1:2000	A3 - 1:40000

	NAME	DATE
REDRAWN		
DESIGNED		
DRAWN	SSB	04/20
CHECKED	NHT	04/20

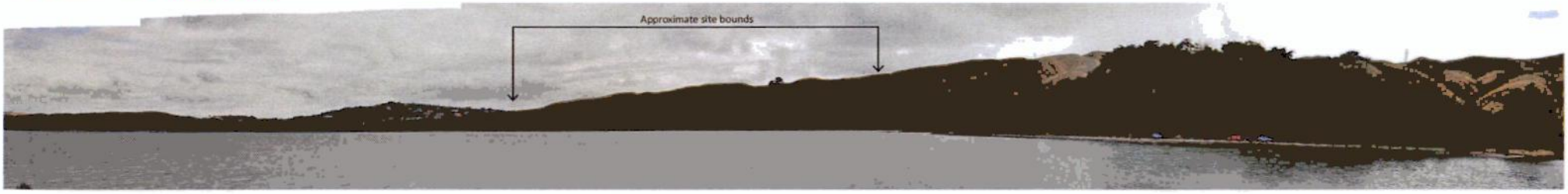
DRAWING NUMBER: 22153 VP
SHEET 2 OF 11 SHEETS
REVISION A

Appendix B – Proposed Development Lots Modelled for Simulation
Kakaho Proposed Development - LVA Addendum

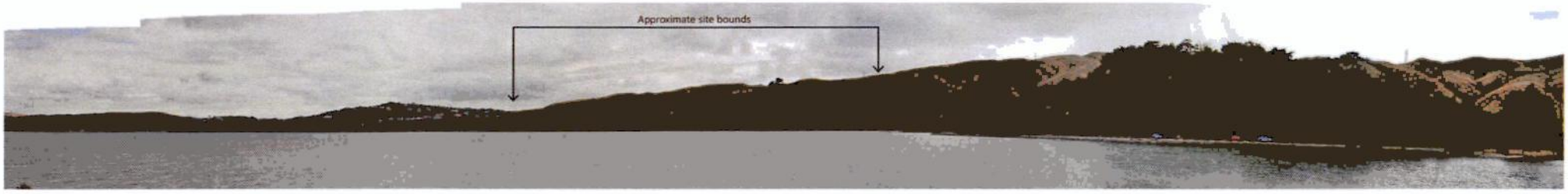
Date: 9th June 2020
Job No: A7241
Dwg Ref: 22153 VP 2
Revision: V1.0
Drawn by: SSB Checked by: MD

4SIGHT CONSULTING

PANORAMA1 - RVP1 - EXISTING VIEW



PANORAMA1 - RVP1 - INDICATIVE VIEW OF POSSIBLE DEVELOPMENT



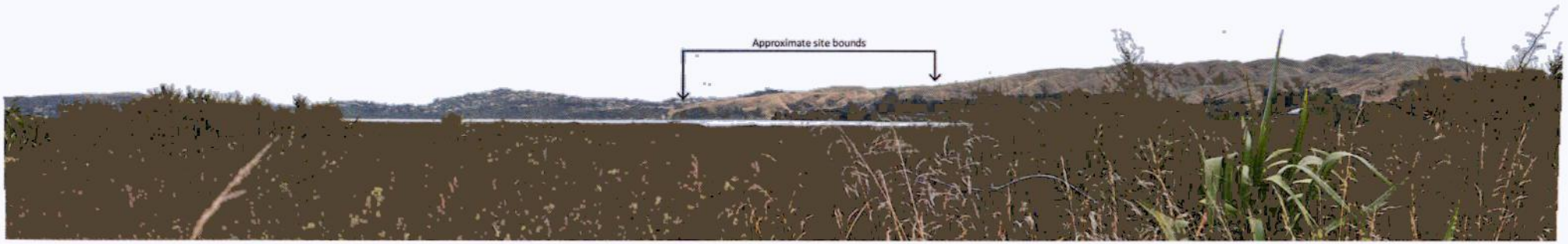
Photographs taken with 50mm lens and stitched into panorama
Approx. optimum viewing distance at A3: 500mm
Viewpoint location: 823185.011 410255.882 3.375

Appendix B – Viewpoint 1
View towards proposed development
Kakaho Proposed Development - LVA Addendum

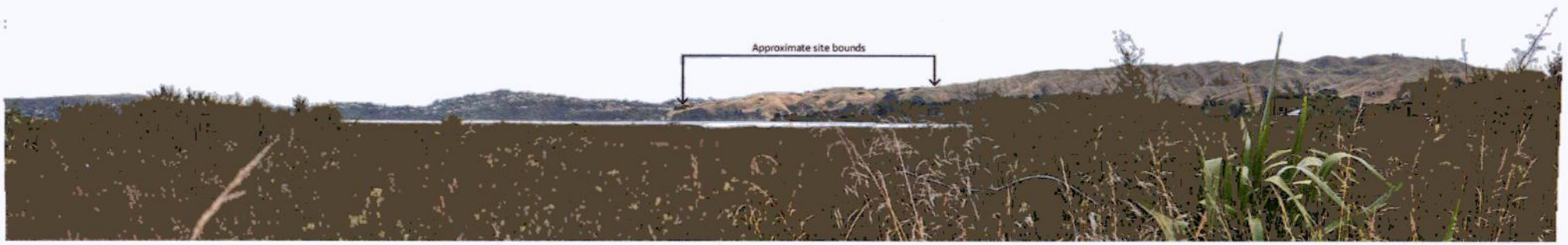
Date: 9th June 2020
Job No: A7241
Dwg Ref: VP01
Revision: V1.0
Drawn by: SH Checked by: MD

4SIGHT CONSULTING

PANORAMA 2 - RVP2 - EXISTING VIEW



PANORAMA 2 - RVP2 - INDICATIVE VIEW OF POSSIBLE DEVELOPMENT



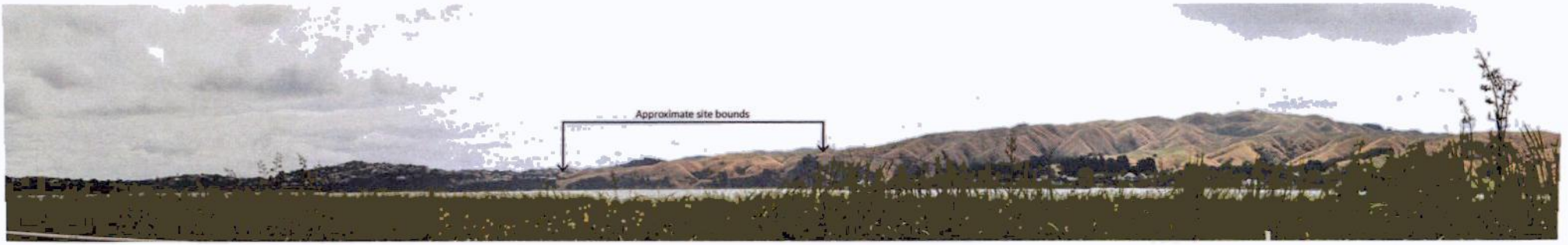
Photographs taken with 50mm lens and stitched into panorama
Approx. optimum viewing distance at A3: 500mm
Viewpoint location: 821859.777 411649.3 1.294

Appendix B – Viewpoint 2
View towards proposed development
Kakaho Proposed Development - LVA Addendum

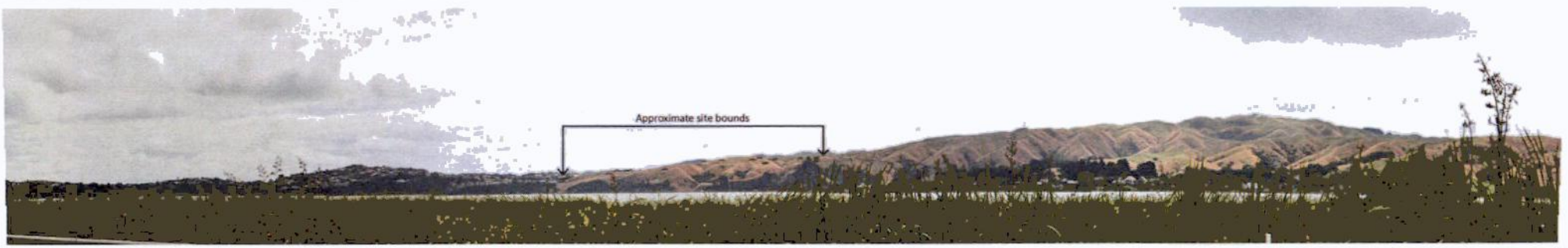
Date: 9th June 2020
Job No: A7241
Dwg Ref: VP02
Revision: V1.0
Drawn by: SH Checked by: MD

4SIGHT CONSULTING

PANORAMA 3 - RVP3 - EXISTING VIEW



PANORAMA 3 - RVP3 - INDICATIVE VIEW OF POSSIBLE DEVELOPMENT



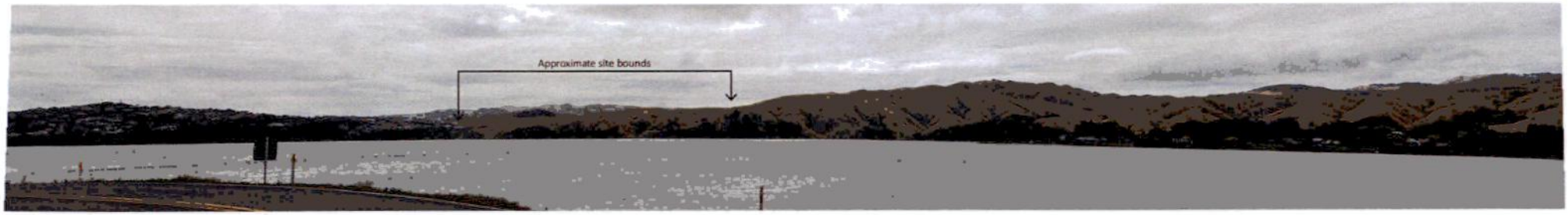
Photographs taken with 50mm lens and stitched into panorama
Approx. optimum viewing distance at A3: 500mm
Viewpoint location: 821815.128 411097.237 2.655

Appendix B – Viewpoint 3
View towards proposed development
Kakaho Proposed Development - LVA Addendum

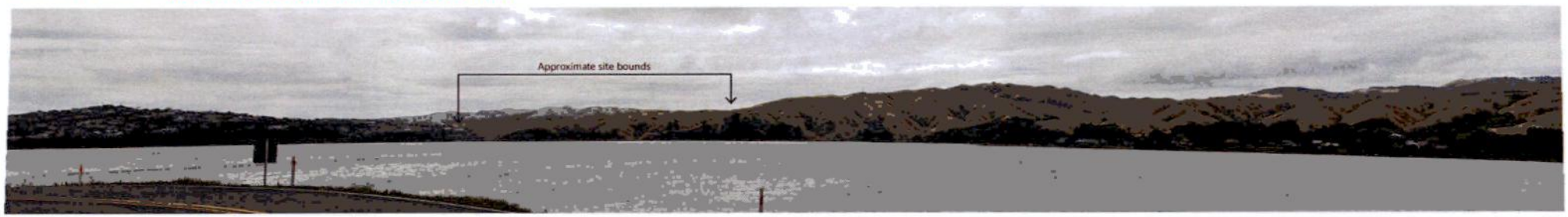
Date: 9th June 2020
Job No: A7241
Dwg Ref: VP03
Revision: V1.0
Drawn by: SH Checked by: MD

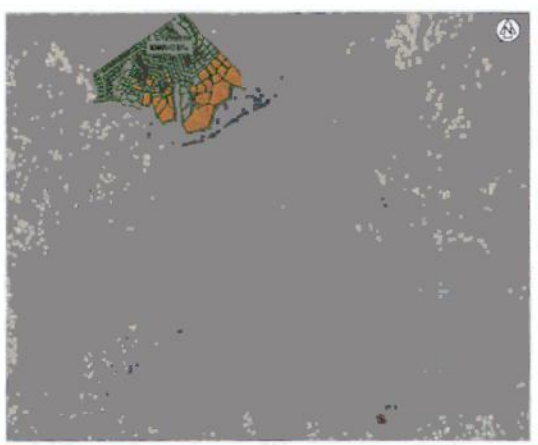
4SIGHT CONSULTING

PANORAMA 4 - RVP4 - EXISTING VIEW



PANORAMA 4 - RVP4 - INDICATIVE VIEW OF POSSIBLE DEVELOPMENT





Photographs taken with 50mm lens and stitched into panorama
Approx. optimum viewing distance at A3: 500mm
Viewpoint location: 821747.468 410289.226 3.981

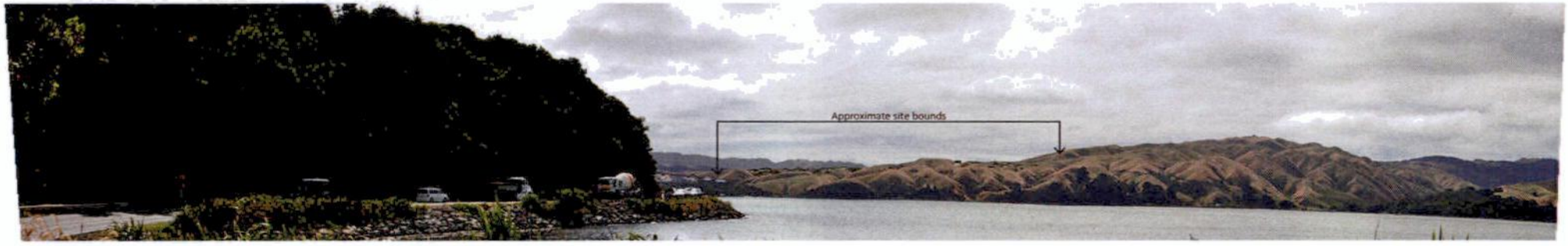
Appendix B – Viewpoint 4
View towards proposed development
Kakaho Proposed Development - LVA Addendum

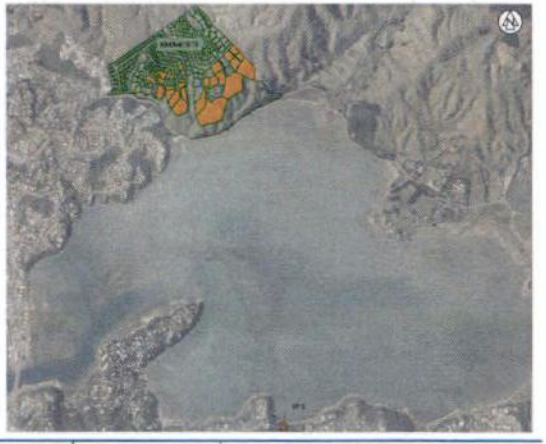
Date: 9th June 2020
Job No: A7241
Dwg Ref: VP04
Revision: V1.0
Drawn by: SH Checked by: MD

4SIGHT CONSULTING

PANORAMA 5 - RVP5 - EXISTING VIEW

PANORAMA 5 - RVP5 - INDICATIVE VIEW OF POSSIBLE DEVELOPMENT





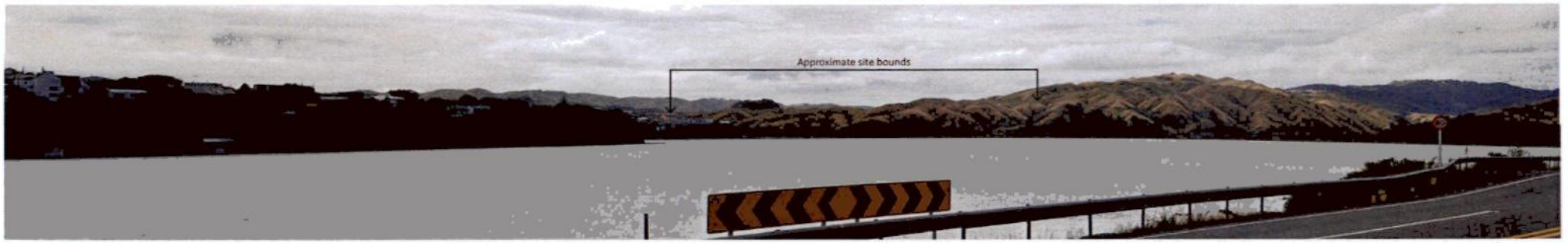
Photographs taken with 50mm lens and stitched into panorama
Approx. optimum viewing distance at A3: 500mm
Viewpoint location: 821652.703 409568.127 2.733

Appendix B – Viewpoint 5
View towards proposed development
Kakaho Proposed Development - LVA Addendum

Date: 9th June 2020
Job No: A7241
Dwg Ref: VP05
Revision: V1.0
Drawn by: SH Checked by: MD

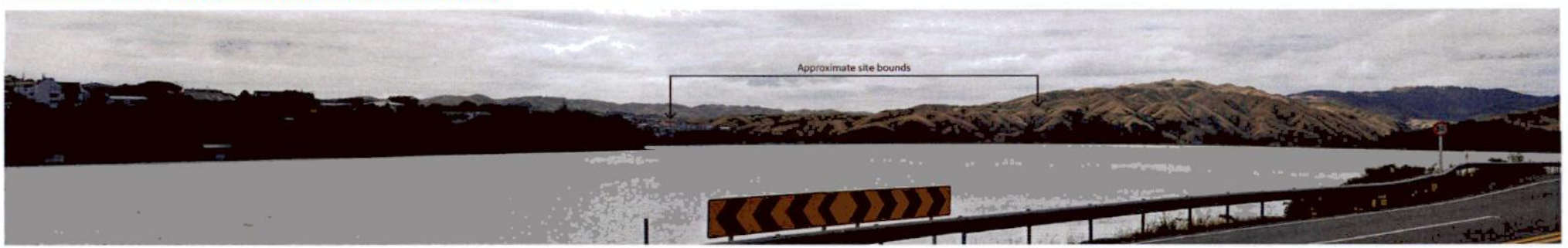
4SIGHT CONSULTING

PANORAMA 6 - RVP6 - EXISTING VIEW



Panorama 6 xxxx

PANORAMA 6 - RVP6 - INDICATIVE VIEW OF POSSIBLE DEVELOPMENT



Panorama 6 xxxx

Photographs taken with 50mm lens and stitched into panorama
Approx. optimum viewing distance at A3: 500mm
Viewpoint location: 821721.956 409290.158 3.86

Appendix B – Viewpoint 6
View towards proposed development
Kakaho Proposed Development - LVA Addendum

Date: 9th June 2020
Job No: A7241
Dwg Ref: VP06
Revision: V1.0
Drawn by: SH Checked by: MD

4SIGHT CONSULTING

PANORAMA 7 - RVP7 - EXISTING VIEW

PANORAMA 7 - RVP7 - INDICATIVE VIEW OF POSSIBLE DEVELOPMENT

Photographs taken with 50mm lens and stitched into panorama
Approx. optimum viewing distance at A3: 500mm
Viewpoint location: 821824.647 408165.46 3.204

Appendix B – Viewpoint 7
View towards proposed development
Kakaho Proposed Development - LVA Addendum

Date: 9th June 2020
Job No: A7241
Dwg Ref: VP07
Revision: V1.0
Drawn by: SH Checked by: MD

4SIGHT CONSULTING

PANORAMA 8 - RVP8 - EXISTING VIEW

PANORAMA 8 - RVP8 - INDICATIVE VIEW OF POSSIBLE DEVELOPMENT

Photographs taken with 50mm lens and stitched into panorama
Approx. optimum viewing distance at A3: 500mm
Viewpoint location: 822157.449 407942.347 1.699

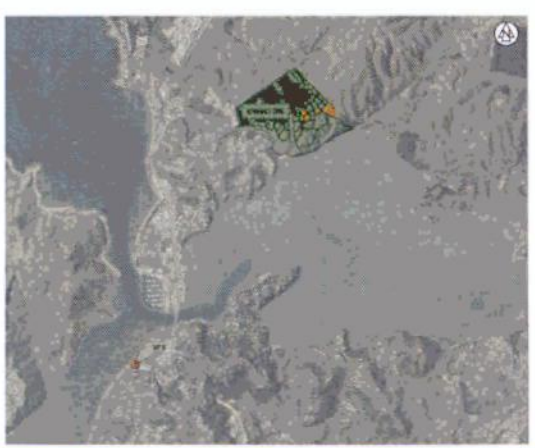
Appendix B – Viewpoint 8
View towards proposed development
Kakaho Proposed Development - LVA Addendum

Date: 9th June 2020
Job No: A7241
Dwg Ref: VP08
Revision: V1.0
Drawn by: SH Checked by: MD

4SIGHT CONSULTING

PANORAMA 9 - RVP9 - EXISTING VIEW

PANORAMA 9 - RVP9 - INDICATIVE VIEW OF POSSIBLE DEVELOPMENT



Photographs taken with 50mm lens and stitched into panorama
Approx. optimum viewing distance at A3: 500mm
Viewpoint location: 821500.448 407439.065 4.381

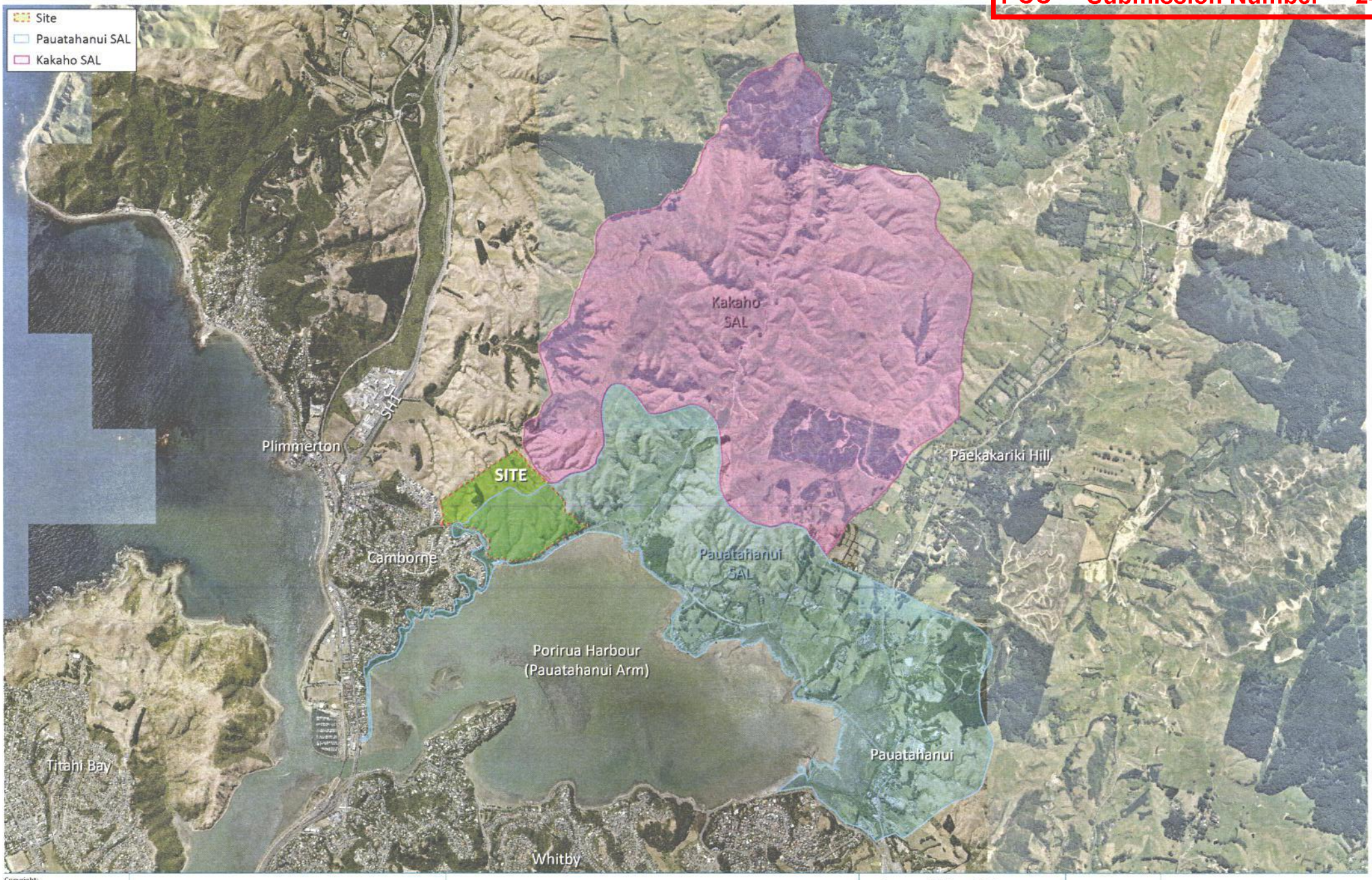
Appendix B – Viewpoint 9
View towards proposed development
Kakaho Proposed Development - LVA Addendum

Date: 9th June 2020
Job No: A7241
Dwg Ref: VP09
Revision: V1.0
Drawn by: SH Checked by: MD

4SIGHT CONSULTING

Appendix C:

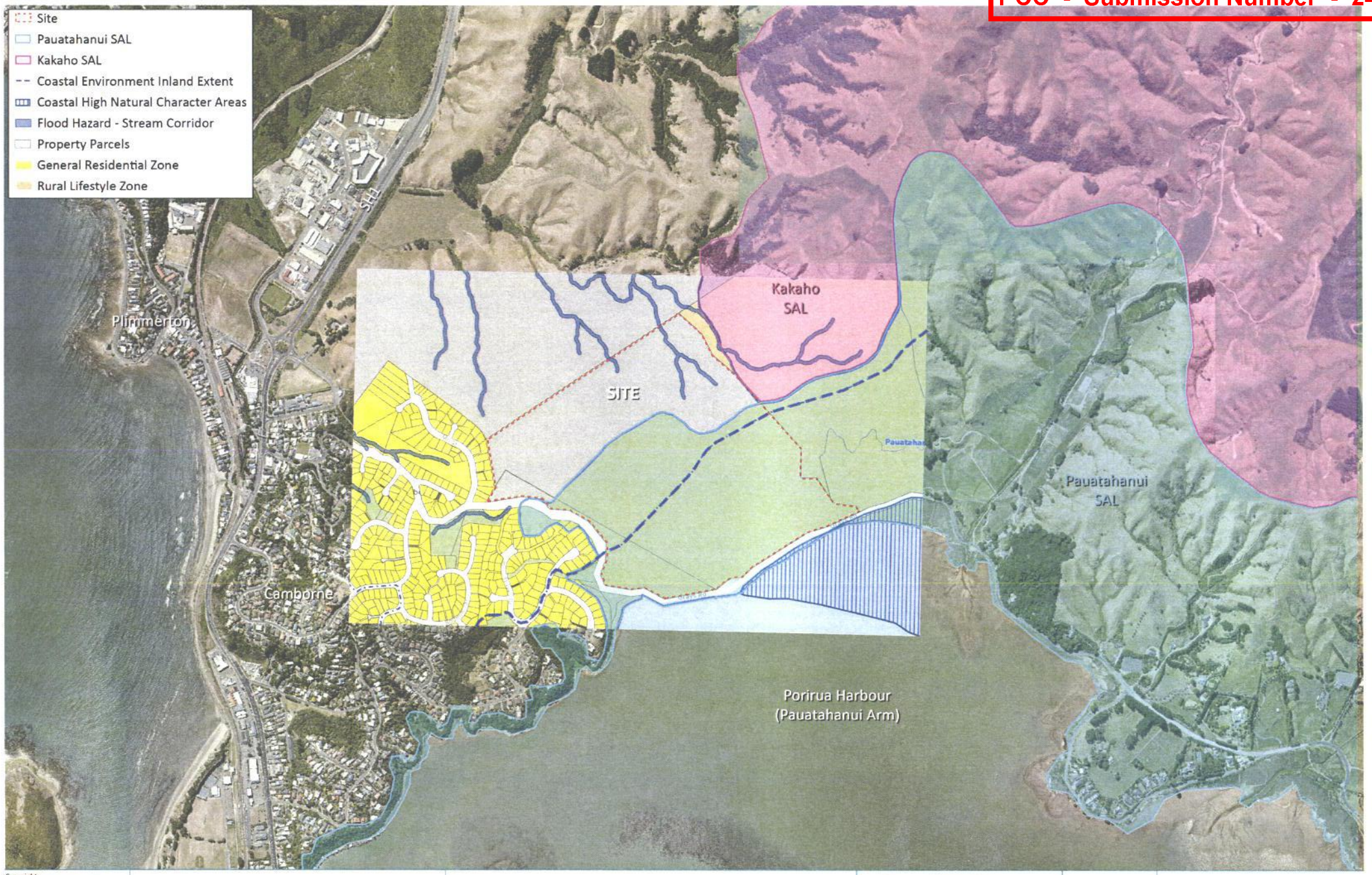
SAL Overlays



Appendix C – Special Amenity Landscape (SAL) Maps
Kakaho Proposed Development - LVA Addendum

Date: 9th June 2020
Job No: A7241
Dwg Ref: SAL 01
Revision: V1.0
Drawn by: SH Checked by: MD

4SIGHT CONSULTING



Appendix C – Special Amenity Landscape (SAL) Maps
Draft Porirua District Plan Overlays
Kakaho Proposed Development - LVA Addendum

Date: 9th June 2020
Job No: A7241
Dwg Ref: SAL 02
Revision: V1.0
Drawn by: SH Checked by: MD

4SIGHT CONSULTING

Appendix D:

Precinct Plan

KEY - MOVEMENT

- MAIN CIRCULATION ROAD
- OTHER ROADS
- ROAD GATEWAYS
- LINKAGE TO PLIMMERTON FARM DEVELOPMENT
- RECREATIONAL WALKWAYS/CYCLE TRAIL NETWORK (INDICATIVE)
- CYCLEWAY (UNDER CONSTRUCTION)

KEY - LAND USE

- MEDIUM DENSITY RESIDENTIAL
  - approx. 120 lots
  - minimum size: 100-400m²
- RESIDENTIAL
  - approx. 160 lots
  - minimum size: 400m²
- RURAL RESIDENTIAL
  - approx. 30 lots
  - minimum size: 2500m²
- RECREATIONAL, STORMWATER MANAGEMENT, AND REVEGATION AREA (PUBLIC OWNERSHIP)
- SPECIAL AMENITY LANDSCAPE AREA
- NEIL GROUP PROPOSED SAL BOUNDARY CHANGE - NO LONGER BEING SOUGHT
- KAKAHO PRECINCT

4SIGHT CONSULTING

KAKAHO PRECINCT PLAN

NEIL CONSTRUCTION LTD

Project: AA7241
Date: 20 November 2020
Revision: v2.0

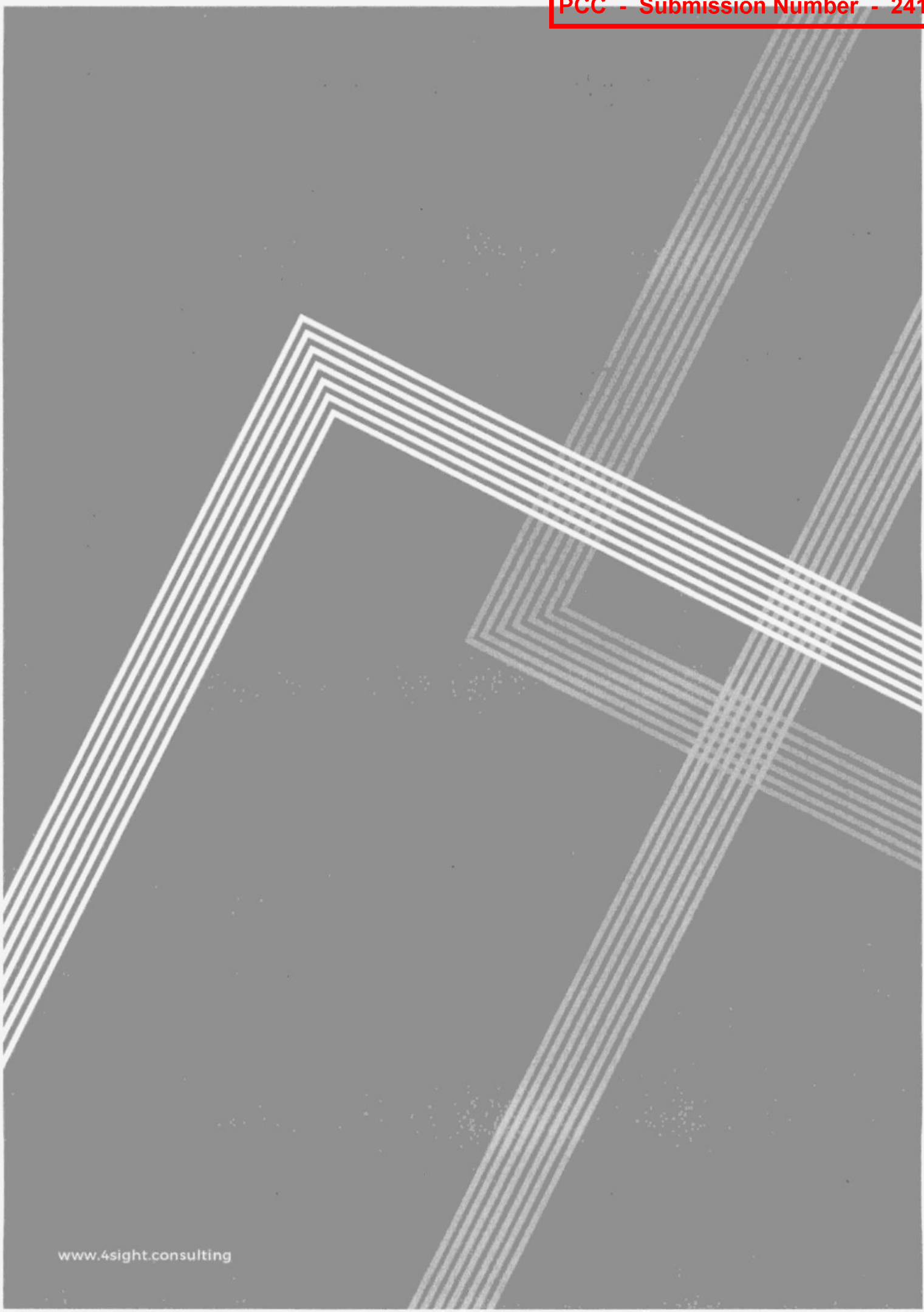
Scale 1:4,000

Appendix E:

Effects Ranking and Ranking Table

The Best Practise Guideline for Visual and Landscape Assessments from the New Zealand Institute of Landscape Architects (NZILA) indicate that a 7-scale effects ranking is usual for Visual and Landscape Assessments. The ranking table below and used in this Assessment report uses the 7-scale of effects outlined in the NZILA Best Practise Guide and then provides explanations for the rankings based on the review of a number of effects ranking tables with common and complementary explanations.

Report descriptor	RMA equivalent	Explanation
No effect	No effects	No part of the proposal is discernible And/or – The proposal will have no effect on the character or key attributes of the receiving environment And/or – The proposal will have no effect on the perceived amenity derived from it
Very low effect	Less than minor effect	The proposal constitutes only an insignificant component of, or change to the wider view. Awareness of the proposal would have a very limited effect on the overall quality of the scene. And/or – The proposal will have a very low level of effect on the character or key attributes of the receiving environment. And/or – The proposal will have a very low level of effect on the perceived amenity derived from it.
Low effect	Less than minor effects	The proposal constitutes only a minor component of or change to the wider view. Awareness of the proposal would not have a marked effect on the overall quality of the scene And/or – The proposal will have a low-level effect on the character or key attributes of the receiving environment And/or – The proposal will have a low-level effect on the perceived amenity derived from it
Low – moderate effect	Minor effects	The proposal may form a visible and recognisable change or new element within the overall scene which may be noticed by the viewer, but does not detract from the overall quality of the scene And/or – The proposal will have a low to moderate effect on the character or key attributes of the receiving environment And/or – The proposal will have a low to moderate level of effect on the perceived amenity derived from it
Moderate effect	Effects of some significance	The proposal may form a visible and recognisable change or new element within the overall scene and may be readily noticed by the viewer and which detracts from the overall quality of the scene And/or – The proposal will have a moderate level of effect on the character or key attributes of the receiving environment
High effect	Significant effects	The proposal forms a significant and immediately apparent part of, or change to, the scene that affects and changes its overall character And/or – The proposal will have a high level effect on the character or key attributes of the receiving environment And/or – The proposal will have a high level effect on the perceived amenity derived from it
Very high effect	Very significant effects	The proposal becomes the dominant feature of the scene to which other elements become subordinate and it significantly affects and changes its character And/or – The proposal will significantly change the characteristics or key attributes of the receiving environment And/or – The proposal will have a significant effect on the perceived amenity derived from it



LANDMATTERS

APPENDIX 2

21 December 2018

GEOTECHNICAL DESKTOP STUDY

KAKAHO SUBDIVISION, 93 GRAYS STREET, PORIRUA

Neil Construction Limited.
Ref:TGA2018_0232AB Rev.1

Table of Contents

Appendices

1 INTRODUCTION

CMW Geosciences (CMW) have been engaged by Neil Construction Ltd (NCL) to undertake a preliminary desktop geotechnical appraisal of A site at 93 Grays Road, Porirua as part of the documentation to support a district plan change.

This report provides a summary of the geological setting with comments on the potential geotechnical risks and constraints for future development.

2 AVAILABLE INFORMATION

The following information was reviewed as part of this report:

- Historic Aerial Photographs from retrolens.nz
    - http://retrolens.nz/map/#/1757535.4583360218/5449469.392360059/1759109.583387137/5450496.514927554/2193/
- Published Geological Maps
    - Begg, J.G., Mazengarb, C. 1996, Geology of the Wellington Area, 1:50,000 Geological Map 22, GNS Science
- Greater Wellington Region Council Web Risk Maps (prepared by GNS): http://mapping.gw.govt.nz/gwrc/

3 SITE DESCRIPTION

The site, legally described as Lot 1 DP 408158, is an irregular shaped block covering a total area of 52,4694 hectares located at the east end of the Camborne suburb. The lot is classified rural and is currently in pasture. It is bound by rural sections to the east, north and west and by the coastal foreshore of Grays Rd to the south.

An accessway runs west from Grays Road towards an existing dwelling in the western part of the property. Topographically the land falls towards the south. Several spurs, oriented North-South, are bound by steep gully features. Land to the south falls steeply to the road and harbour foreshore below. The property is grasslands except a small area near the dwelling which is covered in trees and vegetation.

The block rises from the Porirua Harbour to the south to elevations up to approximately RL145m. The north-eastern part of the property rises elevations up to RL145m (Wellington Datum 1953). Slope gradients within the gully areas are up to 2(v) in 1(h), but are generally 1(v) in 2(h).

4 DEVELOPMENT PROPOSAL

The initial concept design plan provided to us from NCL, referenced project 443, attached in Appendix A, shows earthworks with a total cut volume of 673,000m^3 and total fill of 676,500m^3 for the development of 252 lots. This includes 223 residential lots, 28 rural lots and associated subdivision infrastructure.

The projected earthworks to form access roads and residential lot platforms are deep filling of gully up to 10.0m deep and cuts up to 10.0m in ridges (see Appendix A). Batters have been limited to 1v:1h.

5 CONCEPTUAL GROUND MODEL

5.1 Local Geology

Published Geological Maps and historic reports as referenced above suggest the site is underlain by Rakaia, Torlesse composite terrane rocks, figures 1 and 2. The Rakaia formation is a brownish grey alternating sandstone and mudstone, poorly bedded sandstone with minor coloured mudstone, conglomerate, basalt and chert limestone. The formation is dated late Jurassic. Torlesse formation is often called the "basement rocks" or regionally Wellington greywacke.

Due to the nature of the faulting and emplacement within this area, the greywacke is often highly fractured, variably weathered and often form a melange of strata including mudstones sandstones and argilites.

Quaternary sediments overlie the greywacke and comprise colluvial and residual weathering profiles of greywacke origin generally of hard clays and silts. Due to the nature of these emplaced materials, slopes can often become unstable causing soil creep and shallow failures as observed within the site.

Figure 1 shows an excerpt of the Geological map of the site

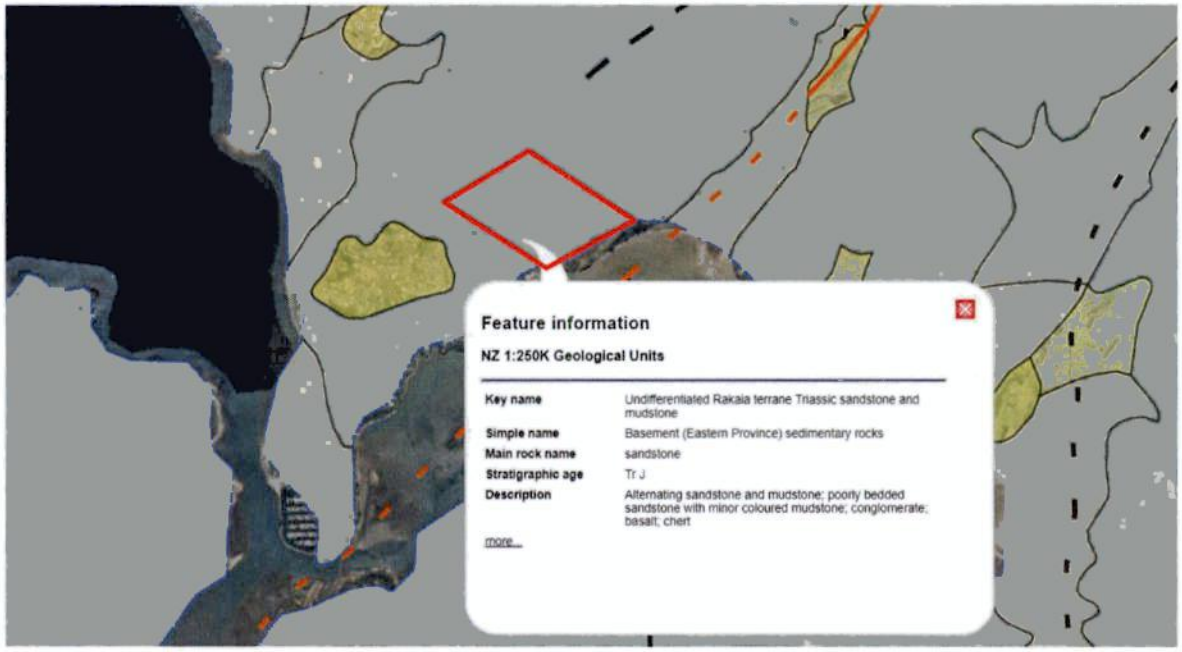


Figure 1 – Geological Map excerpt of GNS Geological Map 1:250,000

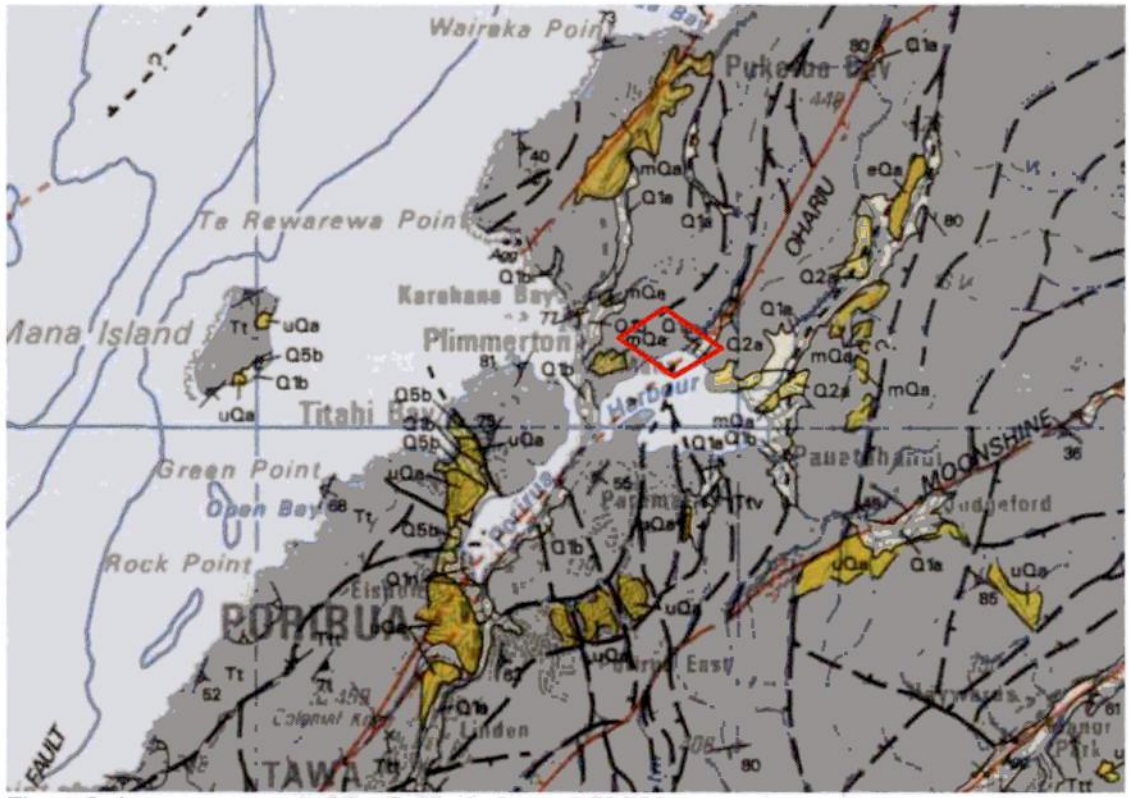


Figure 2 shows an excerpt of the Geological map 1:50,000

5.2 Geomorphology

The regional geology which constrains the site is dominated by one major north-south trending active fault and several fault splays trending in a similar direction, noted in red in the attached regional geology map (figure 3).

Locally, the geology is constrained by similar trending ridgelines with structural lineament that mimic the regional faulting. The landform across the site comprises major elevation changes between the ridge features and gully areas, however the gully areas are not typically heavily incised, rather broad and deep.

Shallow seated failures are observed across the paddocks throughout the site, but aerial photography at a local scale suggests possible deeper-seated head scarps of a rotational landsliding nature may be present in several areas across the site which have been mapped on the geomorphology plan attached. Generally, these features are observed at the arcuate head and steepened flanks of the gully areas.

From site observation; the residual soils may be 2-3m deep. If this is the case, the central southern cuts proposed will have significant areas of rock exposed with infiltration and blowouts being a risk.

The review of previous aerial images suggests that the gullies are wet year-round, with several drought-prone seasons still having lush green grass within the gully areas.

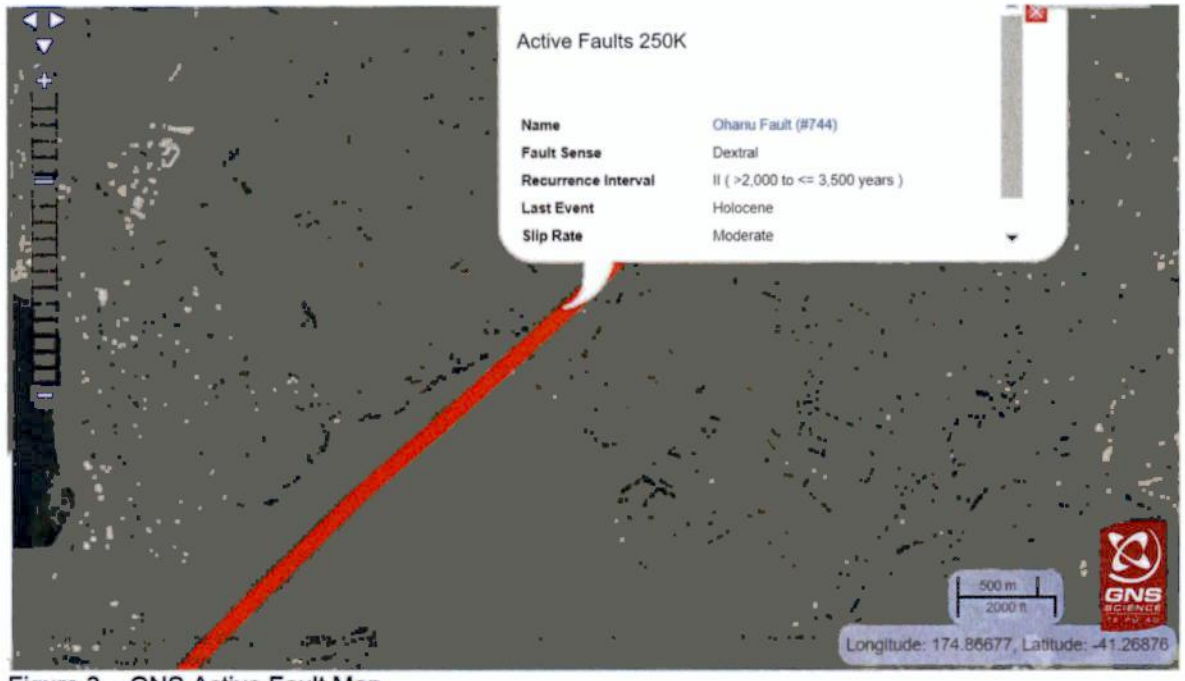


Figure 3 – GNS Active Fault Map

5.3 Local material properties

Based on experience of geotechnical projects in the vicinity, the following materials were observed at the site and typical geotechnical parameters are provided for these as follows:

- Colluvium 1m – 6m thickness, Unit Weight (kN/m^3): 18-20, Cohesion (kPa): 0-5, Friction angle (°): 26-30, Undrained Strength (kPa): 50-100, Young modulus (MPa): 30-80, CBR(%): 20-40, stable batter gradients: 1(v) in 5(h) to 1(v) in 2(h);
- Weathered Greywacke: SPT N>50, Uniaxial Compressive Strength UCS> 1MPa, Friction angle (°): 40-45, stable batter gradients: 1(v) in 1(h) to 3(v) in 1(h).

Further investigations and/or laboratory testing of the soils/rockmass will be required to confirm these parameters for future analysis and design.

6 DEVELOPMENT CONSIDERATIONS

6.1 GWRC Geohazards Summary

We referred to the Greater Wellington Regional Council (GWRC) website to assess the potential geotechnical development risks at the site as follows:

- The site is not on the GWRC Selected Land Use Register (SLUR) and therefore is allowable to district plan change;
- No flood risk, from adjacent coastlines or waterways dur to elevated setting;
- No potential of liquefaction;
- Distance to nearest active fault, Ohariu > 20m and therefore there is no restriction on building;
- Earthquake slope failure hazard (after GNS hazard mapping on GWRC website):
    - likeliness 3 to 5 on a scale of 5: moderate to high

  - severity 1 to 3 on a scale of 5: low to moderate, Please note that severity is associated with land use and the potential consequences of slope failure occurrence.
- Ground shaking amplification,1 on a scale of 5: low
- No risks related to coastal elevation as the project minimal RL is 5.0m at the access road and >30.0m elsewhere
- Earthquake combined hazard 3 on a scale of 5: moderate

Based on the information reviewed as part of this desktop study, the principal geotechnical risk on this site is slope instability.

6.2 Slope Instability Risk and Mitigation Recommendations

With respect to the NCL cut/fill plans provided to us, we consider the following risks in relation to slope instability, these are depicted on the Geotechnical Constraints Plan, Appendix C which has been annotated on the concept cut/fill plan;

- Several potential historical headscarps have been mapped as part of our geomorphological assessment of the site. Investigations are required to confirm these features, however, earthwork cuts below/downslope of these features may cause a destabilising effect. Remediation works in this instance would include (not limited to); shear key construction, earthwork rebalancing (load reduction), buttressing, drainage works, shear piles/palisade walls.
- Several external boundaries are proposing substantial fills ending at the boundary up to several metres high leading into gully areas beyond the boundary. These areas will need to be considered in more detail as the earthworks model is finalised, however it is likely the filling of these areas will require additional volume placed in the adjacent property. Remediation works to enable these fill areas include a combination of shear key, drainage works and undercuts and retaining construction where feasible to do so.
- Partially filled zones are proposed within areas of possible land slippages in two locations. In these areas the fills currently proposed will only partially buttress or buttress and cut at the toe leading to an imbalance of loads and the potential for instability. Again, these areas need careful consideration on earthworks levels to provide suitable buttressing where fills are required or levelling to remove the historic instability features as part of the works. Shear keys and fill rebalancing will be required. Specific investigations and modelling of the fill balancing in these areas will be required as part of detailed design.
- Several areas of the site are proposing to partially fill gully areas, typically the upper 1/3 of the gully. These areas will likely need construction of central subsoil drainage network, gully muckout work and shear keys to lock the fill into rock near the earthworks extents.

North and west portions of the site lend themselves more favourably to development from a slope stability perspective. Development extending into the eastern facing gully features will require more in-depth investigation and stability analyses to confirm suitable development levels and provide guidance on setbacks or building restriction zones from steep natural slopes which are not being remediated.

Shallow surface creep is likely to also be a geotechnical risk to the proposed development, particularly on steeper portions of the site. Soil creep may be mitigated by removal/rework of the soil at appropriate moisture contents, adopting appropriate foundation design or earthworks designs and retaining measures to limit slope gradients.

6.3 Earthworks Operations and Excavatability

Given the proposed cuts throughout the current earthworks design, it is likely that less weathered graywacke rockmass will be exposed at finished levels. Given the depositional environment these materials were formed in and the proximity to areas of active faulting, the rockmass is likely to be heavily jointed, moderately to highly weathered with high permeability characteristics.

An allowance should be made in costing and construction methodology to ensure that the less permeable residual soils are reused as a capping layer on the finished surface to mitigate infiltration and instability caused by pore pressure increases. Generally, capping layers will need to be of the order of 1 to 1.5m thick to mitigate infiltration, however lab testing of the soils can provide confirmation of hydraulic conductivity parameters of the spoil materials confirm layer thicknesses.

While we have not undertaken investigations at the site as part of this report, based on our knowledge of the greywacke within this area of Wellington rock ripping and excavatability is not expected to require specific ripping plan or blasting operations. We envisage earthworks operations using excavators and dump trucks for top-loading/bulk cut/fill operations and/or hydraulic lifting elevator motor-scrappers for wide-spread shallow cut/fill operations.

Ripping efficiency in terms of NZTA TNZ:F1 R1 and R2 rock can be confirmed during future investigations.

6.4 Erosion and Sediment Controls

Ground conditions at the site naturally lend themselves to soil erosion during periods of sustained rainfall and elevated groundwater conditions with evidence of surface rilling within the upper 1-2m of soil and saturated colluvial soils within the gully bases.

All proposed earthworks will require appropriate measures to control and divert overland flows and mitigate contamination of the gully areas. Local silt and erosion control design standards should be followed as part of the earthworks operations (Erosion and Sediment Control Guidelines for the Wellington Region – September 2002). The use of cut/off drains, decants, super silt fences and silt retention ponds should be included as part of the development.

6.5 Land Drainage

In order to control groundwater following the proposed earthworks, the existing low-lying areas including gully formations and tributaries which are being filled will need to be drained long term. Prior to fill placement these gully areas will require undercutting of all soft and/or organic soils (generally into soils with an undrained shear strength in excess of 70 kPa) and placement of permanent subsoil drainage. Outlets for subsurface drainage shall be provided at the termination of the drainage.

6.6 Site Seismicity

The design of cuts and fills batter gradients and retaining walls will largely depend the site seismicity. Given the site location in relation to the nearest active fault. Further work is required to confirm appropriate peak ground accelerations for the site using near fault factors and what effects the topology of the site has on amplification factors for design of structures. Investigations will be required to confirm whether the site spectral shape factor is based on Strong Rock (Class A subsoils), Rock (Class B subsoils) or Shallow Soil (Class C), however based on our knowledge of previous work in the area, Rock and Class B subsoils are likely here.

6.7 Settlement

It is expected that compressible materials beneath any proposed filling will be removed prior to filling being placed, and that the over consolidated nature of the engineered fill will limit settlement with the filling to below acceptable guidelines for residential building development.

6.8 Bearing Capacity

Subject to appropriate subsoil drainage in the gullies, earthworks cuts and fills being completed to appropriate standards and monitoring of fill settlements, appropriate bearing capacities will be available within the lots for construction of residential buildings in accordance with NZS 3604. Confirmation of bearing capacities and any restrictions to foundation design will be provided for each lot following post construction testing and completion reporting.

6.9 Further Geotechnical Investigations

To enable detailed geotechnical design of the subdivision development, investigations are likely to comprise machine boreholes, trial pit excavations and associated laboratory testing including particle size distribution tests, CBR tests, standard compactions, triaxial and UCS testings to aid in the development of suitable geotechnical models and support refining the earthworks models and land gradient stability.

7 LIMITATION

This report has been prepared for the use by our client, Neil Construction Ltd. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has not been prepared for the use of parties other than our client, their consultants and Porirua City Council and it may not contain sufficient information for the purposes of other parties or for other uses.

8 CLOSURE

We trust this report meets your current requirements.

Should you require any further information or clarification regarding our report, please do not hesitate to contact the undersigned.

For and on behalf of CMW Geosciences Limited

Gilles R Seve

Principal Geotechnical Engineer,

CMEngNZ (Geotechnical), CPEng

Greg Snook

Senior Engineering Geologist

Distribution: 1 copy to Neil Construction Limited (electronic)

Original held by CMW Geosciences

Appendix A – NCL Subdivision Concept Plans

Rev	Description	By	Date

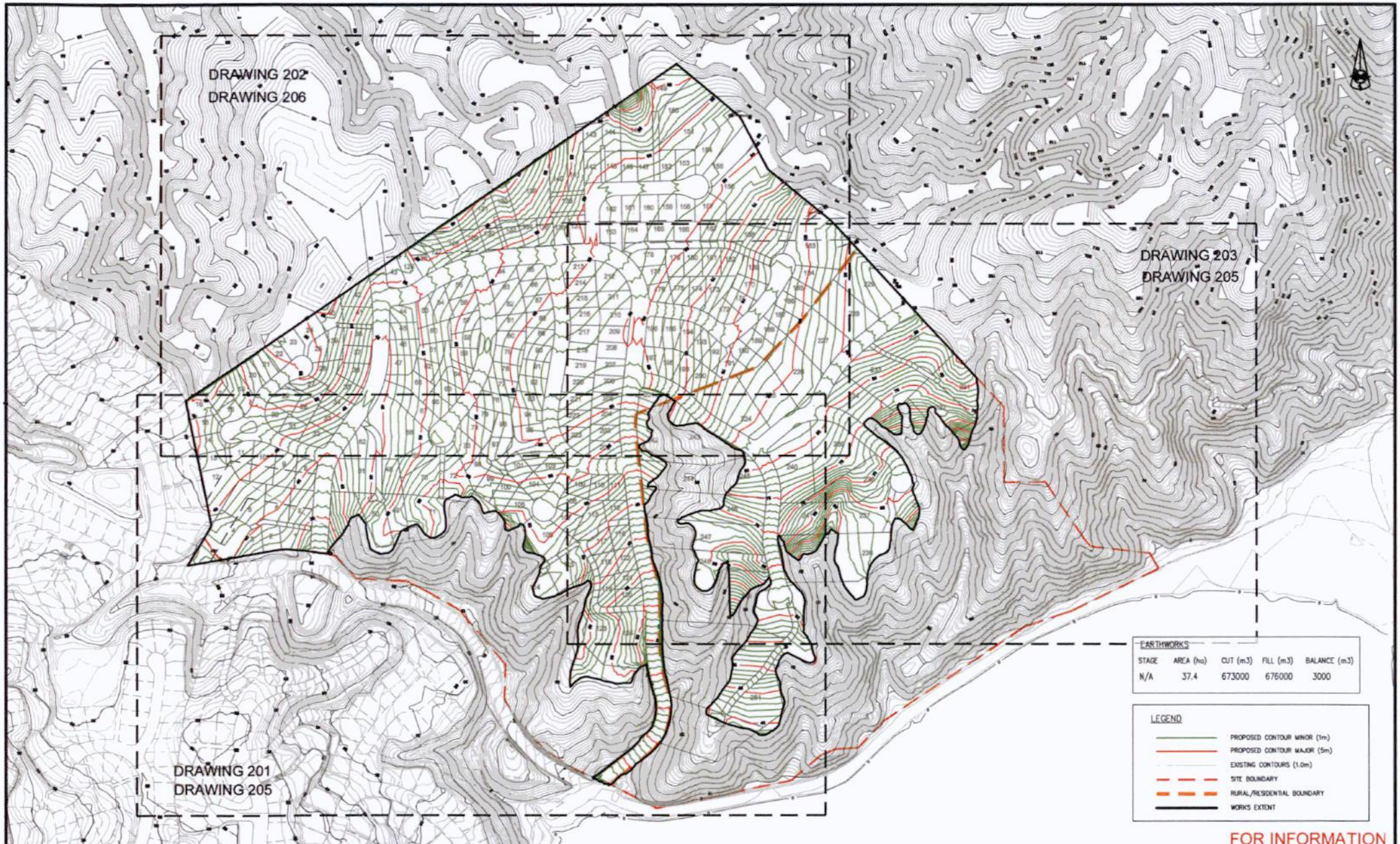
THE NEIL GROUP
NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

Job Title: KAKAHO PORIRUA 93 GRAYS RD, CAMBORNE

Drawing Title: CONCEPT PLAN

	By	Date	Scale	Job No.
Surveyed:			1:2000 @ A1	Drawing No. 443–01–CN–02 Rev
Designed:			1:4000 @ A3	
Drawn:				
Approved:				

CAD FILE: F:_PROJECTS\KAKAHO PORIRUA\DWG\443–01–CN–02.dwg



Rev	Description	By	Date
B	SCHEME PLAN REVISED	DP	07/18
A	FOR INFORMATION	DP	05/18

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
6 NUGENT STREET
GRAFTON

Job Title
KAKAHO
PORIRUA
93 GRAYS ROAD, CAMBORNE

Drawing Title
EARTHWORKS
PROPOSED CONTOURS

	By	Date	Scale	Job No.
Surveyed:			1:4000@A3	Drawing No. 443-01-GE-200 Rev B
Designed:	KLP			
Drawn:	KLP	05/18		
Approved:	DP			
CAD FILE	F:_PROJECTS\KAKAHO PORIRUA\DWG\ENG\443-01-GE-200.dwg			

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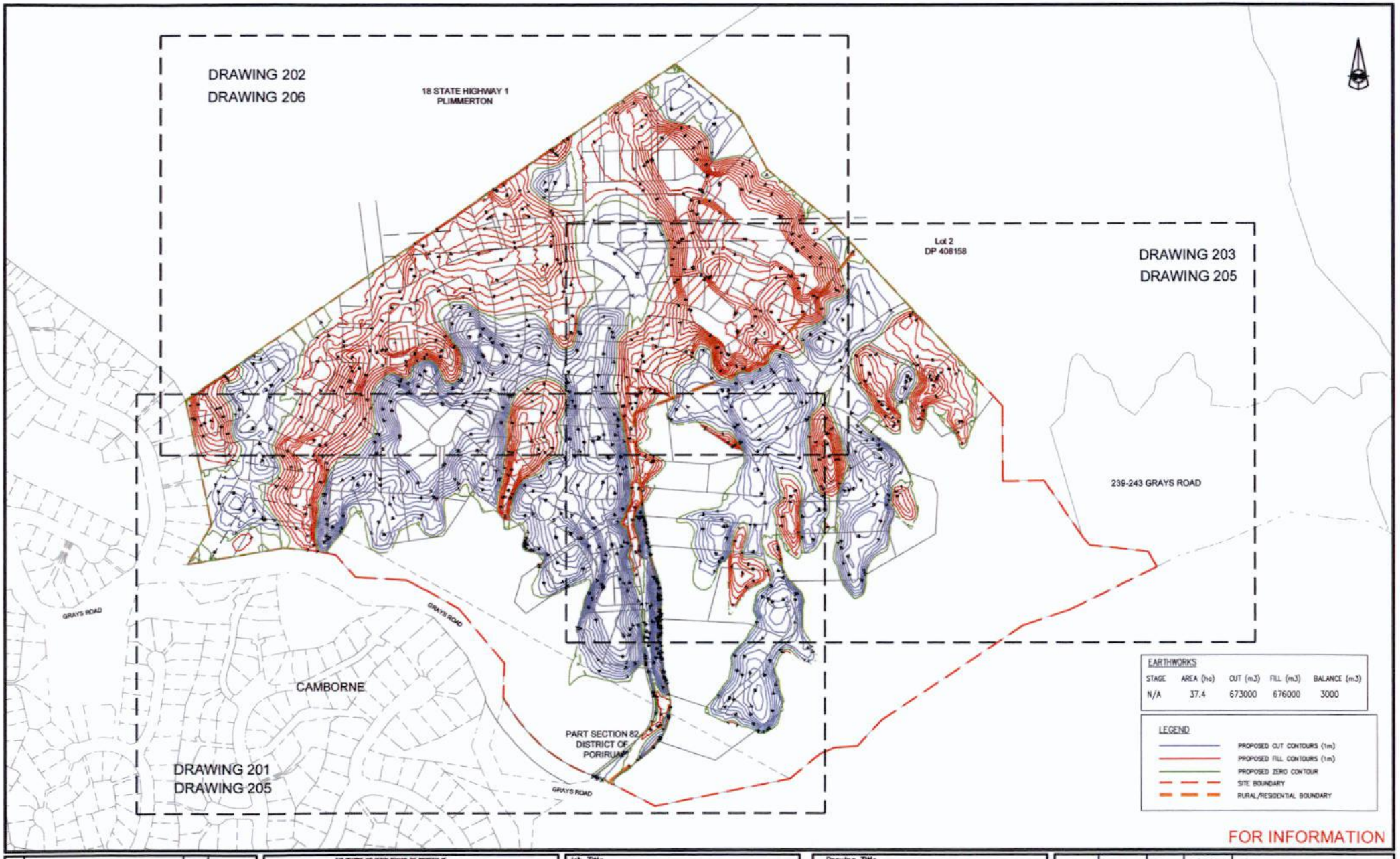

Rev	Description	By	Date
B	SCHEME PLAN REVISED	DP	07/18
A	FOR INFORMATION	DP	05/18

THE NEIL GROUP
NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

Job Title: KAKAHO PORIRUA 93 GRAYS ROAD, CAMBORNE

Drawing Title: EARTHWORKS CUT / FILL

	By	Date	Scale	Job No.	Rev
Surveyed:			1:4000@A3	Drawing No. 443-01-GE-204	B
Designed:	KLP				
Drawn:	KLP	05/18			
Approved:	DP				

CAD FILE: F:_PROJECTS\KAKAHO PORIRUA\DWG\ENG\443-01-GE-200.dwg

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Appendix B – Geomorphology Plan

TGA2018-0232 KAKANO DEVELOPMENT, POKIROA.

Geomorphology Plan

GWRC Web Map

November 20, 2018

- Placenames - Towns
- Placenames - Suburbs
- Placenames - Localities
- Placenames - Bays
- All Roads Labels
- Rail Stations
- Parcel Boundaries
- Region Boundary Line
- Local Government Boundary Lines

GEOMORPHOLOGY LEGEND

- Gully alignment (arrows - direction of flow)
- Ridgelines
- Potential Deep Seated Rotational Movement
- Soil Debris Idec (arrows - direction of movement).
- Soil creep / Tension Cracking
- Structural Lineament
- Potential Shallow Seated Rotational Movement

1:4,000

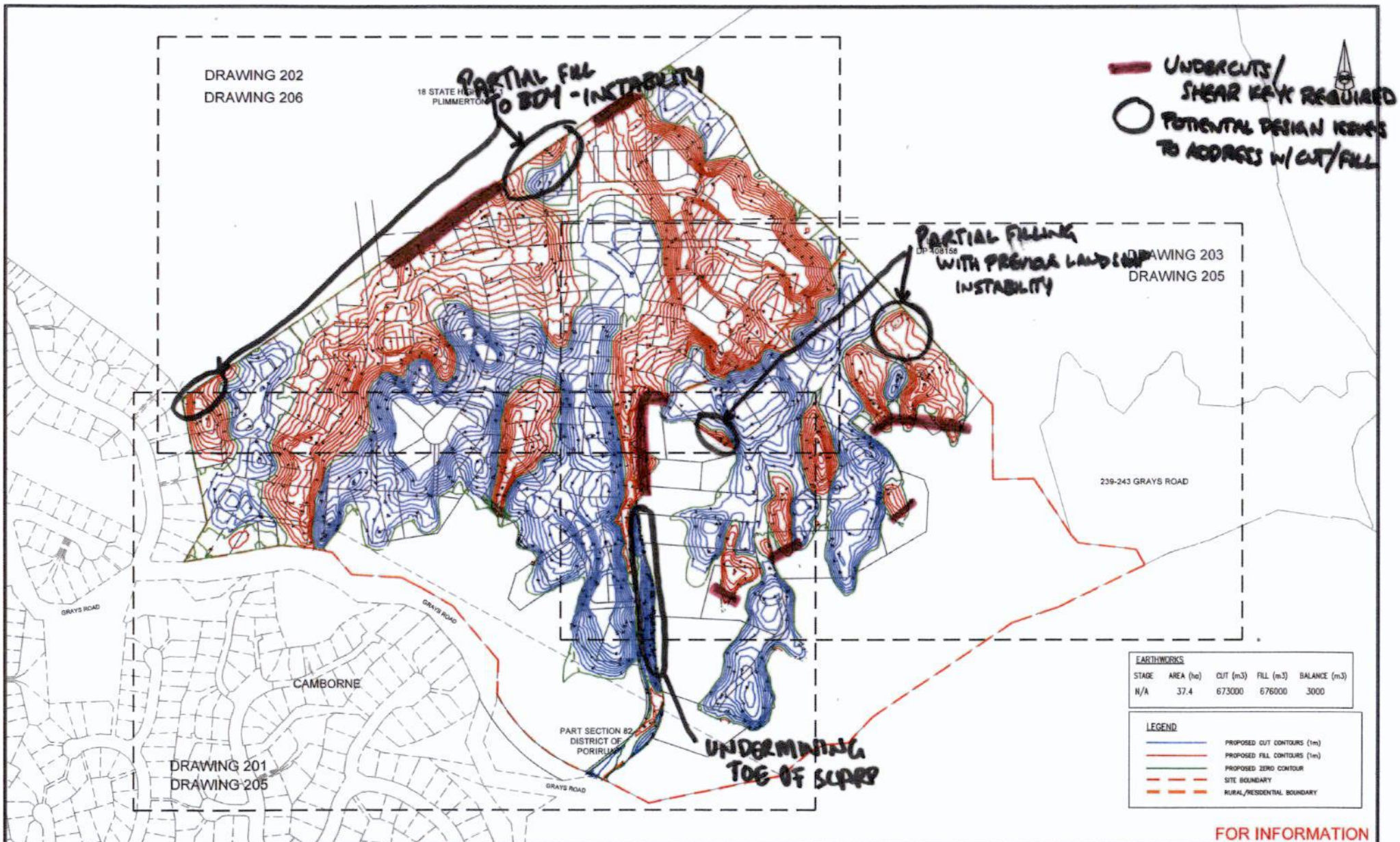
0 0.05 0.1 0.2 mi

0 0.075 0.15 0.3 km

GWRC/LINZ/Terralink International
GWRC, WAGGIS, LINZ, NZAM

GWRC Mapping Services
GWRC

Appendix C – Geotechnical Constraints Plan



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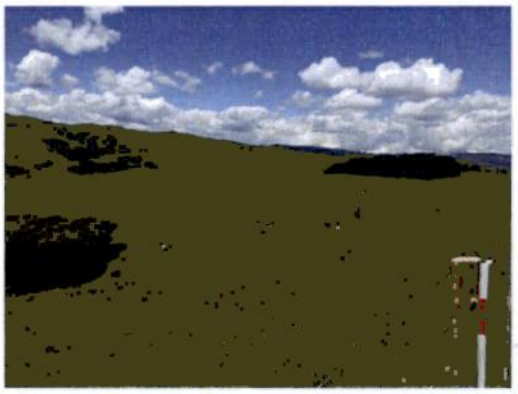
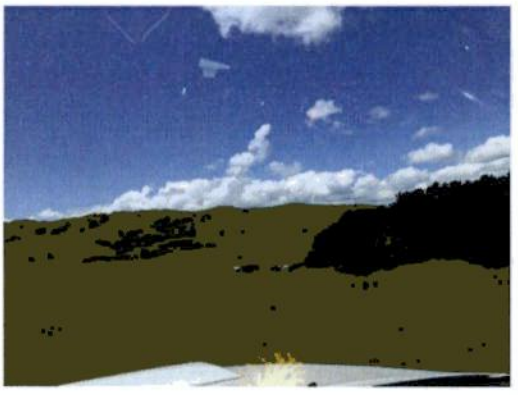
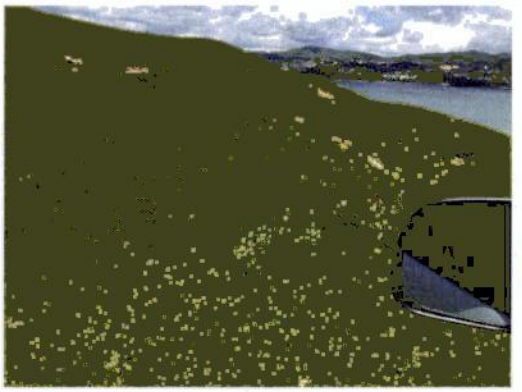
Appendix D – Walkover Photographs

	
View from the West of the site – West boundary is in the gully forefront	From the current access looking south east
	
Looking north. Western part	Slips north-western part
	
Close-up of a scarp approximately 2m	North boundary looking east

	
Looking south-west. Harbour in the background	Looking south. Main gully to be filled for access rd
	
Looking south from the very top (north)	North boundary, looking north-east
	
From north, upper part of the site, looking south-east	Gullies outlet from Grays Rd. Looking north

APPENDIX 3

Harriet Fraser Traffic Engineering & Transportation Planning

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E harriet@harrietfraser.co.nz

9 November 2020

Nick Taylor
Cuttriss Consultants

Via email: **nick@cuttriss.co.nz**

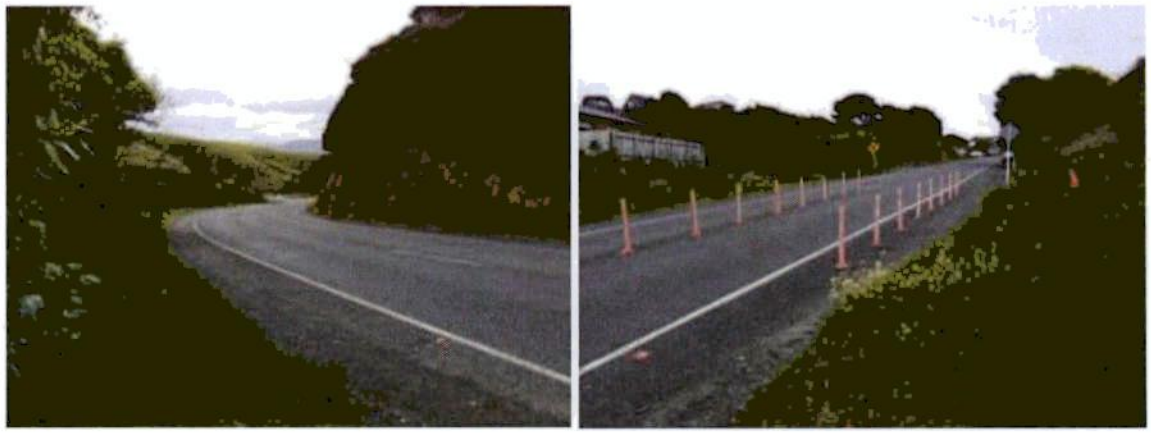
Dear Nick

93 Grays Road – Proposed Structure Plan & Precinct Framework
Transportation Review

Further to your request, I am pleased to provide a transportation review of a possible subdivision of a block of land to the north of Grays Road and to the east of Mo Street in Cambourne, Porirua. It is anticipated that the block might yield some 250 residential lots with a roading connection onto Grays Road to the east of the Mo Street intersection. This review is intended to help inform a submission on the Proposed Porirua District Plan.

1. Background

The location of the site and a concept site layout is shown in Figure 1. Views along Grays Road in the vicinity of a possible intersection are shown in Photos 1 and 2. The location in the photographs is a short distance to the east of the intersection location shown in Figure 1.



Photos 1 and 2: Views along Grays Road from the Site Frontage

Figure 1: Concept Site Plan

The recent application for the nearby Plimmerton Farm Proposed Plan Change included the following with regard to local traffic flows and the expected changes with the opening of the Transmission Gully Motorway:

> The scheduled opening of TG in 2020 will have a marked influence on the manner in which both local traffic and 'through-district' traffic will distribute across the Porirua road network. The forecast key changes in traffic volumes most relevant to the Plimmerton Farm site can be summarised as follows:
>
> - SH1 current alignment adjacent to the site (St Andrews Road) experiences a reduction in traffic flows[1] from 23,000 down to 6,000 vehicles per day ("vpd");
> - TG between MacKays Crossing and SH58 is forecast to carry around 22,000vpd (i.e. traffic diverting off the old SH1 alignment);
> - SH1 current alignment at Mana Esplanade sees a reduction from 26,000vpd down to 14,000vpd; and
> - flows on Grays Road reduce from 7,000vpd down to 3,000vpd.

As such it is anticipated that as a result of the Transmission Gully Motorway opening that traffic flows on Grays Road will reduce by around 4,000vpd from 7,000vpd to 3,000vpd.

If the Plimmerton Farm Zone is adopted and then the land developed accordingly it is forecast in the plan change application that there could be traffic flows of around 22,000vpd associated with the site. Some of these trips will be internal to the Plimmerton Farm Zone and will not appear on the external road network. The Plan Change application included an estimated 10% of trips would travel to and from the east, presumably via Grays Road. This might equate to around 2,000vpd with around 200vph during the peak hours travelling between the Plimmerton Farm Zone and Pauatahanui.

The site is around 1.4km from Plimmerton train station.

As part of this review a search has been made of the Waka Kotahi NZTA crash database for the most recent five years for the area shown in Figure 2.

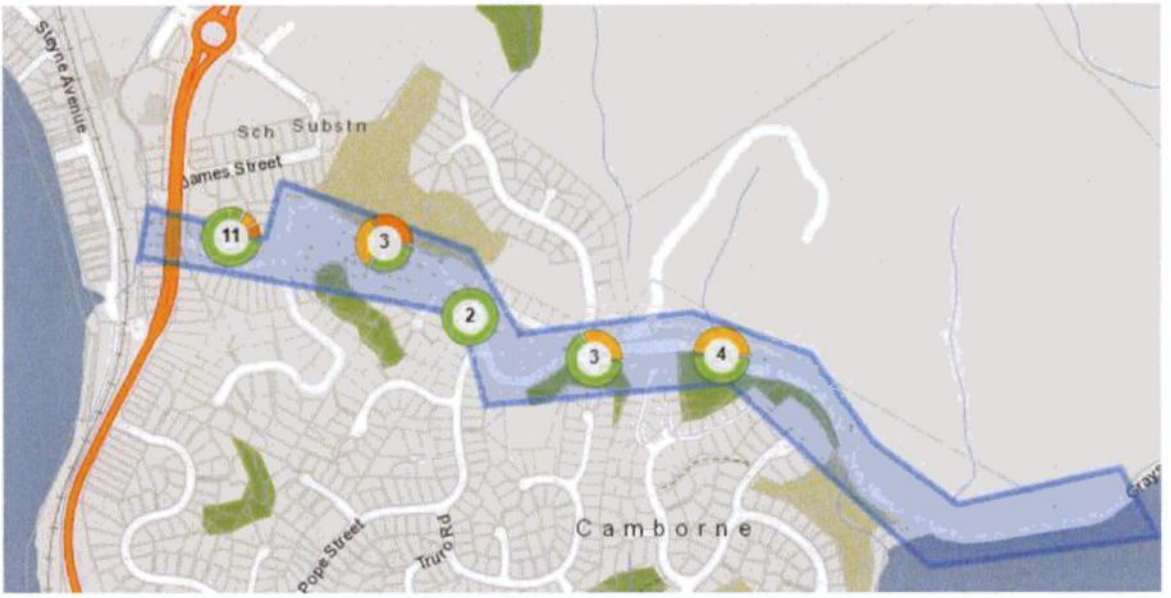


Figure 2: Reported Crashes (2015-2020 inclusive)

As shown there have been 23 reported crashes along this section of Grays Road. Of these two involved serious injury, five minor injury and sixteen were non-injury crashes. Figure 3 focuses in on the crashes closer to the site frontage at 93 Grays Road.

Figure 3: Reported Crashes (2015-2020 inclusive)

The crashes shown in Figure 3 can be summarised as follows, from west to east:

- a single vehicle non-injury crash involving a northbound vehicle losing control turning right. The crash factors include fatigue;
- a single vehicle non-injury crash involving a westbound vehicle losing control turning left;
- a minor injury crash involving an eastbound car losing control turning right;
- a minor injury crash involving an eastbound motorcycle losing control turning right;

- a non-injury crash involving an eastbound ute losing control turning right. The crash factors included 'road surface potholed';
- a non-injury crash involving an eastbound car losing control avoiding a wild animal; and
- a minor injury crash involving a westbound car losing control turning right. The crash factors include new driver/ under instruction and slippery road due to rain.

All seven crashes involved single vehicle loss of control incidents. The cluster of three crashes all occurred at night.

2. Proposal

The concept plan for the site includes around 250 residential lots, a single intersection connection to Grays Road along with possible future roading connections to land to the north and also to the Plimmerton Farm Zone.

At this stage the main transport consideration is the connection with the external road network including access to public transport and for pedestrians and cyclists.

The key design parameter with regard to the design of a safe intersection is the available sight lines. The Austroads Guides to Road Design are generally considered to provide best practice guidance in this regard. The existing speed limit is 60km/h but it could reasonably be expected to be reduced to 50km/h to the east of any new intersection. With a speed limit of 50km/h, a design speed of 60km/h should be adopted.

Sight Line	**Austroads Guidance with 2s Reaction Time**		
	50km/h Design Speed	**60km/h Design Speed**	**70km/h Design Speed**
Stopping Sight Distance(SSD) (must be provided for all approaches and turns)	55m	73m	92m
Approach Sight Distance(ASD) (to be provided on the new road approach to the intersection)	55m	73m	92m
Safe Intersection Sight Distance (SISD) (to be provided in each direction from side road and for right turn in from main road)	97m	123m	151m
Minimum Gap Sight Distance (MGSD)	Left out, 5s gap= 69m Right out, 5s gap= 69m Right in, 4s gap= 55m	Left out, 5s gap= 83m Right out, 5s gap= 83m Right in, 4s gap= 67m	Left out, 5s gap= 97m Right out, 5s gap= 97m Right in, 4s gap= 78m

Table 1: Sight Distance Requirements for New Intersection

For these sight lines to be achieved the intersection would need to be located further to the east than is currently indicated in Figure 1. Some minor widening and realignment of Grays Road will be needed to accommodate a right turn bay.

It is recommended that a footpath is included along the northern side of Grays Road from the intersection through to the intersection with Mo Street. There is a gap in the footpath provision further to the west along Grays Road which should usefully be addressed by Council. Pedestrian connection to the recreational opportunities at the inlet should also be provided. This could be provided in a number of ways including a footpath along Grays Road, protected shoulder provision on Grays Road or an internal connection through the site. Care will need to be taken with regard to achieving a safe pedestrian crossing point across Grays Road to the inlet edge.

There may need to be speed control measures to ensure that vehicle speeds are appropriately matched to available sight lines.

Based on the traffic generation rates used for the Plimmerton Farm Zone, 250 residential lots could be expected to result in 2,250vpd with 215vph during the busiest periods of traffic activity. Again based on the assumed trip distribution for the Plimmerton Farm Zone, 180vpd (8%) can be expected to travel to/from the north (existing SH1), 225vpd (10%) to/from the east with the balance 1,845vpd (82%) heading south (existing SH1).

As such, with the development of the Plimmerton Farm Zone and the site at 93 Grays Road, traffic flows on Grays Road to the west of a new intersection would remain similar to existing levels. That is the traffic activity associated with the Plimmerton Farm Zone and the site at 93 Grays Road would balance the reduction in flows along this section that are anticipated as a result of the opening of the Transmission Gully Motorway. Flows on Grays Road to the east of the site would remain below existing levels.

3. Proposed District Plan Transport Provisions

The transport objectives and policies included in the Proposed District Plan are set out in Table 2 along with comments regarding the potential residential development of the site at 93 Grays Road.

Proposed District Plan TR-Transport	Comment
Objective TR-01 High trip generating use and development Use and development that generates high numbers of vehicle trips: 1. Do not compromise the safety and efficiency of the transport network; and 2. Is located where it is accessible by a range of transport modes.	With more than 60 lots the development would be considered a high trip generator. With considered positioning of the new intersection on Grays Road and some local road widening a safe intersection can be formed. This section of Grays Road would likely benefit to an extension of the 50km/h speed limit towards the east and the lighting of the new intersection which will help with delineating this section of the road for all road users at night. The site is 1.4km from Plimmerton train station. A continuous pedestrian connection on at least one side of Grays Road with safe road crossing pints should be provided from the site towards the west. There is an opportunity to provide connections through the site to the recreational opportunities at the inlet.
Objective TR-02 On-site transport facilities and access Use and development has safe and effective on-site transport facilities and site access which do not compromise the safety and efficiency of the transport network.	The intersection with Grays Road is commented on above. No other direct vehicle connections to Grays Road are included. The internal roading and access details within the site would be fully developed at the resource consent stage.
Policy TR-P1 High trip generating use and development Provide for high vehicle trip generating activities where it can be demonstrated that any adverse effects on the transport network will be minimised, having regard to: 1. The extent to which it integrates and co-ordinates with the transport network, including proposed or planned network upgrades and	The development will benefit from reduced traffic flows on Grays Road as a result of the opening of the Transmission Gully Motorway.

Proposed District Plan TR-Transport	Comment
service improvements; 2. The location of the proposed activity and the purpose of the zone it is located in; 3. The transport network's capacity, level of service, form and function; 4. The effect of the proposed activity on the transport network and its users; 5. The effect of the proposed activity on the character and amenity of the surrounding area; 6. The provision for pedestrians, cyclists, public transport users, freight and motorists, as appropriate; 7. Any alternative site access and/or routes available; 8. Any traffic management and travel planning mechanisms; 9. The staging of the activity; 10. Any improvements to the transport network proposed as part of a high trip generating activity development; 11. Any cumulative adverse effects; and 12. Any positive effects.	The site would be developed for residential purposes and is on the edge of the existing suburban development. Even with the full development of the Plimmerton Farm Zone, traffic flows on Grays Road are forecast to be at similar or lower levels than at present. The main traffic effect will be as a result of introducing a new intersection onto Grays Road. Beyond the site the traffic effects are expected to be similar to at present. In traffic terms, the main change will be the new intersection on Grays Road and an associated extension of the suburb towards the east. Residents can access the rail services to and from Wellington at Plimmerton Station. There are opportunities to provide for pedestrian connections along Grays Road towards the west and also within the site down towards the inlet. The site only has frontage to Grays Road. The intersection location depends on maximising sight lines while avoiding works within or close to any water bodies. These can be developed as needed. In particular there may be a need to ensure slow vehicle speeds in the vicinity of any pedestrian crossing across Grays Road in the vicinity of the inlet. Staging is considered likely. A safe intersection connection with Grays Road will need to be formed at the earliest opportunity. Improved lighting along Grays Road from the site towards the west along with an extension to the 50km/h speed limit and improved pedestrian provision. Consideration needs to be given to changes in traffic flows associated with the opening of the Transmission Gully Motorway and also the possible adoption of the Plimmerton Farm Zone. Potential for improved pedestrian access to the inlet for the wider public and also improved pedestrian links along Grays Road towards the west. Improved lighting of this section of Grays Road.
Policy TR-P2 Appropriate on-site transport facilities and site access Enable on-site transport facilities and site access that: 1. Provide for the safe and efficient use of the site and functioning of the transport network; 2. Meet the reasonable demands of site users; and 3. Promote the uptake and use of public and active transport modes.	Maximising available sight lines at the new intersection with Grays Road is of key importance. Traffic flows associated with the site can be safely and efficiently accommodated via a single intersection with Grays Road. The site is well positioned for commuter rail access to Wellington. The proximity to the inlet facilitates access to active transport modes for recreational purposes.
Policy TR-P3 Potentially appropriate on-site transport facilities and site access Provide for on-site transport facilities and site access that do not meet standards where it can be demonstrated that the safety and efficiency of the transport network and the health and wellbeing of	These are matters which would be addressed as needed through the detailed design and resource consent process.

Proposed District Plan TR-Transport	Comment
people is not compromised, having regard to: 1. Whether the projected demand for loading spaces or cycle spaces will be lower than that required in the standards or can be accommodated by shared or reciprocal arrangements; 2. Whether the site is adequately serviced by public and active transport networks; 3. Whether the proposed activities are conducive with, and the facilities support and promote the uptake and use of, public and active transport modes; 4. Whether the facilities are effective in meeting the operational needs and functional needs of the activity on the site; 5. Whether activities have safe and effective access for firefighting purposes; 6. Whether there are site and topographical constraints that make compliance unreasonable; and 7. The extent to which public health and safety, including the safety of pedestrians walking through any parking areas, will not be compromised.	

Table 2: Proposed District Plan Transport Objectives and Policies

Table 3 considers the alignment of the possible subdivision with the transport provisions for the Future Urban Zone in the Proposed District Plan.

Proposed District Plan FUZ – Future Urban Zone	Comment
Objective FUZ-03 Maintaining the development potential of the Future Urban Zone Use and development in the Future Urban Zone does not result in any of the following: 2. The efficient and effective operation of the local and wider transport network being compromised; 3. The need for significant upgrades, provisions or extensions to the wastewater, water supply or stormwater networks, or any other infrastructure in advance of future urban development; 4. The efficient provision of infrastructure being compromised;	The local and wider transport network is expected to continue to operate in a similar way to at present. The only transport infrastructure that will be formed outside the site will be the new intersection with Grays Road and sections of footpath along Grays Road. The subdivision of the site does not preclude the future provision of transport infrastructure.
Policy FUZ-P1 Identifying future urban areas 2. Are of a size, scale and location which could accommodate comprehensive and integrated future development that: 1. Is serviced by infrastructure or planned to be serviced by infrastructure in the Council's Long Term Plan; 2. Is connected to or planned to be connected to the transport network;	No new transport infrastructure beyond the new intersection with Grays Road and some sections of footpath along Grays Road are needed. The site has direct frontage to Grays Road.

Proposed District Plan FUZ – Future Urban Zone	Comment
APP11 – Future Urban Zone Structure Plan Guidance A structure plan is to identify, investigate and address the matters set out below: Transport networks 1. Integration of land use and development with the local and strategic transport networks. 2. Layout of the transport network and facilities in a manner that is safe, attractive, efficient, and resilient to hazards, well connected to local facilities and integrated with land uses, the surrounding area and the wider transport network. 3. Support for transport and accessibility that is multi-modal and interconnected with an appropriate number and location of access points. 4. Provision of public and active transport linkages. 5. Transport effects on land uses and the management of these effects.	The site is well positioned for access to the north (SH1 existing), south (SH1 existing) and east (Grays Road). Provided safe sight lines are achieved at the new intersection a safe connection can be provided with the road network. The transport details within the site would be developed as the design progresses. The site is 1.4km from Plimmerton train station which for some would be walkable. The intention is to provide for pedestrian connection to the footpath network to the west and also to the inlet. The internal roading layout can be designed to accommodate a future bus service. Active transport linkages will be available towards the east and west on Grays Road. The local and wider transport network is expected to continue to operate in a similar way to at present.

Table 3: Proposed District Plan Future Urban Zone Objectives, Policies and Structure Plan Guidance

4. Summary and Conclusion

The potential development of the site for residential purposes can be achieved with a good level of alignment with the transport objectives and policies in the Proposed District Plan. Key matters moving forward include:

- the provision of a safe intersection with Grays Road which ideally will deliver safety benefits for both existing and future road users. The intersection needs to be located to maximise available sight lines and will need to include a right turning bay. It is likely that the 50km/h speed limit should be shifted towards the east to include the approaches to the new intersection;
- inclusion of a footpath along the northern side of Grays Road towards the west;
- provision of a pedestrian link to the inlet through the site and/or along Grays Road; and
- provision of a safe crossing point across Grays Road connecting with the paths around the inlet. This may involve speed management measures.

Please do not hesitate to be in touch should you require clarification of any of the above.

Yours faithfully

Harriet Fraser

Harriet Fraser

APPENDIX 4

INFRASTRUCTURE REPORT

Ref: 22153

11 November 2020

Prepared for:

The Neil Group

Cuttriss

Surveyors. Engineers. Planners.

Cuttriss
Surveyors. Engineers. Planners.

Ref: Taylor/22153

17 November 2020

PROPOSED DEVELOPMENT – 93 GRAYS ROAD, CAMBORNE – LOT 1 DP 408158 & PART SETION 82 PORIRUA DISTRICT

Cuttriss Consultants Ltd. (Cuttriss) have been engaged to investigate and report on the existing and proposed infrastructure required as part of the proposed development of the above site. We detail our findings and report below.

1. PREAMBLE

This report has been prepared to accompany a submission on the Porirua District Council's Draft District Plan, specifically in relation to the future zoning of the above site, which has been identified within Porirua City's Northern Growth Area. This report provides a summary of the infrastructure capacity constraints and identifies possible solutions for the future development of the site.

2. LOCATION AND SITE DESCRIPTION

The Kakaho development site is legally described as Lot 1 DP 408158 and Part Section 82 Porirua District and lies adjacent to the suburbs of Camborne and Plimmerton, to the north of Porirua. The site comprises approximately 52 hectares of undulating pasture land. It is bound by rural sections to the north and west and Grays Road to the south and east.

The site adjoining the western boundary is known as Plimmerton Farm. At the time of writing this report this land is currently farmland, however, the potential future development of the Plimmerton Farm site is progressing through a plan change under the streamlined planning process.

The site topography is variable, with flat spurs bound by steep gullies, falling from RL 92 down to RL 2. While most of the site is pastural, the eastern faces of the site contain areas of regenerating native scrub. Several streams and induced wetlands have been identified within the site.

Access to the site is via Grays Road, with one existing dwelling gaining access via a gravel driveway at the western corner of the site.

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3. WASTEWATER

3.1 Existing Network

While several manholes have been identified within Grays Road, there are currently no records available showing existing public wastewater network servicing the site.

Discussions with Wellington Water have identified capacity issues with the existing network between Pump Station 13 and the treatment plant. It is understood these capacity issues are caused by significant stormwater infiltration into the wastewater network and undersized pipes. Wellington Water have commissioned an extensive study of their network and are investigating upgrades to the network from the Porirua City centre and the Northern Growth Area. A holding tank in the Porirua City centre is also under construction which will provide storage in the network. It is our understanding that this tank and others being installed in the city have been sized with consideration of the known future growth areas.

While upgrades to the existing infrastructure have been anticipated in Council's long-term planning, the timing of this work will not meet the project timelines for the Kakaho development.

An existing public main to the west of the site connects Mo Street to Pump Station 13, which is located at the intersection of the current State Highway 1 and James Street. This main has been confirmed by Wellington Water to have sufficient capacity to accommodate the Kakaho development. The network to the south may also have capacity, although further modelling would be required to confirm the load on the network.

3.2 Proposed Wastewater

Several solutions have been considered for the servicing of the Kakaho site. Due to downstream capacity issues, the management of peak flows into the network is required. It should be noted that the capacity issues are not unique to this development, and sewage attenuation is a common requirement for developments within the Porirua catchment. Due to ground conditions, and the sensitivity of the receiving environment, on site wastewater disposal is not considered appropriate.

We consider the preferred solution to be a centralised publicly owned pump station with dry weather storage, with residential lots serviced via gravity connections. The final development layout and building platform levels will determine the location and number of pump stations required.

Individual pumps and storage within the private lots connecting to low pressure rising mains is also an option. Wellington Water have confirmed the individual pumps can be fitted with a telemetry system to remotely control discharges to the main network during storm events, which is when the downstream network has limited capacity. A combination of the above solutions may also be considered.

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A detailed assessment of the flow controls and system sizes will be completed once the final layout has been confirmed, however an indicative centralised solution is shown on the overview plan attached at Appendix A.

4. WATER SUPPLY

4.1 Existing Water Network

The site is currently services via a single 25mm service connection for the existing house. The public main does not extend beyond Mo Street, to the east of the site. The existing network in the vicinity of the site is fed by the Camborne reservoir, which sits at an approximate RL of 90m AMSL. This is fed via a Greater Wellington Regional Council bulk main with a connection to the south-west onto the bulk supply main within State Highway 1.

Wellington Water have confirmed there is sufficient supply in the bulk supply main on State Highway 1 to serve the northern growth area, including the Kakaho development.

Adjacent to the Kakaho development is the Plimmerton Heights development. This development reaches an approximate RL of 65m AMSL. Wellington Water have advised that there are supply pressure issues for some of the higher properties in the Plimmerton Heights development.

4.2 Proposed Water Supply

Network modelling has been completed by Stantec and their preliminary report is attached at Appendix B. It should be noted that subsequent discussion has been had with Wellington Water to confirm which of the options is preferred and viable, and to clarify some of the assumptions made in the initial report. Further option evaluation was completed by Stantec which is attached at Appendix C. Subsequent correspondence with Wellington Water is attached at Appendix D confirming several supply and storage options are viable.

Stantec's report assesses the average demand created by the development as 554m³ per day. An indicative pipe network has been proposed and is seen in Figure 6-2 of the this report.

The highest point within the Kakaho site is approximately RL 92m. Wellington Water have indicated that a reduced pressure requirement for the Kakaho site could be considered and would only require 20m of head at the point of supply.

While the network approach connecting through to Plimmerton Farm is desirable, the secondary option has been considered to build resilience into the development planning. Supply detail will be confirmed in conjunction with Wellington Water and Porirua City Council to ensure the network design is optimised for the development of the Northern Growth Area.

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5. STORMWATER DISPOSAL

5.1 Existing Stormwater Network

There is no public stormwater network providing connections to the site. The existing gullies within the site feed into either the Taupo Swamp catchment to the north, or to the Pauatahanui inlet to the south. The flow towards the Pauatahanui inlet is directed to several culverts which cross Grays Road, and discharge directly to the inlet.

Existing springs within the site generate low volumes of water which have formed a number of induced wetlands with low biodiversity values.

5.2 Proposed Stormwater Management

Prior discussions with Wellington Water and Greater Wellington Regional Council have identified a number of critical aspects to be considered in the stormwater network design.

The Taupo Swamp catchment is subject to inundation and as such the area of the development contributing to this catchment will need to be hydraulically neutral. Also critical to the design is the need to remove sediment and other contaminants from the stormwater before discharging to the downstream network. One possible solution is modifying the landform to redirect the stormwater away from the Taupo Swamp catchment, providing the base flows are maintained. Retention systems could also be installed to reduce peak flows.

Unlike the Taupo Swamp catchment, except for the existing culverts under Grays Road, the Pauatahanui inlet catchment is not constrained by the downstream network. As such, while stormwater discharges to the inlet will need to be carefully managed for quality, the quantity of the water entering the downstream catchment is not considered as a significant constraint. Of particular concern is the management of sediment, which has had a significant impact on the ecology of the inlet. Given the steepness of the site and the current land use, residential development of the site and planting of the steep faces will likely reduce sediment runoff into the inlet. It is noted that tight sediment control measures will be put in place during construction to ensure to protect the downstream environments.

The quality of the stormwater being discharged within either catchment will need to be managed to help improve the health of downstream ecosystems and waterbodies, and to align with the National Policy Statement for Freshwater Management and the Resource Management (National Environmental Standards for Freshwater) Regulations 2020.

While the soil conditions prevent the use of infiltration devices, it is envisaged that a treatment train approach will be implemented, with treatment as close to the source as possible prioritised. A range of treatment devices will be considered when preparing the detailed development plans. These include but are not limited to:

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- Private or public rainwater storage/retention tanks to detain runoff
- Swales (for flat areas within the site)
- Private or public bioretention devices
- Macropollutant traps
- Proprietary filters
- Constructed wetlands

In addition to the above, it is recommended that building materials are limited to those that do not contribute to an increase of heavy metals, such as zinc and copper.

6. ACCESS

Discussions with PCC's transport team have confirmed the proposed roading connections through the development are desirable. A possible roading link through to the Plimmerton Farm site has been discussed and an indicative connection point is identified as shown on the overview plan attached at Appendix A.

PCC's assessment of the network for their Northern Growth Area Structure Plan has confirmed there is capacity within the existing roading network for development of the Kakaho site, which is situated within the Camborne North Development Area.

A detailed Transportation Assessment has been completed by Harriet Fraser. This assessment will be included with the submission document.

7. TELECOMMUNICATIONS AND POWER SUPPLY

Discussions with both Chorus and Wellington Electricity have confirmed that while upgrades to the existing networks will be required, the Kakaho site can be adequately serviced.

8. CONCLUSION

This report has been prepared to provide a summary of the infrastructure capacity constraints and identify possible solutions for the future development of the Kakaho site.

Confirmation of the final layout, finished roading and platform levels within the development will determine the required grades and pipe sizing of the necessary wastewater and stormwater infrastructure.

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Consideration will need to be given during the detailed design process to 'safety in design' in relation to the confined space entry to existing sewer infrastructure.

Based on our assessment of the existing infrastructure and discussions with Wellington Water, Porirua City Council, service providers and other stakeholders, we are satisfied that the Kakaho site can be adequately serviced.

Prepared by:

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Reviewed by:

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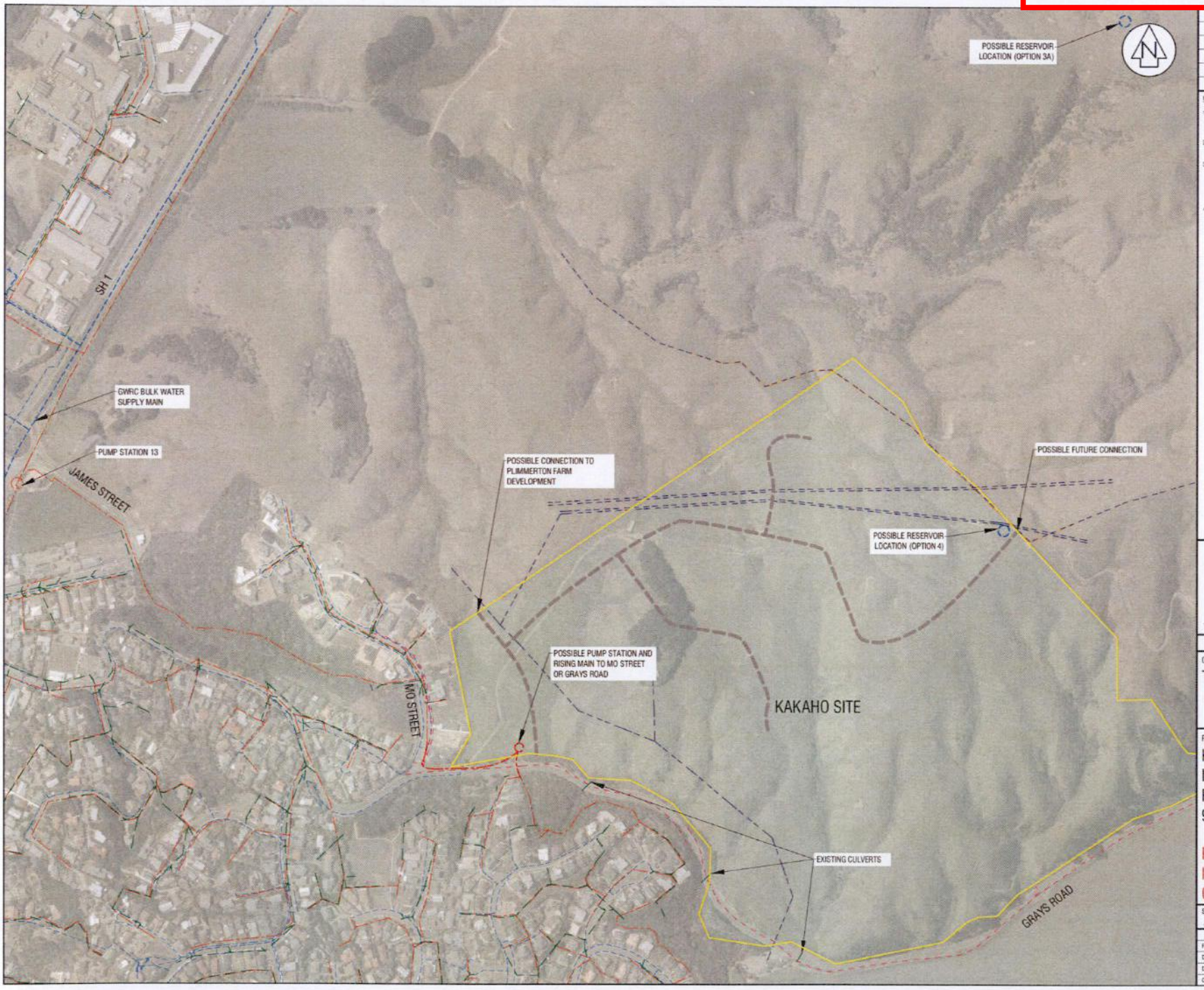
APPENDIX A

PRELIMINARY INFRASTRUCTURE OVERVIEW PLAN



AMENDMENT		NAME	DATE
A	AMENDMENT FOLLOWING STANTEC REPORT	NHT	11/20

NOTES:

1. THIS PLAN IS TO BE USED FOR PRELIMINARY PLANNING PURPOSES ONLY AND NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
2. COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 2000, WELLINGTON CIRCUIT.
3. SERVICES HAVE BEEN LOCATED ON SITE WHERE POSSIBLE. OTHERWISE SHOWN FROM WELLINGTON WATER RECORDS, AND SHOULD BE VERIFIED ON SITE THE CONTRACTOR IS TO CONFIRM LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORKS.
4. ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES

LEGEND:

- BOUNDARY
- SEWER LINE (GIS)
- SEWER LINE (PROPOSED)
- STORMWATER LINE (GIS)
- WATER LINE (GIS)
- BULK WATER SUPPLY MAIN (GIS)
- ELECTRICITY SERVICES (FROM RECORDS & MEASURED)
- GAS SERVICES (FROM RECORDS)
- TELECOMMUNICATIONS SERVICES (FROM RECORDS)
- INDICATIVE ROADING NETWORK (NOT ALL ROADS SHOWN)

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CLIENT
THE NEIL GROUP

PROJECT
KAKAHO
LOT 1 DP 418158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE

PRELIMINARY
INFRASTRUCTURE
OVERVIEW

SCALE	REDUCED SCALE
A1 1:2500	A3 1:5000

	NAME	DATE
FIELDWORK	-	-
DESIGNED	NHT	09-19
DRAWN	NHT	09-19
CHECKED	RH	09/19

DRAWING NUMBER 22153 P2
SHEET 1 OF 1 SHEETS
REVISION A

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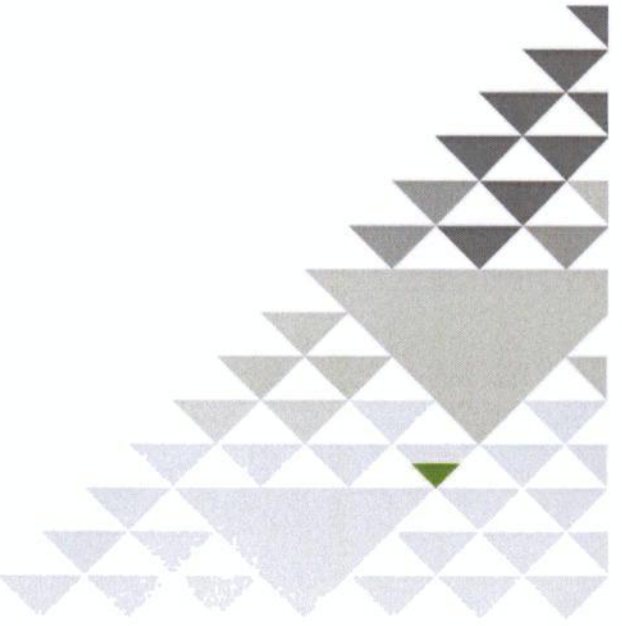
APPENDIX B

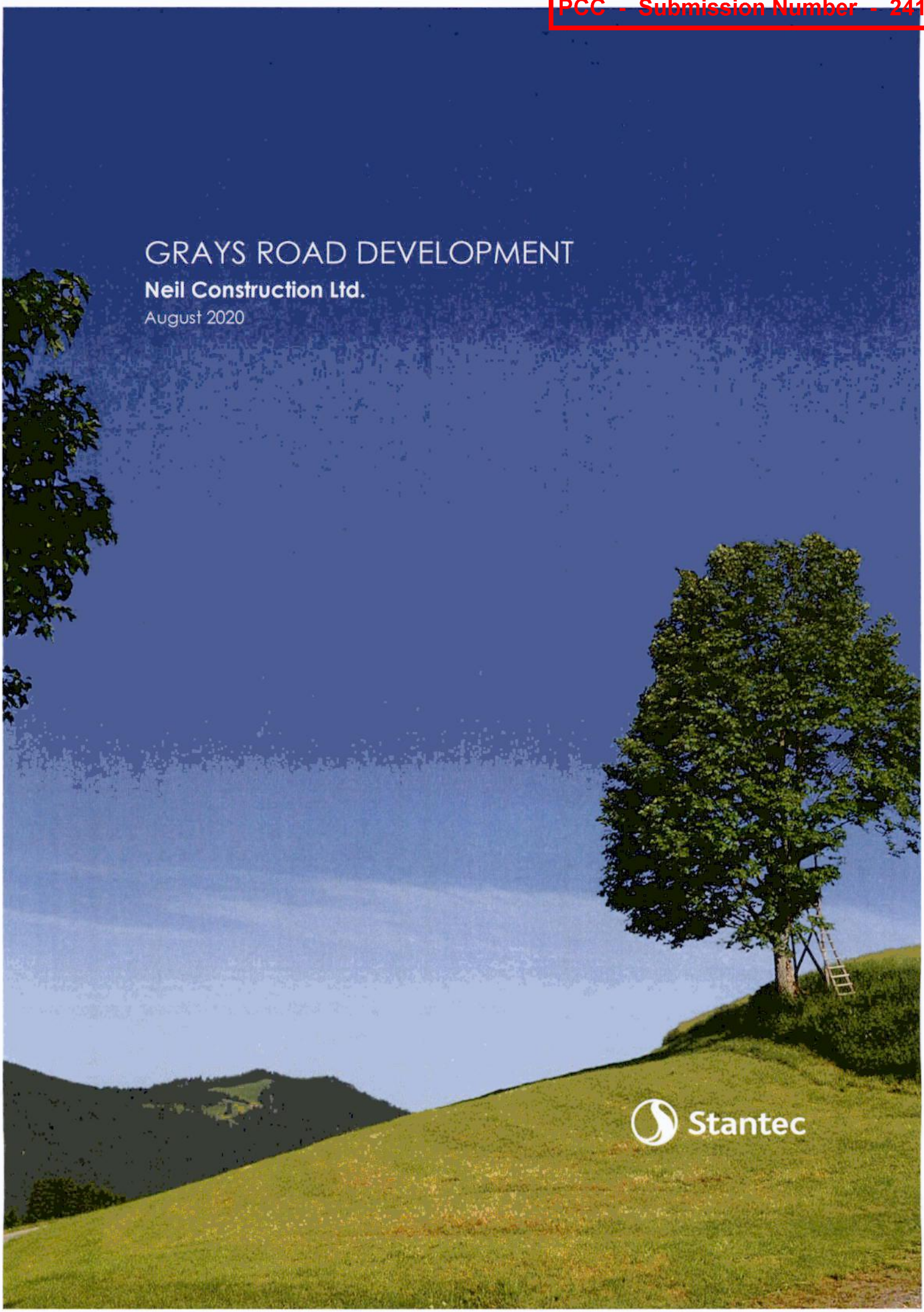
STANTEC PRELIMINARY REPORT



GRAYS ROAD DEVELOPMENT

Neil Construction Ltd.

August 2020



REVISION SCHEDULE

Rev. no	Date	Description	Prepared by	Checked by	Reviewed by	Approved by
0	24/07/20	Draft	AB	CP	CP	BD

1 Introduction

The Grays Road development consists of 257 proposed residential properties on a site to the North of Camborne in Porirua. The terrain is hilly, and the properties are expected to be situated at approximate elevations of between 35m and 90m. Figure 1-1 below shows the layout of the development .

This document describes how the development can be connected into the existing water distribution network in a way that is consistent with the wider growth plans in Porirua.

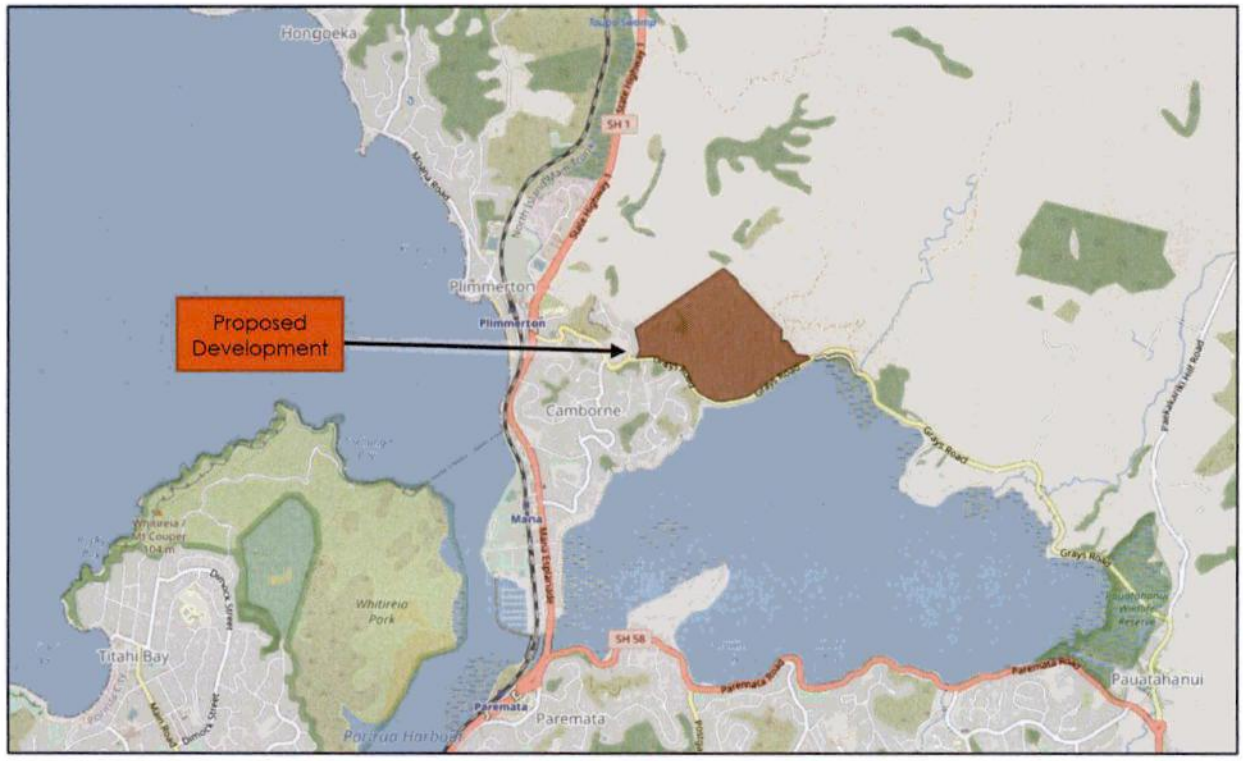


Figure 1-1: Location of Proposed Development

2 Network Configuration

The proposed development at Grays Road sits adjacent to Plimmerton East DMA (also known as Pope Street DMA). This DMA is supplied from the bulk network via Pope Street Reservoir. Figure 2-1 shows how the development would be connected to the current network in relation to the planned Camborne Reservoirs. Figure 2-2 and Figure 2-3 show concepts of short term and long term supply arrangements for the development.

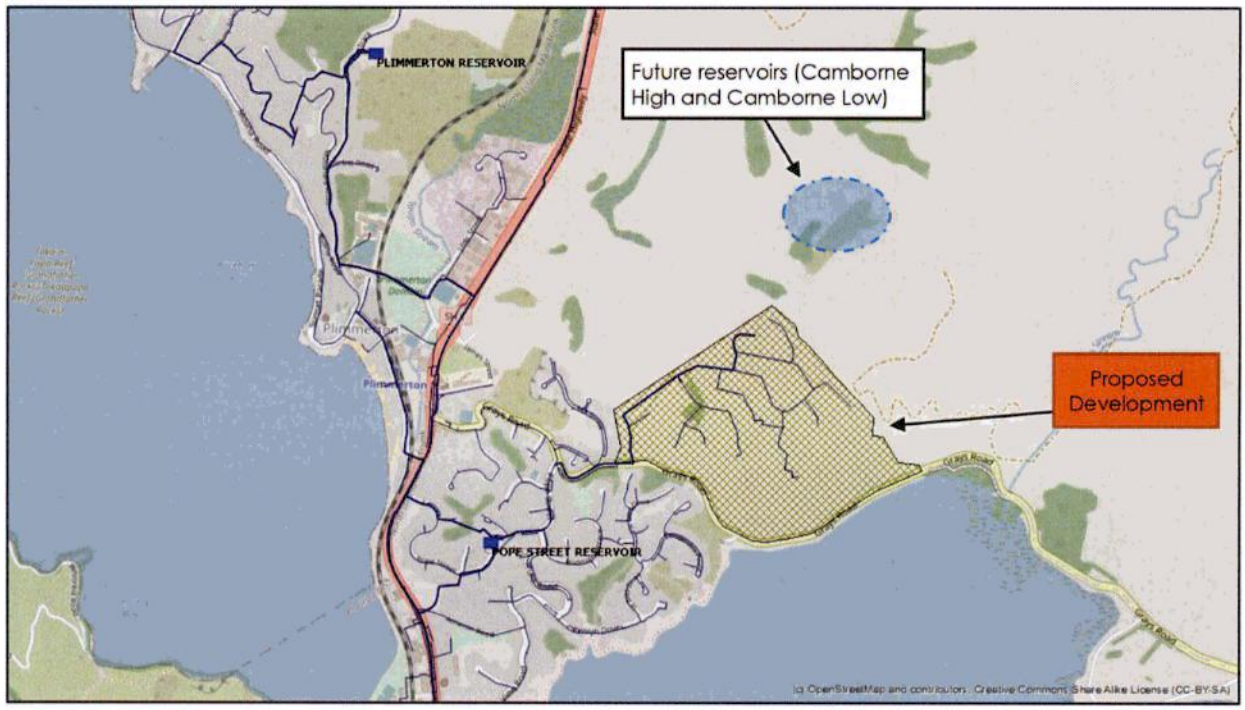


Figure 2-1: Local Pipe Network

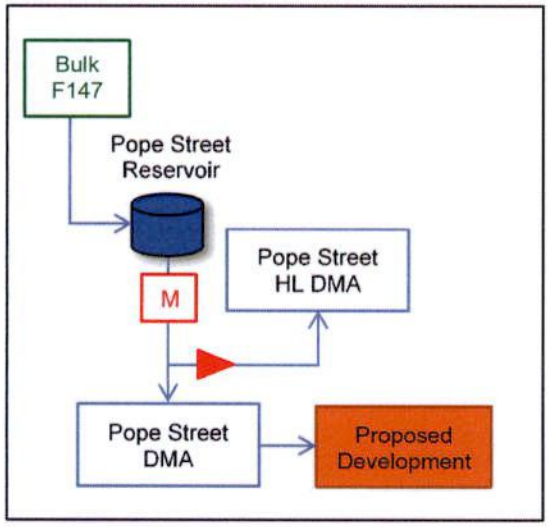


Figure 2-2: Short Term Development Supply

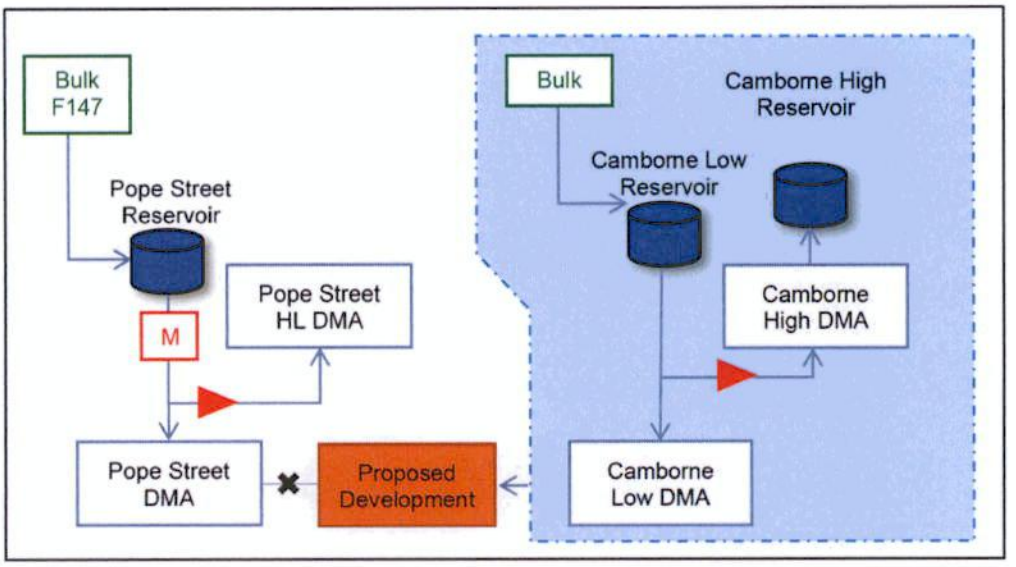


Figure 2-3: Long Term Development Supply

3 Level of Service

3.1 Pressure

Wellington Water's 'Regional Standard for Water Services' Table 6.1 specifies that the pressure range for all properties should be between a minimum of 25m to a maximum of 90m.

Pope Street Reservoir has a Bottom Water Level (BWL) of approximately 90m which means that any proposed properties above about 65m would not be able to meet the PCC level of service of 25m minimum pressure when the reservoir is low, and before taking any network losses into consideration. The approximate area is shown by the 65m contour in Figure 3-1 below. Approximately 60 properties are located above this elevation and cannot be supplied from Pope Street Reservoir by gravity alone. These will be referred to as Stage 2 in this report.

Figure 3-1: Development - 65m Contour

3.2 Fire Flow

The Fire Code (New Zealand Fire Service Firefighting Water Supplies Code Of Practice, SNZ:PAS 4509:2008) states that the required fire flow depends on the fire class of a building. For residential buildings (FW2), there is a requirement of 12.5l/s fire flow available from hydrants within 135m, with a total requirement of 25l/s fire flow available within 270m of the property.

3.3 Storage

Wellington Water's 'Regional Standards for Water Supply' states that storage requirements for water supply reservoirs need to be considered in terms of operational and seismic resilience, outlined as follows:

A. Operational Resilience –

Operational emergency storage is required in the event of a source contamination, a bulk network failure, or the outage of pumps / rising mains system to the study area.

Total reservoir capacity should meet the following criteria for operational resilience:

- 700 l/person/day storage requirements where existing demand is unknown
- Twice the total Average Day Demand (ADD) when existing demand is available
- Peak Day Demand (PDD) + 20% + Fire Fighting Storage requirements

B. Seismic Resilience –

The storage required for seismic resilience is intended for a minimal consumption from Day 7 to Day 30. 70% of the nominal storage must be sufficient to supply 20 l/person/day, as well as critical users and businesses with various levels of priority. This is summarised as follows:

- From Day 8 to Day 30:
  - Public distribution points
  - Critical Users Category 1 (Civil Defence centres, major hospitals, lifelines)
- From Day 14 to Day 30:
  - Critical Users Category 2 (aged care facilities, medical centres)
- From Day 21 to Day 30:
  - Critical Users Category (education)

For planning purposes, high level storage requirements were determined based on estimated PDD.

4 Current Storage

Storage is assessed on a Water Storage Area (WSA) level. Plimmerton East DMA is within Pope Street WSA which currently has a storage shortfall of approximately 2.6Ml. This will be addressed when the Camborne reservoirs have been constructed, which will sit at the same hydraulic grade and have been sized to account for this shortfall, as well as the expected growth in the area.

Wellington Water are willing to accept there will continue to be a short-term storage deficit as developments are built; however, this must be addressed in any long-term supply options.

5 Supply Options

5.1 Option 1 – VSD Pump

5.1.1 Short Term Supply

Option 1 services both Stage 1 and Stage 2. The 60 properties within Stage 2 would be supplied via a pump station as shown below in Figure 5-1. Level of service can be maintained by installing an on-demand Variable Speed Drive booster pump, capable of delivering a constant outlet head of 120m HGL and required fire flow.

Figure 5-1: VSD Boosted Zone

In this option, no new water storage is provided until Camborne Low Reservoir is constructed. In the interim period, the proposed development increases the existing storage shortfall in Pope Street WSA.

The pump is expected to have approximately 2.1kW power requirement[1].

5.1.2 Long Term Supply

Once the Camborne High Reservoir is constructed, Wellington Water may elect to supply the development above 65m via a new pipe. This is essentially Option 3 presented in Section 5.3.

[1] High level estimate of pump power

Max Required Flow (Q) = 5l/s
Head Lift (H) = 31m
Efficiency (η) = 0.72
QρgHη = 2.11kW

5.2 Option 2 – Dedicated Development Reservoir

5.2.1 Short Term Supply

Option 2 services both Stage 1 and Stage 2. Level of service in Stage 2 can be maintained by constructing a dedicated reservoir for high elevation properties on the site. The reservoir – approximately 160m³ in volume [2] – would be situated at around 120m HGL and refilled by a pump via a push-pull network. An indicative arrangement is shown in Figure 5-2 below. Discussions with Wellington Water have indicated that this is their preferred option until Camborne High Reservoir is in place.

Figure 5-2: Small Reservoir and Refill Pump

The pump is expected to have approximately 2.1kW power requirement[3].

5.2.2 Long Term Supply

Once the Camborne High Reservoir is constructed, Wellington Water may elect to supply the development above 65m via a new pipe. This is essentially Option 3 presented in Section 5.3.

---

2 High level estimate of storage = 60 properties x 2,160 litres / property / day x 1.2 (PDD storage criteria)
= 155.5m3

3 High level estimate of pump power Max Required Flow (Q) = 5l/s
Head Lift (H) = 31m
Efficiency (η) = 0.72
QρgHη = 2.11kW

5.3 Option 3 – Future Reservoir Connection

5.3.1 Short Term Supply

Option 3 only services Stage 1 in the short term, until Camborne High Reservoir has been constructed. Camborne High Reservoir is expected to be situated at a sufficient elevation to meet the level of service in Stage 2. However, there is uncertainty over the timing of the construction of this reservoir and this would affect the timing of the last stages of the development. It is unknown when or if the timing of this reservoir will be confirmed. Approximately 197-217 properties are expected to be built in Stage 1, leaving between 40 and 60 properties in Stage 2.

5.3.2 Long Term Supply

Storage shortfalls are expected to be addressed by the construction of Camborne Low Reservoir for the initial phases of the development, with Camborne High Reservoir providing storage for the high-level properties in the development. This may increase the required size of Camborne High Reservoir which could result in additional cost. For consistency across all options, the cost of Camborne High Reservoir has not been included in this option.

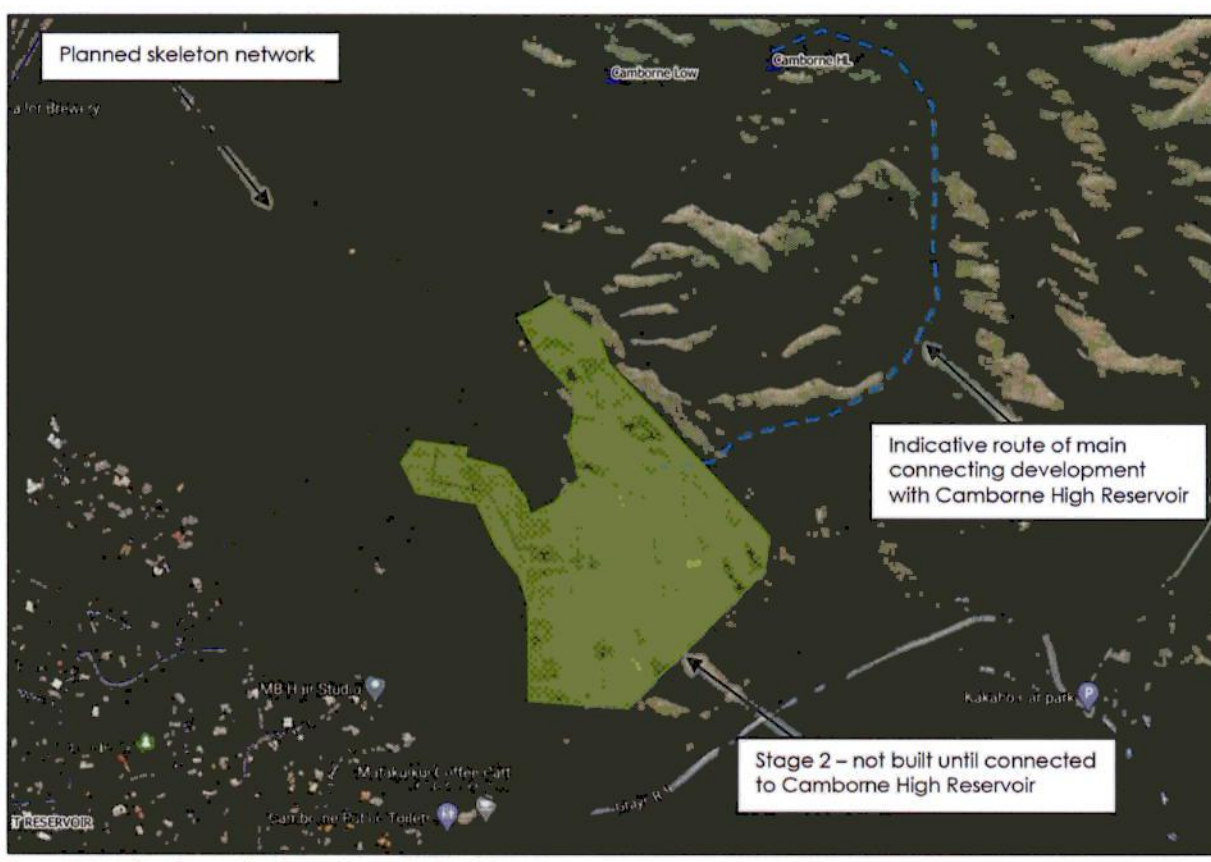


Figure 5-3: Indicative route of Camborne High main

6 Network Modelling

The current operational model network [4] was used to assess the impact of the development on the current network and to size key mains in the development.

6.1 Model Setup

257 individual customer points were developed based on the development plan provided by Cuttriss (shown in Appendix A).

6.1.1 Demand

Customers were given a standard domestic demand profile and a peak consumption of 2,160 litres/property/day as set out by the Wellington Water modelling specifications. The total development flow and daily demand is shown below in Figure 6-1.

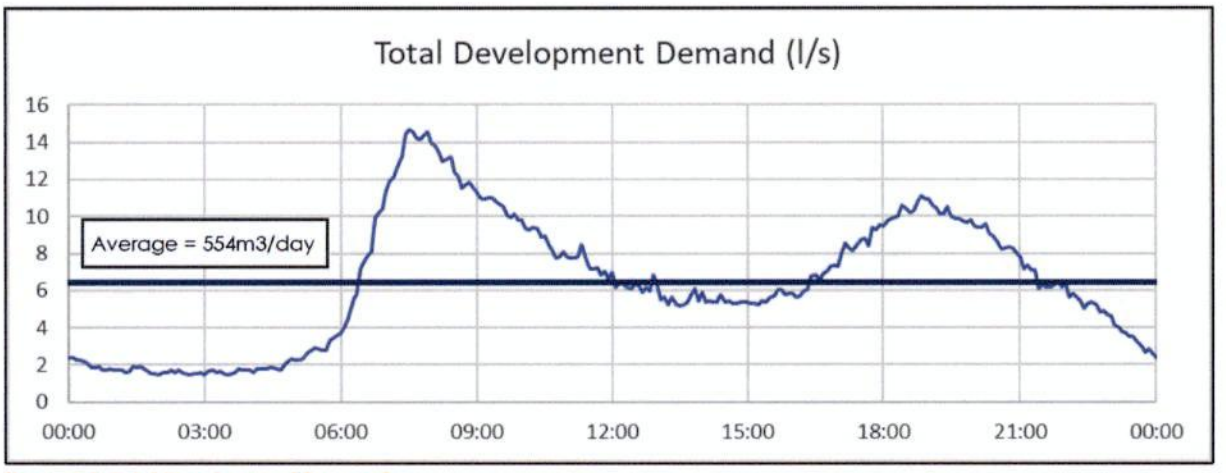


Figure 6-1: Total Development Demand

6.1.2 Mains Layout and Sizing

The pipes have been proposed based on the anticipated road layout. Key mains (in bold) have been sized based on their significance to the long-term planning of the area. These plans include two key mains – sized at 250mm and 150mm – which will supply the future Camborne network, but also provide emergency back feed and storage options for the existing Pope Street network. The proposed mains sizes are shown overlaying the development road layout in Figure 6-2.

6.2 Development Impact

The impact of the development upon the local distribution network has been assessed on the following areas:

6.2.1 Pope Street Reservoir Replenishment

Most of the development will be supplied by the Pope Street Reservoir. Modelling suggests that the proposed development will have no significant effect on the reservoir replenishment, as shown in Figure 6-3.

4 Model Database - WWL – PCC WS MPL06 | Model Group – MOP06 C01 Grays Road

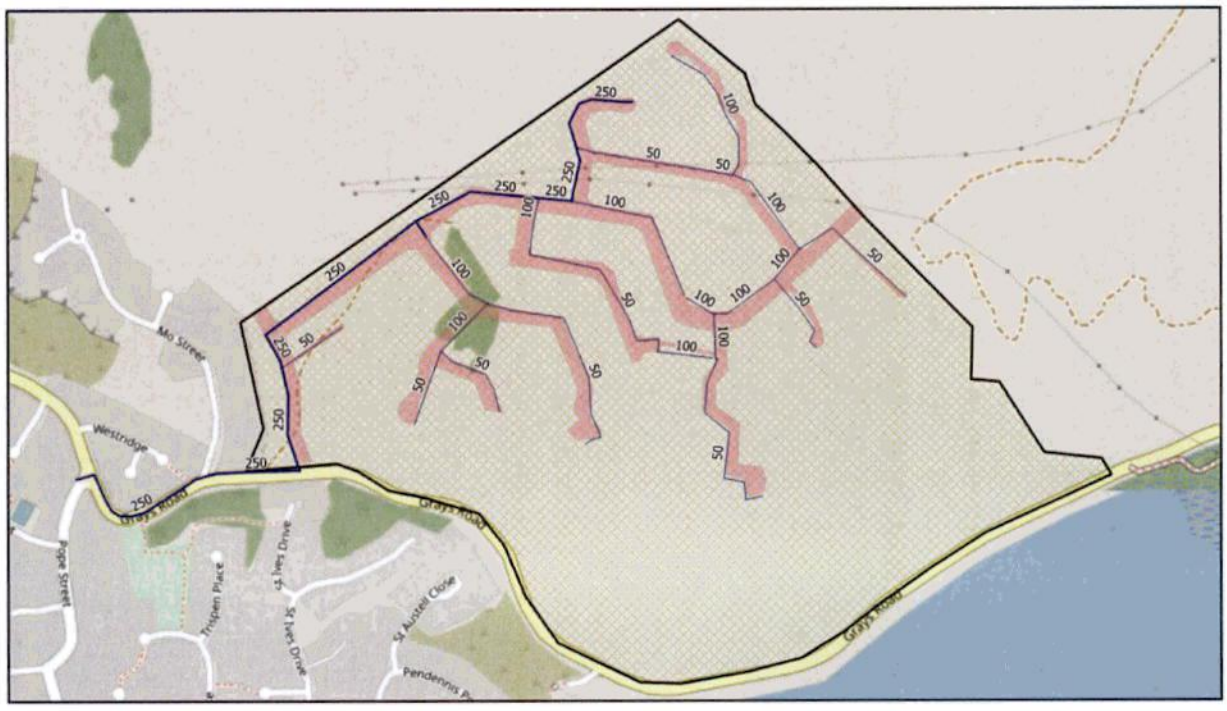


Figure 6-2: Road Layout and Proposed Pipe Network

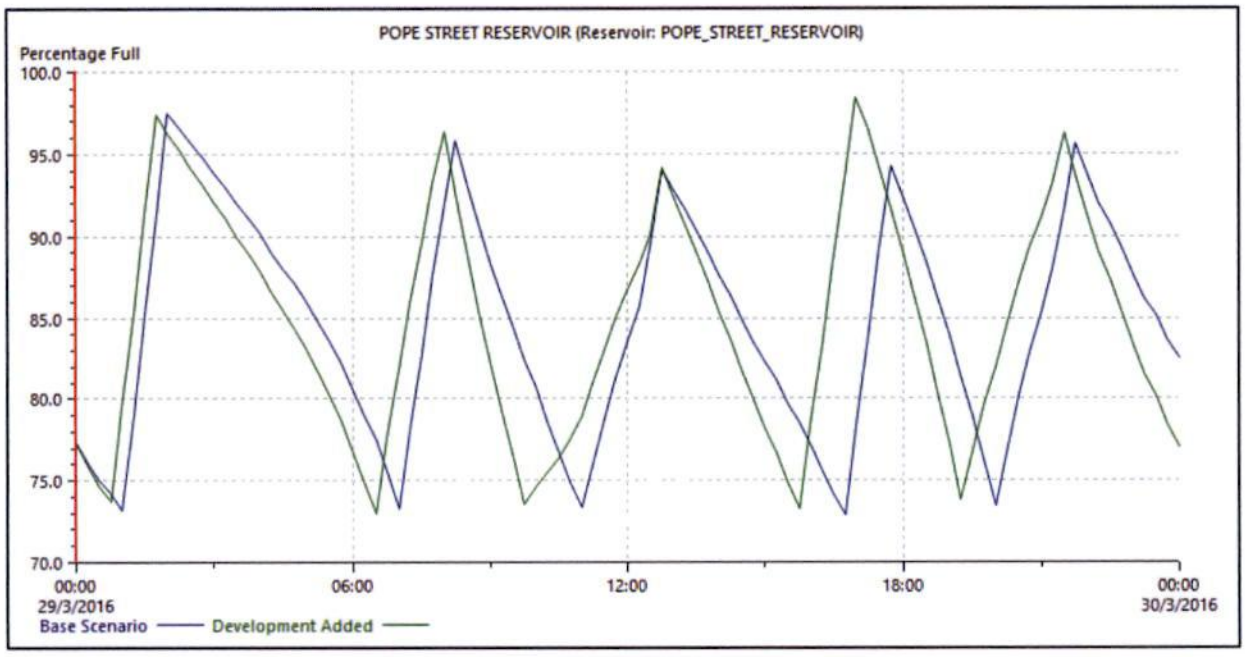


Figure 6-3: Pope Street Reservoir Replenishment

6.2.2 Minimum Pressures near the Point of Connection

Modelling suggests that the development will have no significant effect on the pressures in Pope Street DMA. Figure 6-4 shows a pressure comparison before and after the development has been added to the model.

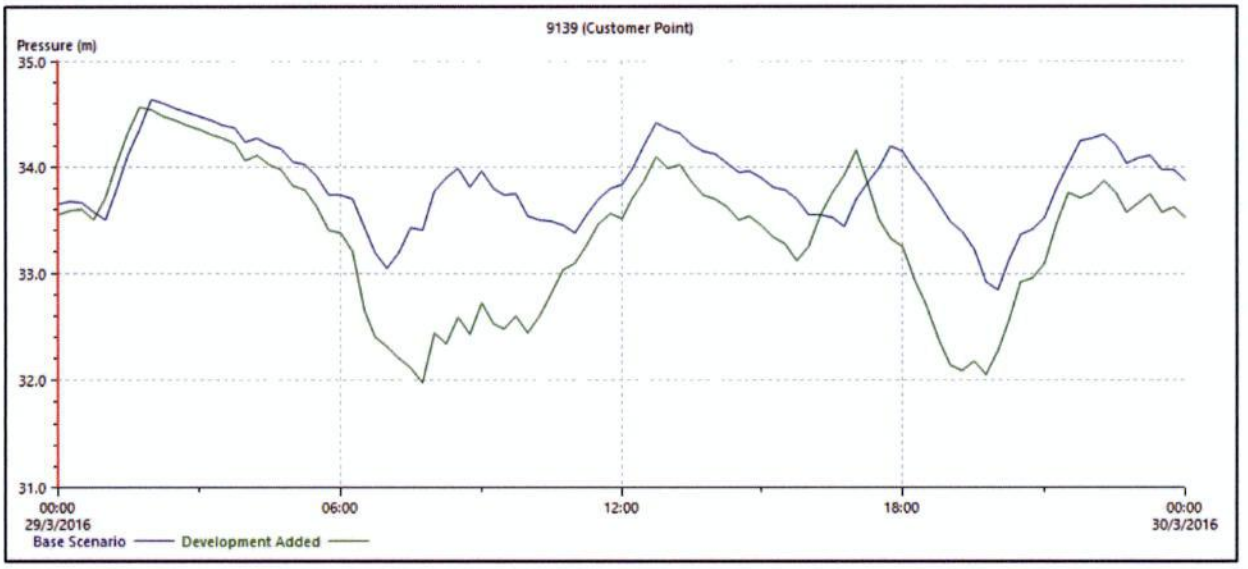


Figure 6-4: Pressure Reduction near Point of Connection

6.2.3 Available fire flow near the Point of Connection

The available fire flow from hydrants in Plimmerton East DMA was assessed before and after the development was added to the model. There were minor reductions in available flows, however there were no areas of non-compliance in either scenario.

7 Costing

A high-level costing has been prepared for supplying water to the development. This has not considered the internal reticulation inside the development. A new pipe connecting the development to the future Camborne High Reservoir is common to each supply option and has been costed as an optional Stage 2 item.

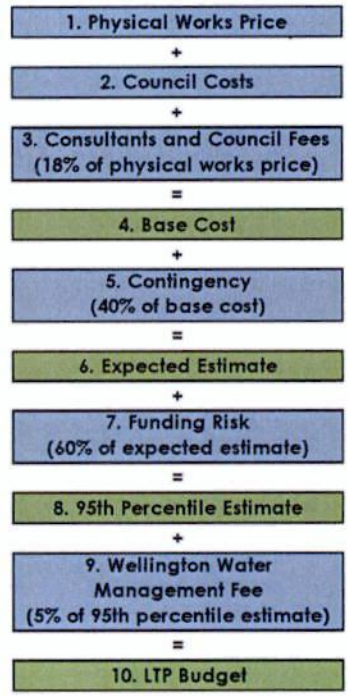
7.1 Costing Methodology

Capital cost estimates were prepared under the instructions provided by Wellington Water.

This is explained below and is illustrated in the figure to the right.

1. Physical Works Price: Covers costs associated with construction activities, environmental management, commissioning, requirements for historic places, service protection or diversion and contaminated land mitigation.
2. Council Costs: Land and property purchase of non-council land.
3. Consultants and Council Fees: Development, consenting, detailed design, procurement and MSQA. The base estimate for these fees is 18% of the physical works price.
4. The Base Cost is the sum of physical works price, council costs, and consultants and council fees.
5. Contingency: The financial provision for the known and unknown risks, 40% of the base cost.
6. The base cost with contingency added is the Expected estimate.
7. Funding Risk: An additional 60% on top of the expected estimate, to cover the difference between the statistical mean and the 95th percentile of threats and opportunities.
8. The expected estimate with the funding risk added is the 95th Percentile Estimate.
9. Wellington Water Management Fee: Fee value varies by council and year; it was taken to be 5% of the 95th Percentile Estimate.
10. The final cost with the Wellington Water Management Fee added is the LTP Budget.

WWL Costing Process



The pipe and reservoir estimates may be classed as a **Level One** estimate.

The assumptions which have been considered as part of this costing estimate are listed below:

- 300m access road for high level reservoir
- Access road is 5m wide
- Land cost for Plimmerton is $200/m^2$ (from *PCC Catchment Plan - WS Costing report 03-09-19)*
- Developed land cost = 1.5 x cost/m^2
- Non-developed land cost = 1.0 x cost/m^2
- Reservoir is 3m high
- Road cost = $500/m (unpaved road)
- Reservoir land area is a square section with edge = diameter x 2
- Reservoir cost is per Three Waters Ltd - cost in $M = 2.37 x (Volume - ML)$^{0.55}$
- Pump cost based on Camborne HL PS (from *PCC Catchment Plan - WS Costing report 03-09-19)*
- Pipe cost based on GHD cost model, trenched in berm and 1.5m to 2.5m deep
- Camborne High Reservoir cost has not been included

7.2 Option 1 Estimate

Short Term Upgrade – Stage 1 and Stage 2	Prelim Cost ($M)	Base Estimate ($M)	Expected Estimate ($M)	95th Percentile Price ($M)	LTP Budget ($)
2.1kW VSD Booster Pump	0.50	0.59	0.83	1.32	**$1,388,000**
Long Term Upgrade (Optional) – Stage 1 and Stage 2					
1,200m of 180DN mains (PN16)	1.26	1.49	2.09	3.34	**$3,506,000**

7.3 Option 2 Estimate

Short Term Upgrade – Stage 1 and Stage 2	Prelim Cost ($M)	Base Estimate ($M)	Expected Estimate ($M)	95th Percentile Price ($M)	LTP Budget ($)
160m³ Reservoir	1.01	1.55	2.17	3.48	**$3,650,000**
2.1kW Refill Pump	0.50	0.59	0.83	1.32	**$1,388,000**
300m of 180DN mains (PN16)	0.32	0.37	0.52	0.83	**$876,000**
Total					**$5,914,000**
Long Term Upgrade (Optional) – Stage 1 and Stage 2					
1,200m of 180DN mains (PN16)	1.26	1.49	2.09	3.34	**$3,506,000**

7.4 Option 3 Estimate

Upgrade – Stage 1 Only	Prelim Cost ($M)	Base Estimate ($M)	Expected Estimate ($M)	95th Percentile Price ($M)	LTP Budget ($)
No Upgrade Required	-	-	-	-	**$0**
Long Term Upgrade – Stage 1 and Stage 2					
1,200m of 180DN mains (PN16)	1.26	1.49	2.09	3.34	**$3,506,000**

8 Conclusion

The impact on pressures and available fire flow has been assessed and is expected to cause only a small impact, after the Grays Road development has been connected to the local distribution network and supplying the development from Pope Street Reservoir.

However, there are limitations to connecting the development to Pope Street Reservoir alone, as the level of service cannot be maintained for properties above 65m. This will require additional infrastructure to be completed before these properties can be connected. Wellington Water has indicated that their preferred option is to install a small (~160m³) reservoir above the development to supply high elevation customers.

This report in intended to be used to frame subsequent discussions about the water supply to the development.

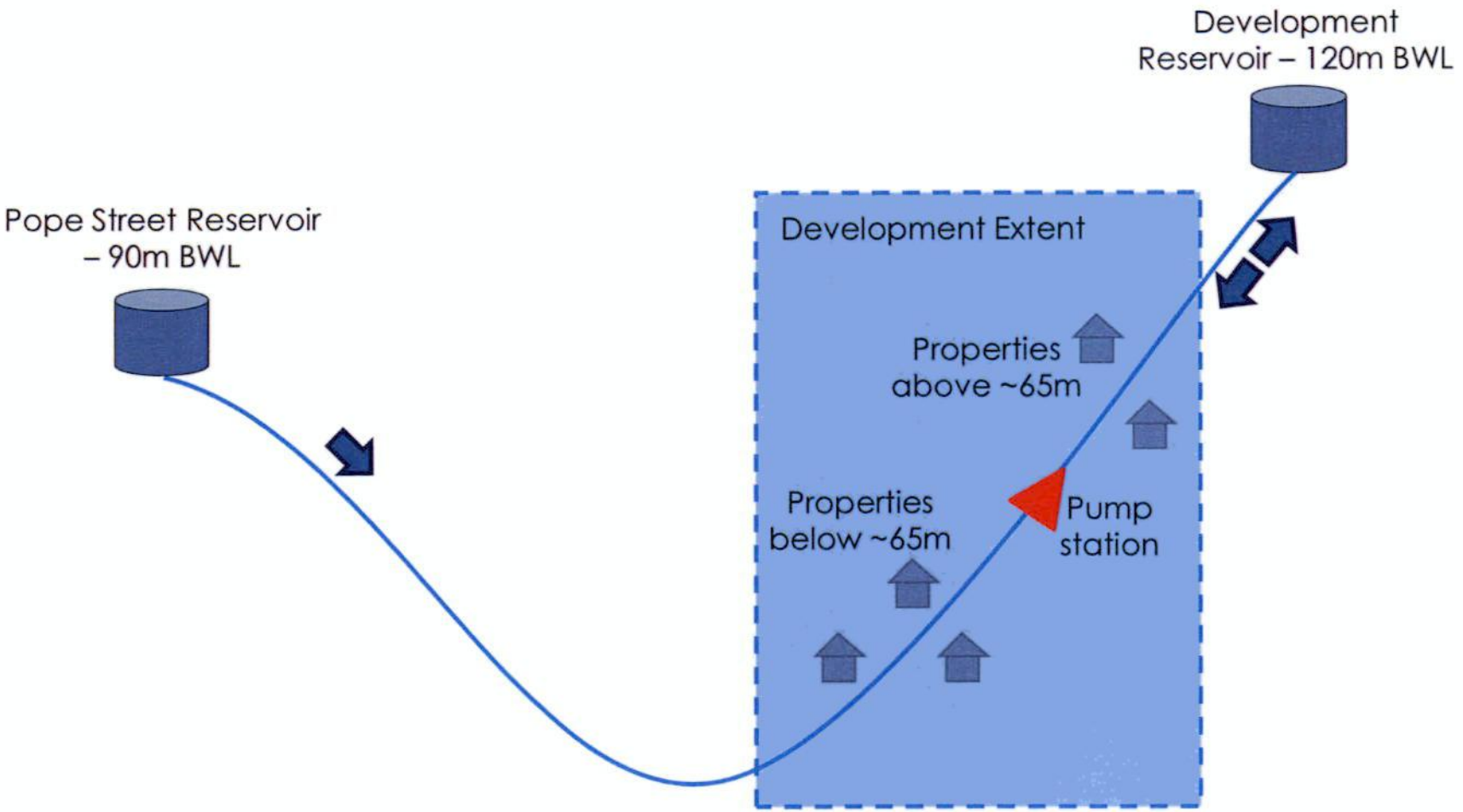

Appendix A
2
DP 489799
2
DP 408158
1
DP 332721
MO STREET
ST IVES DRIVE
ST AUSTELL CLOSE
PENDENNIS POINT
GRAYS ROAD
A LEVELS REVISED NHT 02/20
B REVISED TO ADDRESS LANDSCAPE CONCERNS NHT 04/20
1. THIS PLAN IS TO BE USED FOR DISCUSSION PURPOSES ONLY AND NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED
2. BOUNDARIES SHOWN HAVE BEEN TAKEN FROM LINZ RECORDS AND HAVE NOT BEEN VERIFIED ON SITE.
3. IMAGES CAPTURED USING EBEE PLUS (RTK) 26-02-2019
4. SURVEYED BY N. TAYLOR, A. MORTON & S. TURRINGTON FEBRUARY & MARCH 2019 USING TRIMBLE R10 GNSS & S7 TOTAL STATION
5. CONTOUR INTERVALS ARE 2m
6. LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON DATUM 1953
7. SURVEY DATUM: NZGD2000 WELLINGTON CIRCUIT
8. ORIGIN OF SURVEY AND LEVELS: MOTUKARAKA POINT RL=1.13 (LINZ COORDINATE CONVERSION 10-02-2019)
9. REFER TO RECORDS OF TITLE FOR EASEMENT AND COVENANT INFORMATION.
10. UNLESS STATED OTHERWISE, SERVICES ARE FROM RECORDS WHICH MAY BE INCOMPLETE AND HAVE NOT BEEN VERIFIED ON SITE.
LEGEND
BOUNDARY
EASEMENT
EXISTING PARCEL BOUNDARY
PROPOSED COASTAL ENVIRONMENT INLAND EXTENT
SEISMIC LINE
Cuttriss
Surveyors. Engineers. Planners.
www.cuttriss.co.nz
Copyright Cuttriss Consultants Limited
CLIENT
THE NEIL GROUP
PROJECT
KAKAHO
LOT 1 DP 408158 &
PT SEC 82 PORIRUA DIST
93 GRAYS RD, CAMBOURNE
DRAWING TITLE
PROPOSED STRUCTURE PLAN & PRECINCT FRAMEWORK - OVERVIEW
SCALE A1 1:2000
REDUCED SCALE 1:4000 - A3
NAME DATE
FIELDWORK SMT 02/19
DESIGNED NHT 06/19
DRAWN NHT 01/20
CHECKED WME 01/20
DRAWING NUMBER 22153 P3
SHEET 1 OF 7 SHEETS
REVISION B

Cuttriss
Surveyors. Engineers. Planners.

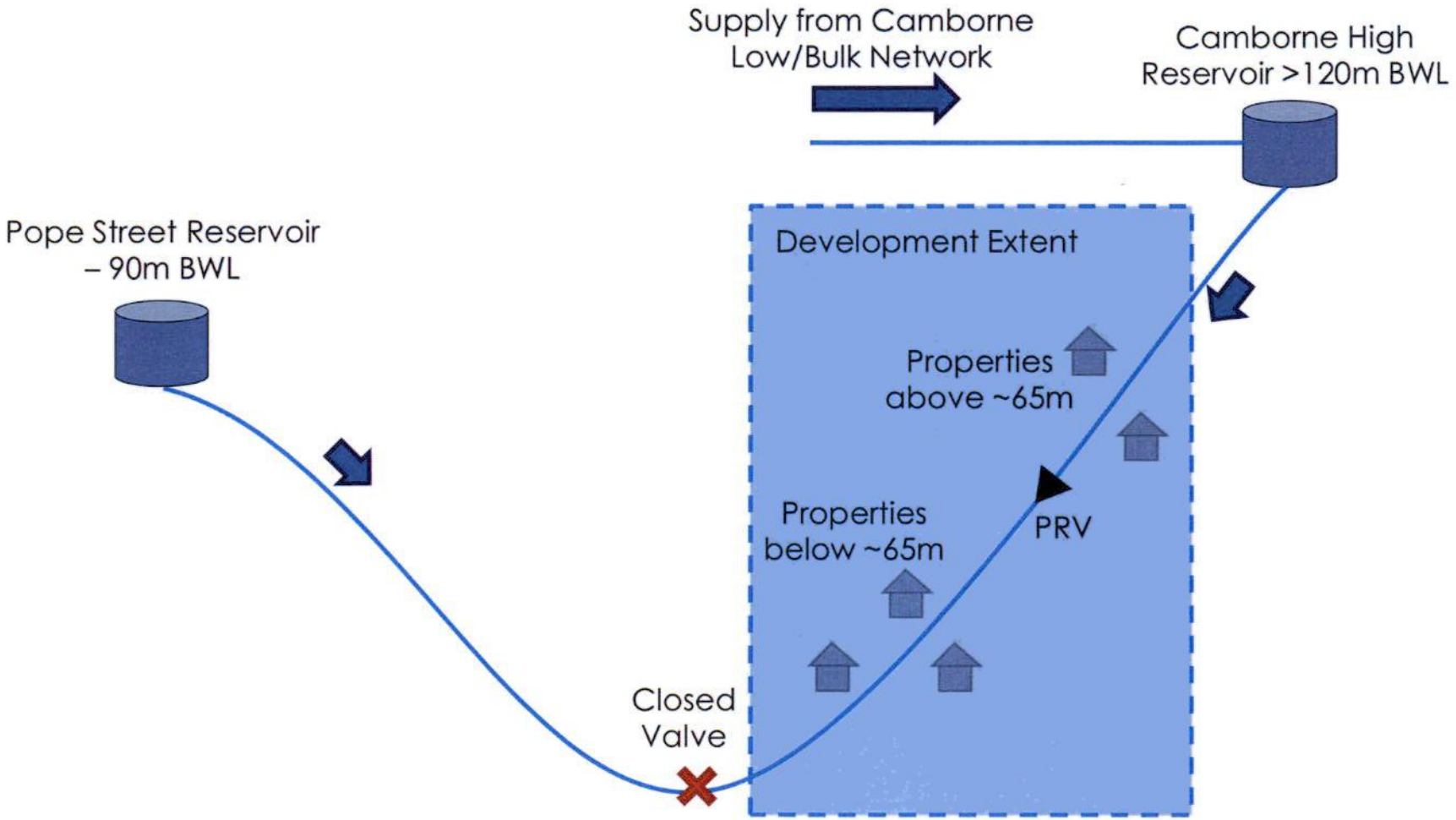
APPENDIX C

STANTEC OPTION EVALUATION

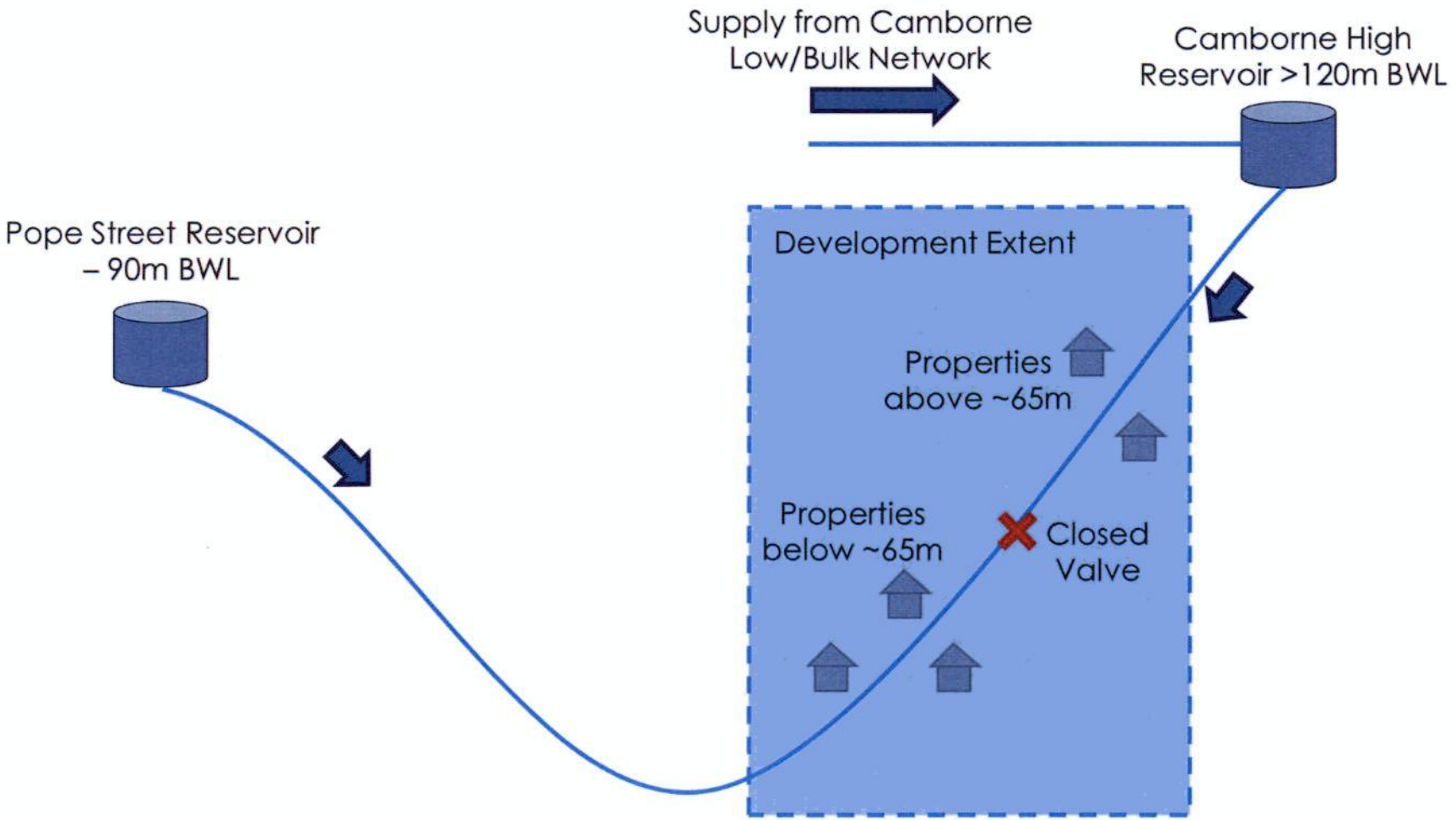
Option 2 – Reservoir 120m BWL – not on development



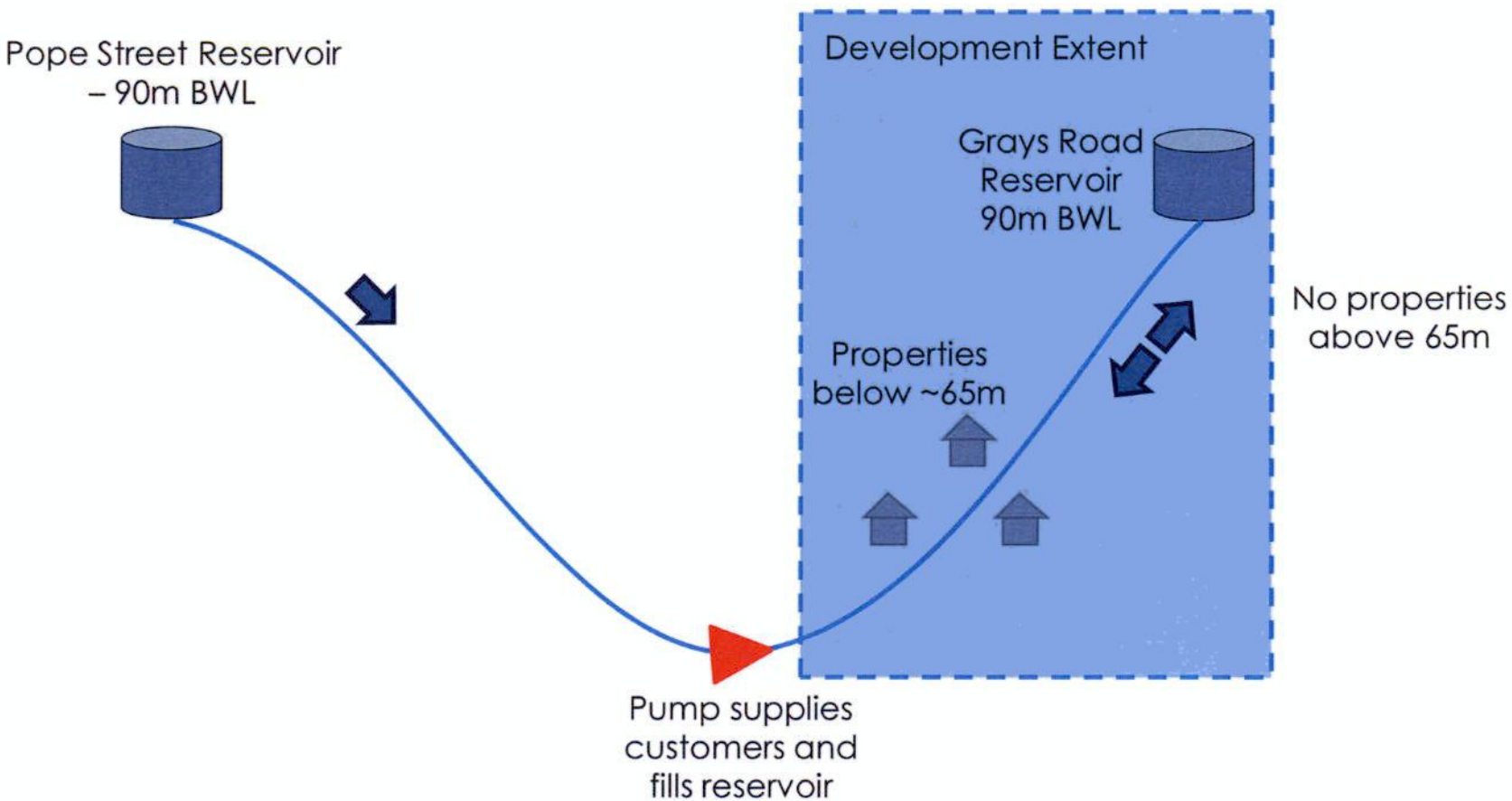
Option 3A – Camborne High Level Reservoir >120m BWL



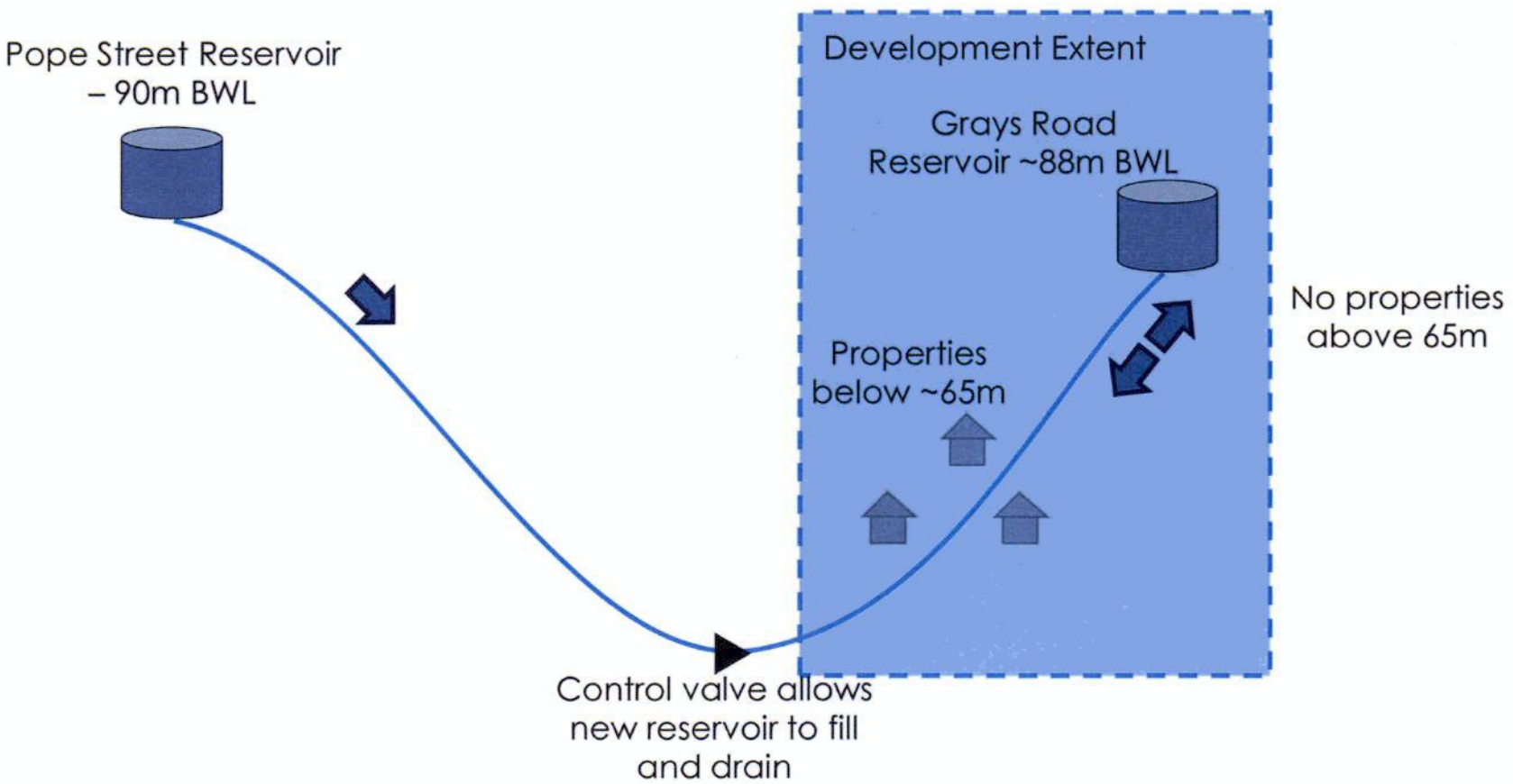
Option 3B – Camborne High Level Reservoir >120m BWL



Option 4a – Reservoir 90m BWL - on development



Option 4b – Reservoir ~88m BWL - on development



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APPENDIX D

WELLINGTON WATER EMAIL WITH OPTION COMMENTARY

Nick Taylor

From: Iman Aghamohammadi <Iman.Aghamohammadi@wellingtonwater.co.nz>
Sent: Friday, 28 August 2020 11:10 am
To: Nick Taylor
Cc: Papion, Cedric; Marlene Roberts-Saidy; Brotherston, Alexander
Subject: RE: [#CCL22153] Grays Road - Supply Concepts
Attachments: Grays Road Supply Options.pptx

Hi Nick,

Following your phone call of yesterday regarding the Option 2 on the attached slides, please see the comments below:

This option (Option 2) is considered viable in principle among few other options as noted in my email on 26 August. However, a bypass and PRV would be required to service properties below 65m. Storage should be sized for the entire development and also a dedicated rising main as opposed to a common rising/falling main would be recommended to prevent the impacts of direct boosting on customers.

Thanks,
Iman

Iman Aghamohammadi Senior Modeller

Wellington Water

Tel 04 912 4400 DDI 04 912 4572 Mob 021 306 810

Private Bag 39804, Wellington Mail Centre 5045
Level 4, IBM House, 25 Victoria Street, Petone, Lower Hutt

www.wellingtonwater.co.nz

From: Iman Aghamohammadi
Sent: Wednesday, 26 August 2020 11:36 AM
To: 'Brotherston, Alexander' <Alexander.Brotherston@stantec.com>
Cc: Papion, Cedric <Cedric.Papion@stantec.com>; Nick Taylor <nick@cuttriss.co.nz>; Marlene Roberts-Saidy <Marlene.Saidy@wellingtonwater.co.nz>
Subject: RE: Grays Road - Supply Concepts

Hi Sandy,

Please see my notes within your email.

Thanks,
Iman

Iman Aghamohammadi Senior Modeller

Wellington Water

Tel 04 912 4400 DDI 04 912 4572 Mob 021 306 810

1

Private Bag 39804, Wellington Mail Centre 5045
Level 4, IBM House, 25 Victoria Street, Petone, Lower Hutt
www.wellingtonwater.co.nz

From: Brotherston, Alexander <Alexander.Brotherston@stantec.com>
Sent: Wednesday, 26 August 2020 10:32 AM
To: Iman Aghamohammadi <Iman.Aghamohammadi@wellingtonwater.co.nz>
Cc: Papion, Cedric <Cedric.Papion@stantec.com>; Nick Taylor <nick@cuttriss.co.nz>
Subject: RE: Grays Road - Supply Concepts

Hi Iman

I've included my notes from your recent call in regards to the supply options for the Grays Road Development, below.

Can you please just confirm that you agree with these notes?

Thanks

Alexander Brotherston
Water Planning Engineer

Direct: +64 4 381 5793
Alexander.Brotherston@stantec.com

Stantec New Zealand
Level 13, 80 The Terrace
Wellington 6011

From: Brotherston, Alexander
Sent: Friday, 21 August, 2020 4:31 PM
To: Iman Aghamohammadi <Iman.Aghamohammadi@wellingtonwater.co.nz>
Cc: Papion, Cedric <Cedric.Papion@stantec.com>; Nick Taylor <nick@cuttriss.co.nz>
Subject: Grays Road - Supply Concepts

Hi Iman

Following feedback from Cuttriss and Wellington Water, we are keen to outline a way forward in regards to the Grays Road Development. I have attached an overview of several development supply concepts, which as we understand are the options available.

These options are:

1. Reservoir 120m BWL, not on development site. Push-pull system filled by refill pump. Reservoir/pump services properties above ~65m.

Reservoir must be sized for all properties in the development, not just higher elevation properties. Bypass required to allow reservoir to supply lower properties
I agree. The goal is not to add extra demand on Pope St reservoir.

2. Camborne High Level Reservoir >120m BWL. Reservoir supplied from Bulk Network. Properties above ~65m fed from reservoir, properties below ~65m are supplied via a PRV.

Ideal scenario – Camborne High supplies entire development I agree.

3. Camborne High Level Reservoir >120m BWL. Reservoir supplied from Bulk Network. Properties above ~65m fed from Camborne, properties below~ 65 are fed from Pope.

Not viable – Camborne High only supplies part of the development I agree.

4. Reservoir 90m BWL - on development site. Pump fills Grays Road Reservoir from Pope Street Reservoir. No properties above ~65m.

Ideal scenario I agree.

5. Reservoir ~88m BWL - on development site. Control valve allows Grays Road Reservoir to fill and drain from Pope Street Reservoir. No properties above ~65m.

Not favourable, but still viable. Not favourable as:

- It will be more difficult from an operational point of view to respond to emergencies when one storage is piggy backed this way without pump station.
- Connecting through the existing 150mm reticulation will limit the flow feeding the new reservoir. You will probably need to have lower reservoir (maybe ~85m BWL) or upgrade a significant length of pipe to feed the new reservoir properly. Otherwise the control valve may need to be open most of the time to fill the reservoir. That would increase the system vulnerability to day-to-day operational issues within the network as opposed to a few hours pumping every day.
- On a peak summer day or during a fire event if Pope street reservoir drops below 70-75%, system's ability to replenish the new reservoir will be affected immediately.
- Operational contingency (specially in a seismic event) is mostly lost if the new storage is not at the same/quite similar level as the Pope Street reservoir.

Other potential pros and cons need to be investigated and documented in order to be able to make an informed decision.

Can you please have a look and confirm that you agree in principle that these are viable as a way forward, as long as the RSWS requirements are met?

Thanks

Alexander Brotherston
Water Planning Engineer

Direct: +64 4 381 5793
Alexander.Brotherston@stantec.com

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Level 13, 80 The Terrace
Wellington 6011

APPENDIX 5

RMA ECOLOGY LTD

Memo

To:	**Bryce Holmes, Landmatters**	**Job No:**	**1907**
From:	**Tony Payne & Graham Ussher**	**Date:**	**9 May 2019**
cc:			
Subject:	**Kakaho Station – Preliminary Ecology Survey**		

Dear Bryce,

This memorandum details the preliminary ecological survey results undertaken on 3rd April 2019, by Senior Ecologist Tony Payne (Nelmac Ltd). We understand that the project team for the Kakaho Station development intends to use this memorandum for internal project planning purposes.

1 Areas of Ecological Significance

The site survey involved a broad scale assessment of the ecological values on site, with a particular focus on identifying the ecological constraints and opportunities for the proposed development.

We have identified the streams on site based on the definition of an 'Active Bed' and in conjunction with the definition of an ephemeral watercourse, both of which are included in the Wellington Region Proposed Natural Resources Plan (PNRP). We have differentiated the streams between ones with an average active bed width >1 m wide, and <1 m wide in case there is planning significance to relies upon active bed width.

We have also mapped areas of terrestrial vegetation that likely meet the ecological significance criteria listed in the Wellington Regional Policy Statement (RPS) - Policy 23.

1. Representativeness
2. Rarity
3. Diversity
4. Ecological Context

All streams and notable areas considered to be of ecological relevance and/or significance are provided in a dwg. file. A figure depicting the relevant ecological features is attached below.

2 Streams

There are two stream catchments on site. Both have been extensively modified and degraded, through a loss of canopy cover, increased sedimentation and stock damage. The streams are generally <1 m wide, with the exception of a short reach beneath a stand of native trees. Three native fish, all of which were the 'Not threatened' banded kokopu (*Galaxias fasciatus*) were observed in a pool in this reach.

There is a significant opportunity for restoration and enhancement of the streams through the exclusion of stock and by providing for appropriate riparian planting.

E: graham.ussher@rmaecology.co.nz
P: 027 272 7930

Figure 1: Banded kokopu (red circle) recorded within a small reach under native trees.

3 Wetlands

The historic agricultural activities have likely resulted in significant modification of the catchments onsite, such that there has likely been a shift from small forested streams, to induced grassland wetlands. This is most likely through increased sedimentation into watercourses during land clearance and subsequent farming, over time.

The areas that are identified as 'wetlands' include areas that are either permanently or intermittently wet that are dominated by plant species that are adapted (obligate or facilitative plant species) to wet conditions. These are novel systems (i.e. not natural) and thus it is unclear whether they should meet the definition of a 'Natural wetland' in the Proposed Natural Resources Plan. This should be a future point of discussion with Council; for now we have taken a conservative approach and mapped areas that may meet this criteria, instead of omitting them in this planning and design stage.

For clarification, we have not included areas that are permanently or intermittently wet and which are dominated by pasture grass, as they clearly meet one the exceptions listed in the RPS of a natural wetland, that wetlands do not include *"damp gully heads, or wetted pasture, or pasture with patches of rushes"*.

Where we consider that induced grassland wetlands would have naturally supported an intermittent steam, we have mapped a stream, as well as mapping the wetland around it. This is because, even if an induced wetland is not considered a 'wetland' under the PNRP, the underlying hydrological feature is likely to be a stream, and should be recognised as such for the purposes of an effects assessment or prediction of potential future state if restored through riparian planting.

The wetlands onsite are highly degraded through stock damage, and their biodiversity values are low (botanically and in terms of wildlife). However, they all retain some function in terms of regulating water flow and quality, and offer an opportunity for enhancement. Despite their degraded state, due to a regional scarcity of wetlands, all wetlands onsite meet the 'Rarity' criteria under the RPS, and are therefore considered ecologically significant.

Where areas of the site are determined to be wetlands and streams, and where Council determines that removal of them is able to take place, it is likely that Council will require some form of ecological

offsetting. That is most likely to involve protection, stock exclusion, revegetation and enhancement in general of wetlands and/or streams elsewhere.

The balance areas of Kakaho Station that are not subject to this development proposal offer a range of opportunities in this regard. The identification of specific opportunities and the likely quantum needed will be dependent on the scale and nature of the streams and wetlands removed from within the project area.

Figure 2: A representation of the lower gully slopes throughout the site which are dominated by the bright green Isolepis prolifera, a wetland obligate plant species.

4 Terrestrial Vegetation

Due to the agricultural context, the site is largely devoid of areas that qualify as ecologically significant vegetation under the RPS. There are several areas of regenerating native scrub (manuka and small leaved Coprosma sp.), and these may meet the significance criteria under the RPS pending Council's decision over how to interpreted the newly-revised national threat status of 'At Risk' manuka (and other Myrtaceae plants including kanuka and some other common native plant species).

There are some relatively small areas of boulderfields covered in pohuehue (*Muehlenbeckia complexa*) towards the south eastern boundary of the site. These areas provide suitable habitat for native skinks. During the site survey two copper skinks (*Oligosoma aeneum;* not threatened) were recorded within this area.

All New Zealand lizards are absolutely protected under the Wildlife Act 1953 and consequently a Wildlife Act Authority from Department of Conservation is required to undertake activities within New Zealand herpetofauna habitat that may result in a significant impact on a species or habitat.

Given the presence of these lizards, and the presence of viable lizard habitat elsewhere on the site, a lizard survey to assess the importance of the site for native lizards in general should be conducted as part of any future assessment of ecological effects.

Figure 3: Pohuehue covering a boulderfield near Grays Road – habitat for copper skinks and, potentially, other native lizards.

Figure 4: A copper skink recorded on site

We trust that this information provides the initial basis for further strategic planning to ensure the proposed development appropriately avoids, minimises or mitigates any significant ecological effects.

Yours sincerely,

Tony Payne
Senior Ecologist
Nelmac Ltd

Graham Ussher
Principle Ecologist[1]
RMA Ecology Ltd

g:\my drive\rma ecology ltd\active projects\1907 kakaho porirua\working\kakaho porirua_ecology survey_memo_7may2019.final.docx

[1] This report has been prepared for the benefit of our Client with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement. Any use or reliance by a third party is at that party's own risk. Where information has been supplied by the Client or obtained from other external sources, it has been assumed that it is accurate, without independent verification, unless otherwise indicated. No liability or responsibility is accepted by RMA Ecology Limited for any errors or omissions to the extent that they arise from inaccurate information provided by the Client or any external source.

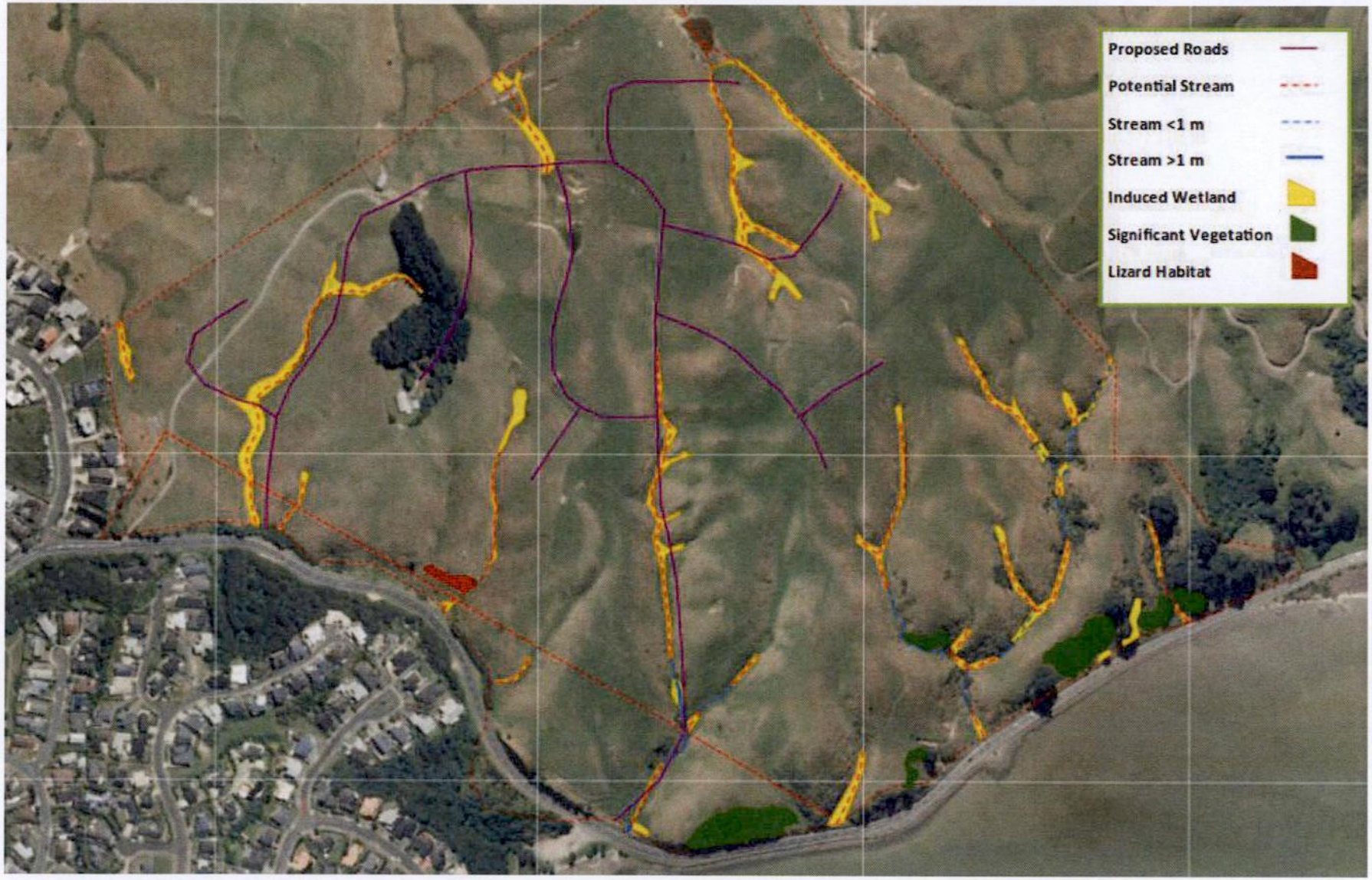

Figure 5: Kakaho Station, ecological features map