Proposed
District Plan Change 48

64 Waipounamu Drive, Kelson
Rezoning to General Residential Activity Area and General Recreation Activity Area

Publicly Notified:	23 January 2018
Submissions Close:	23 February 2018

HUTT CITY
TE AWA KAIRANGI

Part 1: Introduction

1. What is proposed Plan Change 48

The purpose of proposed Plan Change 48 is to rezone the majority of the site at 64 Waipounamu Drive (Lot 1 DP 91313 WN59A/795) from Hill Residential Activity Area to General Residential Activity Area. The proposed rezoning would affect 12.4ha of the site and would provide a zoning that is consistent with the zoning of surrounding residential sites.

It is also proposed to rezone the northern portion of the site to General Recreation Activity Area. This smaller area covers 1.7ha and contains a small wetland and the most ecologically significant vegetation on the site. The proposed zoning to General Recreation limits the future development potential and signals Council's intention to vest this area as reserve as part of a future subdivision of the site.

The plan change proposes the addition of site specific provisions to the Subdivision Chapter to manage the potential effects from stormwater runoff from a future subdivision on the wetland or Speedy's stream and its tributaries.

2. Structure of this Document

This document contains five parts:

Part 1	Introduction
Part 2	Public Notice for proposed Plan Change 48
Part 3	Proposed Amendments to Chapter 11 Subdivision and District Plan Map E2
Part 4	Section 32 Evaluation
Part 5	Submission Form (Form 5)

All five parts of this document are publicly available from Hutt City Council as detailed in the Public Notice in Part 2 of this document.

3. The Process of Proposed Plan Change 48

The process for proposed Plan Change 48 so far can be summarized as follows:

April to November 2017	Pre-notification consultation with iwi authorities.
29 November 2017	District Plan Committee recommends that Council resolves to promulgate proposed Plan Change 48 and instructs officers to publicly notify the proposed Plan Change.
12 December 2017	Council resolves to promulgate proposed Plan Change 48 and instructs officers to publicly notify the proposed Plan Change.
23 January 2018	Proposed Plan Change 48 is publicly notified.

Upon notification of the proposed Plan Change, all interested persons and parties have an opportunity to have input through the submissions process. The process for public participation in the consideration of this proposed Plan Change under the Resource Management Act 1991 is as follows:

- The proposed plan change is publicly notified and any member of the public may make a submission in support of or in opposition to the proposal. This initial submission phase is at least 20 working days from the date of Public Notice.
- After the closing date for submissions, Council must prepare a summary of decisions requested and this summary must be publicly notified.
- No later than 10 working days after the notification of the summary of decisions requested certain persons may make a further submission in support of, or in opposition to, the submissions already made.
- If a person making a submission or further submission asks to be heard in support of his/her submission, a hearing must be held.
- Following the hearing the Council must give its decision on the Plan Change in writing (including its reasons for accepting or rejecting submissions).
- Any person who has made a submission has the right to appeal the Council decision on the Plan Change to the Environment Court.

Part 2: Public Notice

PUBLIC NOTICE

Public Notification of

Proposed District Plan Change 48 to the City of Lower Hutt District Plan

Clause 5 of the First Schedule of the Resource Management Act 1991

Proposed District Plan Change 48: 64 Waipounamu Drive, Kelson
Rezoning to General Residential Activity Area and General Recreation Activity Area

Hutt City Council has prepared Proposed Plan Change 48 which seeks to rezone the majority of the site at 64 Waipounamu Drive (Lot 1 DP 91313 WN59A/795) from Hill Residential Activity Area to General Residential Activity Area. The proposed rezoning would affect 12.4 ha of the site and would provide a zoning that is consistent with the zoning of surrounding residential sites.

It is also proposed to rezone the northern portion of the site to General Recreation Activity Area. This smaller area covers 1.7ha and contains the most ecologically significant vegetation on the site.

The plan change further proposes the addition of site specific provisions relating to stormwater runoff to the Subdivision Chapter.

Documentation for Proposed Plan Change 48 can be viewed:

- on Council's website: huttcity.govt.nz/pc48;
- at all Hutt City Council Libraries; and
- at the Customer Services Counter, Council Administration Building, 30 Laings Road, Lower Hutt.

Copies can also be requested by contacting Hutt City Council:

- Phone: 04 570 6666 or
- Email: district.plan@huttcity.govt.nz

Any person may make a submission but, if the person could gain an advantage in trade competition through the submission, then the person may do so only if the person is directly affected by an effect of the proposal that -

- adversely affects the environment; and
- does not relate to trade competition or the effects of trade competition.

Submissions may be lodged in any of the following ways:

- Online huttcity.govt.nz/pc48
- Email: submissions@huttcity.govt.nz
- Post: District Plan Division, Hutt City Council, Private Bag 31912, Lower Hutt 5040
- In Person: Council Administration Building, 30 Laings Road, Lower Hutt

Submissions must be written on or in accordance with RMA Form 5 and include:

- details on the specific provisions the submission relates to;
- whether the specific provision is supported or opposed or proposed to be amended, with reasons; and
- precise details on the decision that is sought from Council.

Submissions must also address potential trade competition advantages and state whether or not you wish to be heard in support of your submission.

Form 5 is available:

- on Council's website: huttcity.govt.nz/pc48;
- at all Hutt City Council Libraries; and
- at the Customer Services Counter, Council Administration Building, 30 Laings Road, Lower Hutt.

Copies can also be requested by contacting Hutt City Council:

- Phone: 04 570 6666; or
- Email: district.plan@huttcity.govt.nz

Submissions close on Friday 23 February 2018 at 5pm

The process for public participation in the consideration of this proposal under the RMA is as follows:

- after the closing date for submissions, Hutt City Council must prepare a summary of decisions requested by submitters and give public notice of the availability of this summary and where the summary and submissions can be inspected; and
- there must be an opportunity for the following persons to make a further submission in support of, or in opposition to, the submissions already made:
  - any person representing a relevant aspect of the public interest:
  - any person who has an interest in the proposal greater than the general public has:
  - the local authority itself; and
- if a person making a submission asks to be heard in support of his or her submission, a hearing must be held; and
- Hutt City Council must give its decision on the provisions and matters raised in the submissions (including its reasons for accepting or rejecting submissions) and give public notice of its decision within 2 years of notifying the proposal and serve it on every person who made a submission at the same time; and
- any person who has made a submission has the right to appeal against the decision on the proposal to the Environment Court if, -
  - in relation to a provision or matter that is the subject of the appeal, the person referred to the provision or matter in the person's submission on the proposal; and
  - in the case of a proposal that is a proposed policy statement or plan, the appeal does not seek the withdrawal of the proposal as a whole.

Please contact Joe Jeffries (04 570 6905 or Joseph.Jeffries@huttcity.govt.nz) if you have any questions about the proposal.

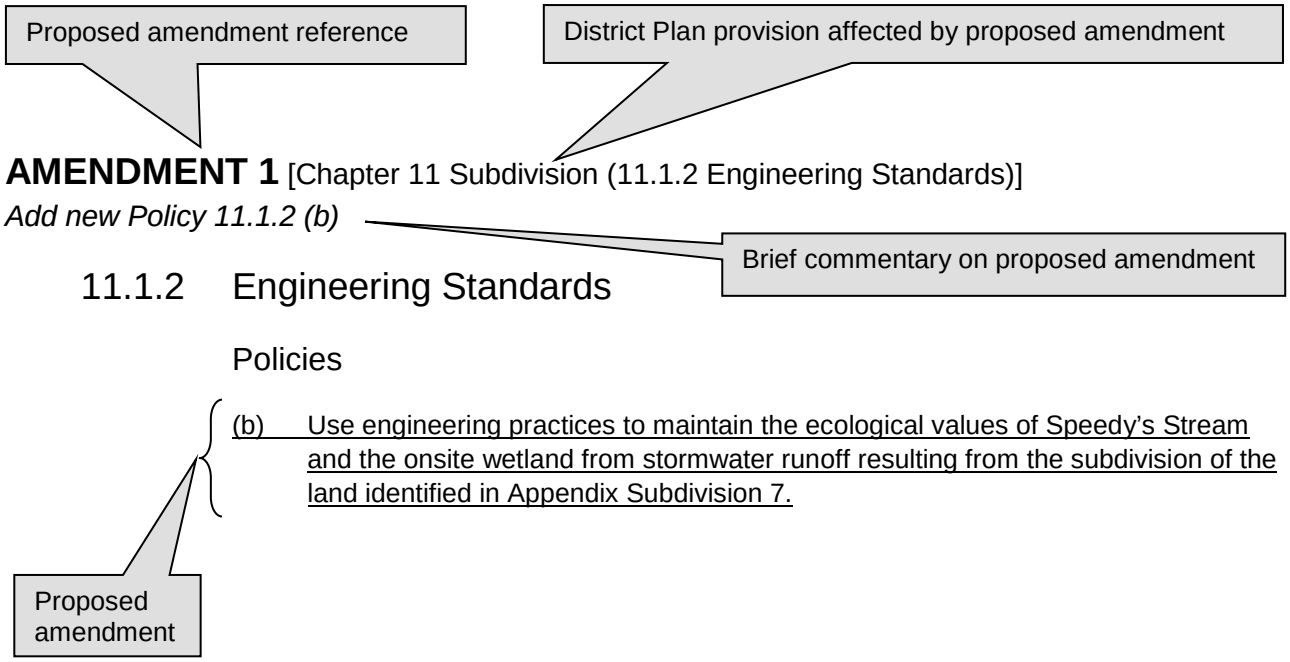
Tony Stallinger
Chief Executive

23 January 2018

Part 3: Proposed Plan Change 48

Proposed Amendments to Chapter 11 Subdivision and District Plan Map

Proposed amendments to Chapter 11 Subdivision are shown as underlined for new text.



Any new text that is proposed to be added is underlined, while any text proposed to be deleted has been ~~struck through~~.

AMENDMENT 1 [Chapter 11 Subdivision (11.1.2 Engineering Standards)]
Add new Policy 11.1.2 (b)

11.1.2 Engineering Standards

Policies

(b) Use engineering practices to maintain the ecological values of Speedy's Stream and the onsite wetland from stormwater runoff resulting from the subdivision of the land identified in Appendix Subdivision 7.

AMENDMENT 2 [Chapter 11 Subdivision (11.2.3 Restricted Discretionary Activities)]
Add new Restricted Discretionary Activity 11.2.3 (d)

11.2.3 Restricted Discretionary Activities

…

(d) Any subdivision of the site identified in Appendix Subdivision 7.

AMENDMENT 3 [Chapter 11 Subdivision (11.2.3.1 Matters in which Council has restricted its discretion)]
Add new Matter 11.2.3.1 (c)

11.2.3.1 Matters in which Council has restricted its discretion

…

(c) Any subdivision of the site identified in Appendix Subdivision 7.

(i) Amenity Values:

The extent to which any earthworks proposal will affect adversely the visual amenity values of the area, and the extent to which the earthworks will result in unnecessary scarring and be visually prominent.

The effects on the amenity values of neighbouring properties including dust and noise.

The extent to which replanting, rehabilitation works or retaining structures are included as part of the proposal to mitigate adverse effects. Earthworks should not result in the permanent exposure of excavated areas or visually dominant retaining structures when viewed from adjoining properties or public areas, including roads.

(ii) Existing Natural Features and Topography:

The extent to which the proposed earthworks reflect natural landforms, and are sympathetic to the natural topography.

(iii) Historical or Cultural Significance:

The extent to which the proposed earthworks will affect adversely land and features which have historical and cultural significance.

(iv) Construction Effects:

The extent to which the proposed earthworks have adverse short term and temporary effects on the local environment.

(v) Engineering Requirements:

The extent of compliance with NZS 4431:1989 (Code of Practice for Earth Fill for Residential Development).

The extent of compliance with Part 2 NZS 4404:2004 (Land Development and Subdivision Engineering).

(vi) Erosion and Sediment Management:

The extent of compliance with the "Erosion and Sediment Control Guidelines for the Wellington Region 2002" and "Small Earthworks – Erosion and Sediment Control for small sites" by Greater Wellington Regional Council.

(vii) The design and layout of the subdivision, including the size, shape and position of any lot, any roads or the diversion or alteration to any existing roads, access, passing bays, parking and manoeuvring standards, and any necessary easements;

(viii) The provision of servicing, including water supply, waste water systems, stormwater control and disposal, roads, access, street lighting, telephone and electricity;

(ix) Management of construction effects, including traffic movements, hours of operation and sediment control;

(x) Avoidance or mitigation of natural hazards;

(xi) The design and layout of the subdivision where any lot may affect the safe and effective operation and maintenance of and access to regionally significant network utilities (excluding the National Grid) located on or in proximity to the site;

(xii) The outcome of consultation with the owner and operator of regionally significant network utilities (excluding the National Grid) located on or in proximity to the site;

(xiii) Those matters described in Section 108 and 220 of the Resource Management Act 1991;

(xiv) The engineering measures proposed to manage stormwater runoff to ensure the ecological health of Speedy's Stream and the onsite wetland. To assist, expert assessment shall be undertaken, and provided with any subdivision application. This report shall identify the following:

i. The existing ecological values of Speedy's Stream and the onsite wetland;

ii. The stormwater runoff rates for both the onsite wetland and Speedy's Stream to maintain these ecological values (including for smaller frequent events like the 1 in 1 year and 1 in 2 year rainfall events);

iii. The acceptable level of contaminants in the stormwater to maintain the ecological values of both the onsite wetland and Speedy's Stream;

iv. The engineering practices (for example, bio-retention devices and detention tanks) required to treat and control all stormwater runoff to ensure that the identified ecological values are at least maintained and the stormwater runoff rates and treatment identified in the points

above are achieved. These engineering practices shall control all runoff generated by the 85-90th percentile rainfall depth. This is defined as treating the stormwater volume generated by the 27mm rainfall depth; and

v. Any potential conditions that may need to be imposed on the subdivision consent to ensure that these engineering measures are undertaken and appropriately maintained.

AMENDMENT 4 [Chapter 11 Subdivision (11.2.4 Discretionary Activities)]
Add new Discretionary Activity 11.2.4 (l)

11.2.4 Discretionary Activities

…

(l) Any subdivision of the site identified in Appendix Subdivision 7 that does not comply with the standards and terms for controlled activity under Rule 11.2.2.1 in respect of (a) Allotment Design.

AMENDMENT 5 [Chapter 11 Subdivision (11.2.4.1 Assessment Criteria for Discretionary Activities)]
Add new Assessment Criteria 11.2.4.1 (e)

11.2.4.1 Assessment Criteria for Discretionary Activities

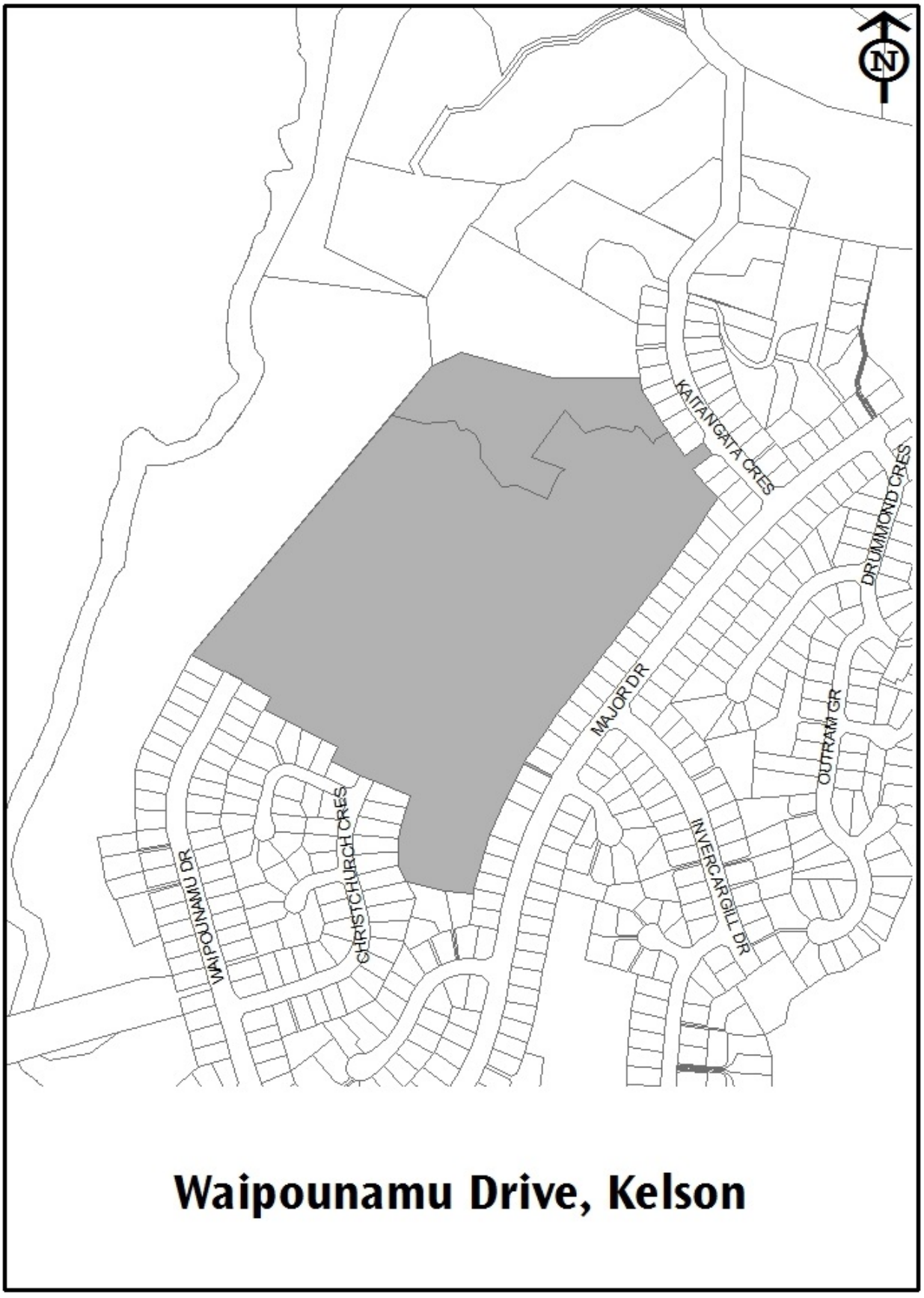
…

(e) For the site identified in Appendix Subdivision 7, those matters to which Council has restricted its discretion under Rule 11.2.3.1 (c).

AMENDMENT 6 [Chapter 11 Subdivision (Appendices)]

Add new Appendix Subdivision 7

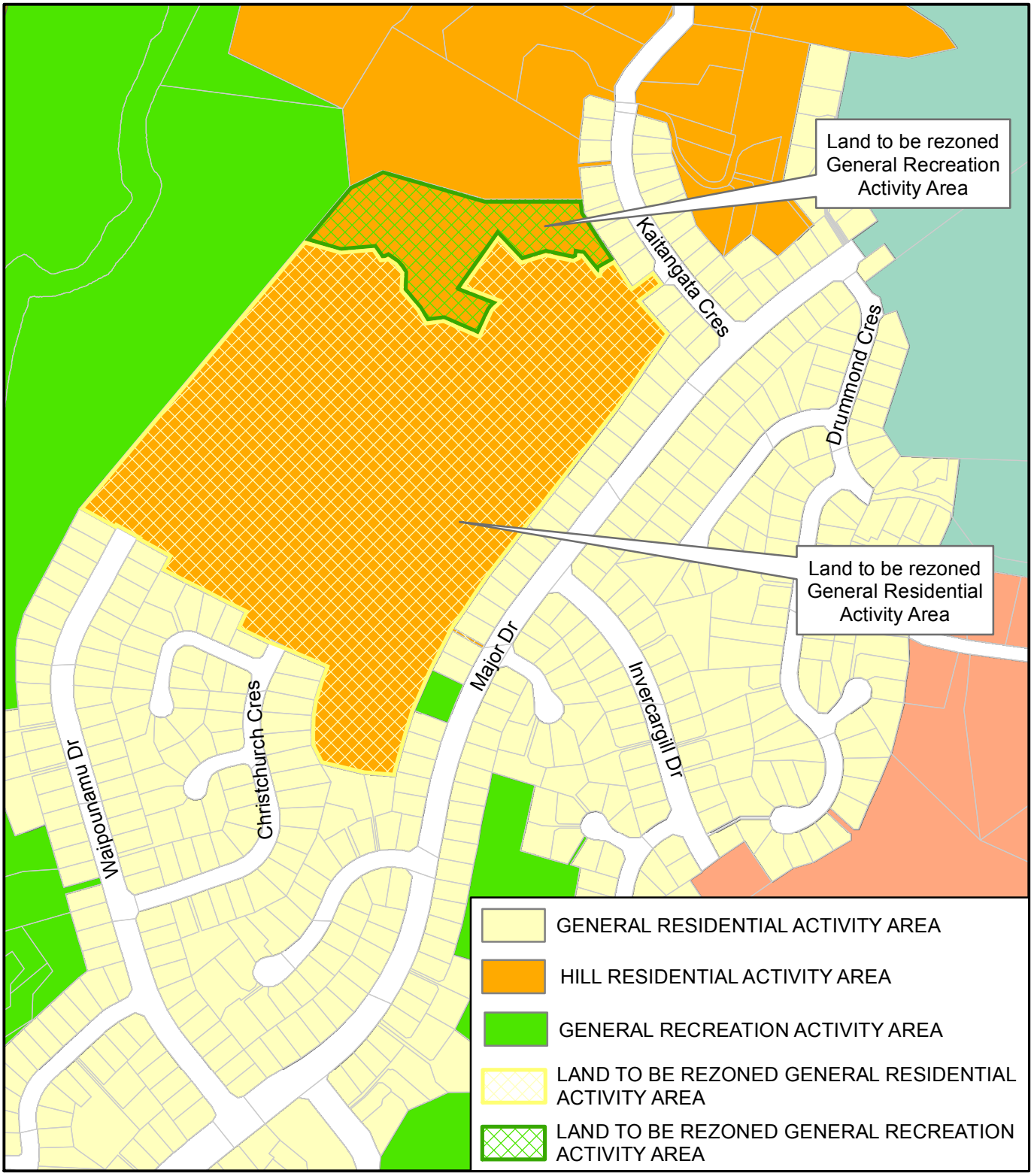
Appendix Subdivision 7



Waipounamu Drive, Kelson

AMENDMENT 7 [Planning Maps]

Amend Planning Map E2



Proposed District Plan Change 48

64 Waipounamu Drive, Kelson

Planning Maps D2 and E2

N

Scale 1:5,000

HUTT CITY TE AWA KAIRANGI

District Plan - City of Lower Hutt

Part 4: Section 32 Evaluation

CONTENT

Introduction

(1) Proposed Plan Change 48 seeks to rezone the majority of the site at 64 Waipounamu Drive, Kelson from Hill Residential Activity Area to General Residential Activity Area while rezoning the northern portion of the site from Hill Residential Activity Area to General Recreation Activity Area under the City of Lower Hutt District Plan.

(2) As part of the proposed Plan Change, a site specific policy and rules are proposed to be added to the subdivision chapter to address specific environmental constraints associated with the development of the site. These provisions are primarily designed to ensure that stormwater runoff from a future developed site does not adversely affect the ecological integrity of the onsite wetland or Speedy's Stream and its tributaries.

(3) This report presents:

- Introduction
- Statutory Basis for Section 32 Evaluation
- Background
- Consultation
- National, Regional and Local Policy Framework
- Effects of the Proposed Plan Change
- Evaluation of Options
- Evaluation of Proposed Objectives
- Evaluation of Proposed Policy
- Evaluation of Proposed Rules and Standards
- Conclusion
- Appendices

Statutory Basis for Section 32 Evaluation

(4) The overarching purpose of Section 32 (s32) of the Resource Management Act 1991 ("the RMA" or "the Act") is to ensure that any proposed district plan provisions are robust, evidence-based and the best means to achieve the purpose of the Act. The s32 evaluation report provides the reasoning and rationale for the proposed provisions and should be read in conjunction with those provisions.

(5) Section 32 of the RMA requires that an evaluation report be prepared before the notification of a plan change by Council. Sections 32 (1), 32 (2), 32 (3), 32 (4) and 32 (4A) provide guidance as to what such an evaluation must examine and consider as follows:

(1) An evaluation report must -

(a) examine the extent to which the objectives are the most appropriate way to achieve the purpose of this Act; and

(b) examine whether the provisions in the proposal are the most appropriate way to achieve the objectives by -

(i) identifying other reasonably practicable options for achieving the objectives; and

(ii) assessing the efficiency and effectiveness of the provisions in achieving the objectives; and

(iii) summarising the reasons for deciding on the provisions; and

(c) contain a level of detail that corresponds to the scale and significance of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the proposal.

(2) An assessment under subsection 1(b)(ii) must -

(a) identify and assess the benefits and costs of the environmental, economic, social and cultural effects that are anticipated from the implementation of the provisions, including opportunities for -

(i) economic growth that are anticipated to be provided or reduced; and

(ii) employment that are anticipated to be provided or reduced; and

(b) if practicable, quantify the benefits and costs referred to in paragraph (a); and

(c) assess the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the provisions.

(3) If the proposal (an amending proposal) will amend a standard, statement, regulation, plan, or change that is already proposed or that already exists (an existing proposal), the examination under subsection (1) (b) must relate to -

(a) the provisions and objectives of the amending proposal; and

(b) the objectives of the existing proposal to the extent that those objectives -

(i) are relevant to the objectives of the amending proposal; and

(ii) would remain if the amending proposal were to take effect.

(4) If the proposal will impose a greater prohibition or restriction on activity to which a national environmental standard applies than the existing prohibitions or restrictions in that standard, the evaluation report must examine whether the prohibition or restriction is justified in the circumstances of each region or district in which the prohibition or restriction would have effect.

(4A) If the proposal is a proposed policy statement, plan, or change prepared in accordance with any of the processes provided for in Schedule 1, the evaluation report must -

(a) summarise all advice concerning the proposal received from iwi authorities under the relevant provisions of Schedule 1; and

(b) summarise the response to the advice, including any provisions of the proposal that are intended to give effect to the advice.

(6) This report has been prepared in accordance with these requirements.

Relevant Case Law

(7) The decision in Long Bay-Okura Great Parks Society Incorporated v North Shore City Council (Decision A 078/2008), and amended in High Country Rosehip Orchards Ltd and Ors v Mackenzie DC ([2011] NZEnvC 387) to reflect the changes made by the Resource Management Amendment Act 2005, sets out the mandatory requirements for district plans as follows. These have been updated here to reflect amendments to the RMA.

A. General Requirements

1. A district plan should be designed to accord with, and assist the territorial authority *to carry out* its functions so as to achieve, the purpose of the Act.

2. When preparing its district plan the territorial authority must *give effect to* any national policy statement or New Zealand Coastal Policy Statement.

3. When preparing its district plan the territorial authority shall:

   (a) *have regard to* any proposed regional policy statement;

   (b) *give effect to* any operative regional policy statement;

   (c) *have regard to* the extent to which the plan needs to be consistent with the plans of adjacent territorial authorities.

4. In relation to regional plans:

   (a) the district plan must *not be inconsistent with* an operative regional plan for any matter specified in s30 (1) [or a water conservation order]; and

   (b) *must have* regard *to* any proposed regional plan on any matter of regional significance etc.;

5. When preparing its district plan the territorial authority must also:

   - have regard to any relevant management plans and strategies under other Acts, and to any relevant entry in the Historic Places Register and to various fisheries regulations; and to consistency with plans and proposed plans of adjacent territorial authorities;
   - take into account any relevant planning document recognised by an iwi authority; and
   - not have regard to trade competition;

6. The district plan must be prepared *in accordance with* any regulation and any direction given by the Minister for the Environment.

7. The district plan (change) must also state its objectives, policies and the rules (if any) and may state other matters.

B. Objectives [the s32 test for objectives]

8. Each proposed objective in a district plan is *to be evaluated* by the extent to which it is the most appropriate way to achieve the purpose of the Act.

C. Policies and Methods (including rules) [the s32 test for policies and rules]

9. The policies are to *implement* the objectives, and the rules (if any) are to *implement* the policies.

10. Each proposed policy or method (including each rule) is to be examined, as to whether it is the most appropriate method for achieving the objectives of the district plan by:

    (a) *identifying* other reasonably practicable options for achieving the objectives; and

    (b) *assessing the efficiency and effectiveness* of the provisions in achieving the objectives, including:

        (i) identifying, assessing and quantifying (where practicable) the benefits and costs of the environmental, social and cultural effects anticipated

from the implementation of the provisions, including opportunities for economic growth and employment; and

(ii) assessing the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the policies, rules, or other methods; and

(iii) if a national environmental standard applies and the proposed rule imposes a greater prohibition or restriction than that, then whether that greater prohibition or restriction is justified in the circumstances.

D. Rules

11. In making a rule the territorial authority must *have regard to* the actual or potential effect of activities on the environment.

12. There are special provisions for rules about contaminated land.

13. There must be no blanket rules about felling of trees in any urban environment.

E. Other Statutes

14. Territorial authorities may be required to comply with other statutes.

(8) The benefits and costs are defined in Section 2 of the RMA as including benefits and costs of any kind, whether monetary or non-monetary.

(9) Section 32 applies to the entire policy and plan development and change process from issue identification to decision release. Therefore, s32 is applicable:

- When objectives are identified and assessed;
- When examining policies, rules, or other methods;
- After the draft plan or provision is prepared;
- When the decision is made to notify;
- In the officer 's report on submissions;
- During deliberations by the council hearings committee; and
- Before the final decision is being released.

(10) A Section 32 evaluation is an iterative process, requiring a regular review of earlier steps and conclusions when necessary.

Background

Scope of the Proposed Plan Change

(11) Proposed Plan Change 48 seeks to rezone the site at 64 Waipounamu Drive, Kelson (Lot 1 DP 91313 WN59A/795) from the current Hill Residential Activity Area zoning to General Residential Activity Area and General Recreation Activity Area under the City of Lower Hutt District Plan.

(12) The areas that are to be rezoned are shown on the map in Appendix 1 and comprise of the following:

- 12.4ha of the site is to be rezoned General Residential Activity Area. This area of General Residential zoning will encompass the majority of the site, with the exception of the northern portion of the property.

- The northern portion of the property, being the remaining 1.7ha, is to be rezoned to General Recreation Activity Area.

(13) The proposed General Residential Activity Area zone would increase the development potential of the site, and would result in a zoning and development pattern that is consistent with the existing and anticipated development form in the local area.

(14) The proposed General Recreation Activity Area zoning for the northern portion is being sought for two reasons:

- This area contains a small wetland and the most ecologically significant vegetation on the site. The proposed General Recreation Activity Area zone is the most appropriate zone to ensure that future development in this area is limited, thereby ensuring that vegetation is retained.
- This area is to be vested as reserve as part of a future subdivision of the site. As such, the plan change ensures that the site is already appropriately zoned for future recreational uses.

(15) As part of the proposed Plan Change, a site specific policy, and rules are proposed to address specific environmental constraints associated with the development of the site. These provisions are primarily designed to ensure that stormwater runoff from a future subdivision of the site does not adversely affect the ecological integrity of Speedy's Stream and its tributaries and the onsite wetland.

Site Description

(16) The site is a currently undeveloped 14.1ha allotment, situated on the western facing hills of Kelson. The site adjoins Belmont Regional Park along its western boundary and is bounded by established residential properties on its eastern and southern boundaries. The northern boundary adjoins several residential properties and a larger more rural residential allotment.

(17) The site has a mixed topography, comprising of four west facing spurs and five intervening gullies. The tops of the spurs and western facing upper portions of the site are vegetated with a mix of gorse and other scrub type vegetation. The gullies are dominated by a mix of regenerating native bush and semi mature native vegetation with a number of streams, running east to west, which are tributaries of Speedy's Stream. These streams drain the small catchments created by the rolling topography of the site, and are generally ephemeral in the upper portions of the site but become permanently flowing in the lower sections of the site. A small wetland area exists in the northern portion of the site. The eastern facing aspect of the site that runs parallel to Major Drive is predominantly covered in native regenerating bush with several pockets of maturing vegetation within this area.

(18) Vehicle access to the allotment is provided from three different points, being Waipounamu Drive and Christchurch Crescent in the south and Kaitangata Crescent in the north. An access leg approximately 2.3 - 2.5m wide also exists, connecting the site to Major Drive in the east. Several access tracks across the site are representative of its former use as grazing land prior to being retired from this use and allowed to regenerate.

Site Background

(19) A review of the property file and Council records indicate that the site was previously zoned residential in the 1970s and 1980s. The City of Lower Hutt – Western Hills Area District Scheme 1988 (Variation No 9) had the site zoned Western Hills Residential Zone. It was not until the Proposed District Plan of 1995 that the zoning was proposed to change to the new Hill Residential Activity Area, as stages 10 and 11 of the 1973 medium density subdivision that created the Kelson suburb did not proceed. The Hill Residential zoning

remained unchanged since the District Plan became operative in 2003.

(20) The site has been the subject of several resource consent applications for development of varying scales, none of which have been realised. Several resource consents (RM 20-W11-64/6, WGN080187 [26514] and WGN080187 [26515]) currently exist, which provide for a 142 residential lot subdivision including bulk earthworks and to permanently divert the full flow of tributaries on the site. These consents were publicly notified and on 19 March 2009 a joint hearings panel granted the consents, subject to conditions, under delegated authority from Hutt City Council and Greater Wellington Regional Council. The consents granted have a 10 year lapsing period until 2019.

(21) These current consents allow for the implementation of development over 10 stages to create 142 residential allotments, roading, access lots and two reserve allotments, near the western periphery of the site, to be vested in Council. The net site area of the proposed allotments range in size from 400m² to 950m².

(22) Under the 2009 decision, the extent of the approved earthworks across the site covered an area of approximately 93,380m² (66% of the site), comprising 226,450m³ of cut and 226,450m² of fill (once an 11% compaction factor was added), or a total volume of 452,900m³ of earthworks. These earthworks included the filling of gullies and placement of subsoil drains beneath the fill, resulting in the loss of ephemeral streams that are tributaries of Speedy's Stream. In the upper reaches of the gullies on the site, site specific erosion and sediment control measures were developed and proposed to control stormwater runoff during the works and once works were completed. Offsite mitigation was proposed to offset the onsite effects associated with the vegetation removal and stream loss.

(23) In December 2017, resource consent was granted for earthworks on the site. These earthworks varied from those approved in 2009. The 2017 resource consent authorises earthworks in the eastern and south-western parts of the site, with cuts in the eastern side of the site and deposition of fill in gullies in south-western and north-eastern parts of the site. The purpose of these earthworks is to facilitate future residential development of the site.

(24) The level of development of the site that has been authorised by way of resource consent is a relevant consideration for the Proposed Plan Change. The existing resource consents authorise a development with a residential density that is more typical of a development in the General Residential Activity Area than in the Hill Residential Activity Area

Scale and Significance Assessment

(25) Under s32 (1) (c) of the RMA, this evaluation report needs to:

> *contain a level of detail that corresponds to the **scale and significance** of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the proposal. (**emphasis** added)*

(26) The following Scale and Significance Assessment discusses the proposed Plan Change in terms of 8 factors, and scores each factor out of 5 (where 1 is of low scale and significance, and 5 is of high scale and significance).

(27) The Assessment concludes with a table summarising the factors and scores, and gives a final overall score for the scale and significance of the proposed Plan Change.

Factor 1 Reason for the Change

(28) The proposed Plan Change seeks to ensure that site has an appropriate zoning that allows for the development potential of the property to be realised in the manner that assists Council with meeting its requirements under the National Policy Statement on

Urban Development Capacity.

(29) For the reasons identified above, Factor 1 *Reason for the Change* scores 2.

Factor 2 Resource Management Issues / Problem Definition

(30) The resource management issues of the District Plan that are relevant to this plan change are as follows:

- *1.10.2 - The different character and amenity values of areas contribute significantly to the environment of the City. The Act recognises the importance of people's environment (which is defined to include amenity values) and it is necessary to recognise these as essential elements in the Plan.*
- *1.10.3 - The manner in which an urban area is arranged can have an important effect on resource use, social and economic wellbeing and environmental quality.*
- *1.10.6 - Areas of open space and recreation facilities are of crucial importance to the overall environment of the City and to the health and wellbeing of residents. People need a diverse range of open space and recreational opportunities and it is important that these are provided within the City.*
- *4A 1.1.1 - Residential dwellings and activities, subdivision patterns, open space, vegetation and a general absence of non-residential, or large scale commercial or industrial operations, all contribute to the residential character and amenity values associated with the general residential areas of the City. It is important that activities are managed to ensure residential character is retained, and amenity values are maintained and enhanced.*
- *4A 1.2 - The height, scale, intensity and location of buildings and structures can cause adverse effects upon amenity values of neighbouring properties, and the residential character of the surrounding area. It is important that such adverse effects are managed.*
- *7A 1.1.1 - General Recreation Activity Areas are located throughout the City, with many adjoining Residential Activity Areas. Activities in recreation areas can generate adverse effects, which detract from the amenity values of adjoining residential areas.*
- *7A 1.1.2 - The type of activities carried out should be compatible with the physical characteristics of the land. Areas which are generally flat and not covered with bush should be developed for more active and formal recreation purposes. Areas covered in bush and steeper areas should be protected from inappropriate use and development.*
- *11.1.1 - Subdivision of land can impose a constraint on the future use or development of land. It is necessary to ensure land which is subdivided can be used for the proposed use or purpose.*
- *11.1.2 - Subdivisions need to be serviced in a manner that adverse effects are avoided, remedied or mitigated and that adverse effects on the health, safety and wellbeing of residents are no more than minor.*
- *11.1.4 - Subdivision of land in the coastal environment and in areas of ecological value can have adverse effects that need to be controlled.*
- *14I 1.1 - Earthworks can cause unnecessary scarring of the landscape, and alterations to the natural topography. This can significantly alter the natural*

character of the City's landscape. It is important that earthworks are managed to avoid, remedy or mitigate adverse effects upon the natural topography.

- *14I 1.2 - Unnecessary scaring of the landscape, removal of vegetation and alteration of the natural topography can affect adversely visual amenity values, historical and cultural values. Earthworks will be managed to ensure such values are maintained.*

(31) Most of the above resource management issues are appropriately addressed through the District Plan's existing objectives policies and rules of the District Plan. While the proposed Plan Change does not seek the introduction of new objectives to the District Plan it proposes the introduction of a new policy and rules to address anticipated issues associated with future development of the site in relation to stormwater runoff and the protection of identified ecological values.

(32) Factor 2 *Problem / Issue* scores 2 for the above reasons.

Factor 3 Degree of Shift from the Status Quo

(33) The proposed rezoning of the site to General Residential and General Recreation Activity Area (which are existing established zones), and the introduction of a site specific policy and rules to address the quality of the stormwater runoff from the site would provide for additional development potential of the site.

(34) The proposed introduction of new provisions is site specific has no wider implications.

(35) An existing resource consent allows for the creation of 142 residential allotments, roading, access lots, and significant earthworks on the site. The level of development provided for by the proposed Plan Change is not significantly greater than what is provided for by the resource consent.

(36) Factor 3 Degree of Shift from the Status Quo therefor scores 2.

Factor 4 Who and How Many Will be Affected/Geographical Scale of Effects

(37) The proposed Plan Change seeks the rezoning of a single site which would allow for more intense residential development on the site, when compared to the existing zoning. The effects from this development would be mostly localised to surrounding properties in the immediate environment.

(38) Factor 4 Who and How Many Will be Affected/Geographical Scale of Effects scores 2.

Factor 5 Degree of Impact on or Interest from Iwi/Maori

(39) The site is not identified in the District Plan as having significant cultural values. However, Speedy's Stream which is located off-site and could be affected by stormwater runoff if the site was developed, does have cultural importance. The proposed policy and rules seek to address stormwater runoff from the site to ensure the on-going health of Speedy's Stream.

(40) Factor 5 Degree of Impact on Interests from Iwi/Maori therefore scores 2.

Factor 6 Timing and Duration of Effects

(41) The effects of the proposed Plan Change would be ongoing from the time development of the site enabled by this plan change would commence. While the construction effects associated with development of the site would likely be for a limited amount of time, the effects of the buildings and activities at the site on the surrounding area would be ongoing. However, a plan change that results in a new development will always have ongoing effects.

(42) Factor 6 *Timing and Duration of Effects* scores 2 due to the above reasons.

Factor 7 Type of Effects

(43) The type of effects that would be generated by a development that is enabled by the proposed Plan Change are well understood and are similar in type and scale to the effects generated by existing developments on adjacent sites with General Residential zoning.

(44) The proposed new policy and rules would address site specific effects of development.

(45) Factor 7 Type of Effects scores 2.

Factor 8 Degree of Risk and Uncertainty

(46) The degree of risk and uncertainty is low. The General Residential Activity Area and General Recreation Activity Area are well established in the District Plan and the resulting development forms are well understood.

(47) The proposed introduction of site specific provisions requiring assessments and engineering works to be undertaken to maintain the ecological health of Speedy's Stream and the onsite wetland if the site was developed add a small amount of risk and uncertainty to the plan change.

(48) Factor 8 *Degree of Risk and Uncertainty* scores 2 due to the certainty provided by the existing proposed zones, while recognising the small level of uncertainty resulting from the proposed new policy and rules.

Overall Scale and Significance

(49) Table 1 Summary of Scale and Significance below lists the factors discussed above and the scores for each factor. The scores are then combined to give a total scale and significance score for the proposed Plan Change.

(50) The scale and significance of the proposed Plan Change is moderate.

Table 1 Summary of Scale and Significance

Factor		Score
1.	Reason for Change	2
2.	Problem / Issue	2
3.	Degree of Shift from Status Quo	2
4.	Who and How Many Affected, Geographic Scale of Effects	2
5.	Degree of Impact on or Interest from Maori	2
6.	Timing and Duration of Effects	2
7.	Type of Effect	2
8.	Degree of Risk or Uncertainty	2
Total (out of 40)		**16**

Total Score Interpretation

0-10 Scale and Significance = Low

11-20 Scale and Significance = Moderate

21-30 Scale and Significance = High

31-40 Scale and Significance = Very High

Consultation

(51) In preparing the proposed Plan Change, consultation has been undertaken with the following statutory authorities and mana whenua in accordance with Schedule 1 of the RMA:

- Ministry for the Environment;
- Porirua City Council;
- Upper Hutt City Council;
- Wellington City Council;
- New Zealand Transport Agency;
- Transpower;
- Port Nicholson Block Settlement Trust;
- Te Rūnanga o Toa Rangatira Inc; and
- Wellington Tenths Trust.

(52) Responses were received from Wellington City Council, the Wellington Tenths Trust, Transpower and New Zealand Transport Agency (NZTA) - none of who raised any objections to the Proposed Plan Change.

(53) NZTA did provide some comment on the initial Traffic Report and the report has been updated to reflect the feedback from the Agency.

(54) In their initial response Transpower raised one minor issue which has since been addressed. Transpower then advised that they have no concerns regarding the proposed Plan Change.

(55) Responses from these parties can be found in Appendix 3 of this report.

(56) Responses were also received from Port Nicholson Block Settlement Trust and Te Rūnanga o Toa Rangatira Inc. These are summarised in more detail below.

Port Nicholson Block Settlement Trust

(57) On 30 April 2017 an email was sent to Port Nicholson Block Settlement Trust advising them of the proposed Plan Change and asking how they would like to be consulted regarding the proposed Plan Change.

(58) An initial meeting was held with Port Nicholson Block Settlement Trust on site on 8 June 2017. At the meeting the extent of the proposed works and the plan change were discussed and representatives of the Trust indicated that they had no significant concerns regarding the proposed Plan Change.

(59) A follow up email was sent to the Port Nicholson Block Settlement Trust on 13 June 2017 which summarised the proposed Plan Change and the mitigation measures that formed part of the proposal. On 21 July 2017 an email was received from Port Nicholson Block Settlement Trust which confirmed the site has been used primarily as a thoroughfare and a place to gather kai (food) and rākau (wood). No particular concerns were raised with the proposed Plan Change or future development of the site but it was indicated that the Trust would be interested in the wetland/bioretention/stormwater management of the site and how that is to be progressed as part of the development.

Te Rūnanga o Toa Rangatira Inc

(60) On 30 April 2017 an email was sent to Ngāti Toa advising them of the proposed Plan

Change and asking them how they would like to be consulted regarding the proposed Plan Change.

(61) An initial meeting was held with Ngāti Toa on 19 May 2017, where an outline of the proposed Plan Change was presented, including the site history, and potential mitigation measures to address the environmental effects associated with the plan change (including stormwater runoff) and seeking confirmation that the site did not contain any areas of cultural significance. An email summarising the main points associated with the plan change was sent on 24 May 2017.

(62) A response was received from a representative of Ngāti Toa on 26 June 2017, confirming that their records did not indicate any known areas of cultural significance within the immediate vicinity of the proposed Plan Change and acknowledging the current approach was better than what has previously been consented on the site. It was raised that the development of the site has the potential to have adverse effects on Speedy's Stream, Te Awa Kairangi (the Hutt River), and the Wellington Harbour and if these are significant enough a Cultural Impact Assessment may be required. Overall Ngāti Toa confirmed they were supportive of the updated approach and wished to be sent a draft copy of the section 32 report, which was circulated on 31 July 2017.

National, Regional and Local Policy Framework

(63) The following sections consider and discuss the national, regional and local policy framework that provides the context for the proposed Plan Change.

Resource Management Act 1991

(64) Section 32(1)(a) requires an evaluation report to examine the extent to which the proposed objectives are the most appropriate way to achieve the purpose of the RMA. The purpose and principles are set out in Part 2, Sections 5 to 8, of the RMA.

Section 5 Purpose and Principles

(65) Section 5 sets out the purpose of the RMA, which is to promote the sustainable management of natural and physical resources. Section 5 states:

> *Sustainable Management means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –*
>
> *(a) Sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations; and*
>
> *(b) Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and*
>
> *(c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

(66) The proposed zones are considered to be the best way to achieve Section 5 of the Act. The existing zoning as Hill Residential Activity Area allows for low density housing to be established. The site is situated within the urban boundaries of Lower Hutt and is adjoined by properties in the General Residential Activity Area on three sides. The site is accessible from the existing road network and can be serviced by existing infrastructure.

(67) The process of preparing the plan change has recognised natural sensitivities of the site, namely the wetland in the northern portion of the property and the need to maintain the

ecological function of Speedy's Stream. It is proposed to address these matters through zoning the wetland in a manner that prevents residential development, while also introducing a new site specific policy and rules to the subdivision chapter which address the offsite stormwater effects that could arise from future development associated with the plan change.

(68) The proposed Plan Change would allow for additional housing to be developed on the site. While there is an existing resource consent for 142 lots on the property, it is anticipated that the proposed Plan Change would provide a resource consent pathway that would enable a development of approximately 165 lots depending on the outcome of resource consent process for a Restricted Discretionary Activity. The proposed rezoning would enable the more efficient use of the site, while the proposed site specific subdivision provisions would ensure that any potential stormwater effects are managed. The proposed General Residential Activity Area zone would allow for the site to be developed in a manner that is consistent with the existing properties to the south and east of the site.

(69) Given the above factors, the proposed Plan Change is considered to be consistent with Section 5 of the RMA.

Section 6 Matters of National Importance

(70) In achieving the purpose of the RMA, Council needs to recognise and provide for the Matters of National Importance identified in Section 6:

> *In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:*
>
> *(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
>
> *(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:*
>
> *(c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:*
>
> *(d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:*
>
> *(e) the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:*
>
> *(f) the protection of historic heritage from inappropriate subdivision, use, and development:*
>
> *(g) the protection of protected customary rights.*
>
> *(h) management of significant natural hazard risk*

(71) The Section 6 matters that are applicable to this proposed Plan Change are subsections 6(a), 6(c) and 6(d). Overall, the proposed zones, policy and rules are consistent with Section 6 of the Act.

Section 6(a)

(72) The proposed Plan Change would result in the wetland being rezoned to General

Recreation Activity Area. This zone generally supports the establishment of recreational activities and would ensure that the site is appropriately zoned to allow for this area to eventually become part of the Hutt City Council reserves network (which is envisioned as part of a future subdivision of the site). It is considered that the proposed zone would help to preserve the natural character of the wetland.

(73) As part of the plan change, an additional policy and rules are proposed to ensure that the future stormwater runoff from the site does not compromise the ecological integrity of the onsite wetland and Speedy's Stream and its tributaries. It is considered that these provisions, combined with the proposed General Recreational zoning would ensure that the wetland is sufficiently protected.

Section 6(c)

(74) As part of the plan change an ecological assessment of the site has been undertaken. This ecological assessment has identified the wetland situated in the northern portion of the site as having ecological value. This report also identifies Speedy's Stream which is located off site as having particular ecological values. It is proposed to retain and protect the wetland through the proposed General Recreational Activity Area zoning. It is further proposed to manage any potential effects of future development and maintain the ecological health of the wetland and Speedy's Stream through the introduction of a site specific policy and rules to the subdivision chapter. These measures would ensure that the areas of ecological value would be maintained and protected over time.

Section 6(d)

(75) The existing site is in private ownership and there is no public access to any of the waterbodies on the site, including the wetland. The proposed rezoning of the wetland and surrounding area to General Recreation Activity Area is in anticipation of the transfer of this area to Hutt City Council as reserve. In this regard, the proposed Plan Change would improve access to the wetland as it would allow for this area to eventually become part of the Hutt City Council reserves network and the new roading network (once the subdivision is completed) could provide access. The proposed Plan Change is therefore consistent with Section 6(d) of the Act.

Section 7 Other Matters

(76) The plan change must also have particular regard to the Other Matters referred to in Section 7:

> *In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to—*
>
> *(a) kaitiakitanga:*
>
> *(aa) the ethic of stewardship:*
>
> *(b) the efficient use and development of natural and physical resources:*
>
> *(ba) the efficiency of the end use of energy:*
>
> *(c) the maintenance and enhancement of amenity values:*
>
> *(d) intrinsic values of ecosystems:*
>
> *(e) [Repealed]*
>
> *(f) maintenance and enhancement of the quality of the environment:*
>
> *(g) any finite characteristics of natural and physical resources:*

(h) the protection of the habitat of trout and salmon:

(i) the effects of climate change:

(j) the benefits to be derived from the use and development of renewable energy.

(77) The Section 7 matters that are applicable to this proposed Plan Change are 7(b), 7(c), 7(d), and 7(f). The proposed Plan Change is considered to be consistent with these subsections.

Section 7(b)

(78) The site is situated within the existing urban boundaries of the Hutt Valley. The proposed General Residential and General Recreation Activity Areas in combination with the associated site specific policy and rules in the Subdivision Chapter, are considered to be the most efficient use of the resource (being an undeveloped site). The proposed zones allow for future development of the site which is consistent with the wider environment, while ensuring that the ecological values of Speedy's Stream and the onsite wetland are maintained. The proposed Plan Change is therefore considered to be consistent with Section 7(b) of the Act.

Section 7(c)

(79) The proposed rezoning would allow for the site to be developed in a manner that is consistent with adjoining residential properties and responds to the ecological limitations that exist on the site. It is considered that the existing bulk and location provisions and the existing and proposed subdivision provisions will ensure that any future development of the site is consistent with Section 7(c) of the Act.

Section 7(d)

(80) It is proposed to retain and protect the wetland through the proposed General Recreational Activity Area zoning. It is further proposed to manage any potential effects of future development and maintain the ecological health of the wetland and Speedy's Stream through the introduction of a site specific policy and rules to the subdivision chapter. These measures would ensure that the areas of ecological value would be maintained and protected over time.

Section 7(f)

(81) The proposed rezoning would allow for the site to be developed in a manner that is consistent with adjoining residential properties and in a manner that responds to the ecological limitations that exist on the property. The existing bulk and location and subdivision rules of the General Residential Activity Area, in conjunction with the proposed new policy and rules, will ensure that any future development of the site is consistent with Section 7(f) of the Act.

Section 8 Treaty of Waitangi

(82) Section 8 Treaty of Waitangi states:

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

(83) Section 8 of the RMA requires that the principles of the Treaty of Waitangi are taken into account. As part of the consultation process, local iwi were invited to provide feedback on the plan change. All iwi groups engaged with during the development of the plan change

have indicated that the site has no unique cultural significance to them; and no issues have been raised with the proposed Plan Change. Iwi have indicated that the aquatic environment of Speedy's Steam is of importance, and the significant degradation in the aquatic environments of these waterbodies would be of concern. A policy and rules have been proposed to ensure the ecological value of Speedy's Stream is considered and maintained through the design and development of the site. Accordingly, it is considered that the proposed Plan Change is consistent with Section 8 of the Act.

National Policy Statements

(84) Section 75(3)(a) of the Resource Management Act 1991 states that a district plan change must give effect to any National Policy Statement.

National Policy Statement for Urban Development Capacity:

(85) The National Policy Statement on Urban Development Capacity became operative on 1 December 2016. The Wellington area, including Lower Hutt, has been classified as a medium-growth urban area. As such, the proposed Plan Change must be considered against the policies of this National Policy Statement.

(86) The relevant policies that require consideration when assessing the proposed Plan Change are policies PA1 – PA4. These are discussed in detail below:

> *Policy PA1*
> *Local authorities shall ensure that at any one time there is sufficient housing and business land development capacity according to the table below:*
>
> *a. Short term - Development capacity must be feasible, zoned and serviced with development infrastructure.*
>
> *b. Medium term - Development capacity must be feasible, zoned and either:*
>
> - *serviced with development infrastructure, or*
> - *the funding for the development infrastructure required to service that development capacity must be identified in a Long Term Plan required under the Local Government Act 2002.*
>
> *c. Long-term - Development capacity must be feasible, identified in relevant plans and strategies, and the development infrastructure required to service it must be identified in the relevant Infrastructure Strategy required under the Local Government Act 2002.*

(87) The proposed Plan Change is consistent with Policy PA1. The site is currently zoned Hill Residential Activity Area, and as such provides for limited development due to the greater net site area requirements of the zone (compared to the General Residential Activity Area). The development potential of the site is further reduced, given the existing topography of the site and constraints within the zone provisions, objectives and policies with regard to earthworks.

(88) The site is able to be serviced by existing infrastructure. City reticulated services for all three waters (wastewater, stormwater and potable water) are available in the immediate environment and have sufficient capacity to service a development that complies with the standards of the General Residential Activity Area. Other infrastructure connections such as power, telecom and gas are also available within the area, and connections to these networks can be made throughout the site.

(89) Rezoning a large area of the site to General Residential Activity Area will increase the residential development potential of the site, thereby assisting Council in meeting its short and medium term development capacity requirements.

Policy PA2

Local authorities shall satisfy themselves that other infrastructure required to support urban development are likely to be available.

(90) The proposed Plan Change is considered to be consistent with Policy PA2. The infrastructure report contained in Appendix 4 confirms that the site is able to be serviced by the existing infrastructure in the local environment.

Policy PA3

When making planning decisions that affect the way and the rate at which development capacity is provided, decision-makers shall provide for the social, economic, cultural and environmental wellbeing of people and communities and future generations, whilst having particular regard to:

a. Providing for choices that will meet the needs of people and communities and future generations for a range of dwelling types and locations, working environments and places to locate businesses;

b. Promoting the efficient use of urban land and development infrastructure and other infrastructure; and

c. Limiting as much as possible adverse impacts on the competitive operation of land and development markets.

(91) The proposed Plan Change is considered to be consistent with Policy PA3. The proposed General Residential Activity Area allows for a range of housing developments. It is acknowledged that while an indicative scheme plan has been prepared, this only represents one of a number of potential development options that could occur on the site.

(92) The proposed Plan Change also allows for the efficient use of urban land and development infrastructure. The area to be rezoned to General Residential Activity Area is currently undeveloped. The proposed rezoning would allow for the site to be developed for residential purposes at a density that is consistent with the character of the local environment. The site is already serviced by existing infrastructure and it is considered that the existing infrastructure in the area still has capacity to support the future development of the site for residential purposes at a density that is in line with the proposed zoning.

Policy PA4

When considering the effects of urban development, decision-makers shall take into account:

a. The benefits that urban development will provide with respect to the ability for people and communities and future generations to provide for their social, economic, cultural and environmental wellbeing; and

b. The benefits and costs of urban development at a national, inter-regional, regional and district scale, as well as the local effects.

(93) The proposed Plan Change takes into account Policy PA4. The proposed rezoning would allow for the site to be developed for residential purposes at a density greater than currently provided for. This will allow for additional housing to be constructed in an area of the Hutt Valley where housing supply is currently limited, without the need for major investment in additional infrastructure (such as roading or services). The proposed General Residential Activity Area would ensure that the development is undertaken in a manner that maintains the environmental wellbeing of the local environment as well as enabling a housing form that will be consistent with the character of Kelson (which is predominantly zoned General Residential Activity Area).

(94) Due to the modest size of the area to be rezoned, it is considered that the benefits and costs associated with the proposed Plan Change are limited to the district scale. In this regard, the proposed Plan Change is considered to have benefits for both Kelson and Lower Hutt. The proposed rezoning allows for a more efficient use of land which is currently poorly utilised in part due to zoning that limits development potential.

National Policy Statement on Electricity Transmission:

(95) The National Policy Statement on Electricity Transmission became operative on 13 March 2008. The Transpower Haywards – Melling B (HAY-MLG B) 110kV Transmission line (Span 14-15) is situated within the northern corner of the site. As such, the proposed Plan Change must be considered against the policies of this National Policy Statement.

(96) The Objective of this NPS and the relevant Policies 10 and 11 that require consideration when assessing the proposed Plan Change are discussed in detail below:

> *Objective*
> *To recognise the national significance of the electricity transmission network by facilitating the operation, maintenance and upgrade of the existing transmission network and the establishment of new transmission resources to meet the needs of present and future generations, while:*
>
> - *managing the adverse environmental effects of the network; and*
> - *managing the adverse effects of other activities on the network.*
>
> *Policy 10*
> *In achieving the purpose of the Act, decision-makers must to the extent reasonably possible manage activities to avoid reverse sensitivity effects on the electricity transmission network and to ensure that operation, maintenance, upgrading, and development of the electricity transmission network is not compromised.*
>
> *Policy 11*
> *Local authorities must consult with the operator of the national grid, to identify an appropriate buffer corridor within which it can be expected that sensitive activities will generally not be provided for in plans and/or given resource consent. To assist local authorities to identify these corridors, they may request the operator of the national grid to provide local authorities with its medium to long-term plans for the alteration or upgrading of each affected section of the national grid (so as to facilitate the long-term strategic planning of the grid).*

(97) The District Plan already recognises the importance of the transmission lines through the establishment of a National Grid Yard and Corridor. The National Grid Yard and Corridor apply to the northern portion of the site. The District Plan controls activities within the National Grid Yard and limits subdivision within the National Grid Corridor. The proposed Plan Change does not alter the extent of the National Grid Yard and Corridor or the activity status of developments within. Furthermore, the overall extent of the site in the National Grid Yard and Corridor is small, with the majority of this area proposed to be rezoned General Recreation Activity Area. Given these factors, the proposed Plan Change is consistent with the objectives and policies of the National Policy Statement for Electricity Transmission.

(98) As part of the preparation of the proposed Plan Change consultation has been undertaken with Transpower. Transpower has not raised any concerns regarding the proposed Plan Change. Their comments are attached in Appendix 3.

(99) No other National Policy Statements relevant to this proposed Plan Change.

Regional Policy Statement for the Wellington Region (RPS)

(100) Under Section 75(3)(c) of the Resource Management Act 1991 a district plan must give effect to any Regional Policy Statement.

(101) The RPS for the Wellington Region sets out the regional approach for managing the environment and providing for growth and associated effects. The RPS identifies the significant resource management issues for the region and outlines the policies and methods required to achieve the integrated sustainable management of the region's natural and physical resources.

(102) The objectives and policies of the RPS most relevant to this plan change are:

Section 3.3 Energy, Infrastructure and Waste

Objective 10
The social, economic cultural and environmental benefits of regionally significant infrastructure are recognised and protected.

Policy 8
Protecting regionally significant infrastructure

(103) The Hutt City District Plan recognises the importance of the transmission lines through the establishment of a National Grid Yard and Corridor. The National Grid Yard and Corridor applies to the northern portion of the site. The District Plan controls activities within the National Grid Yard and limits subdivision within the National Grid corridor. The proposed Plan Change does not propose any changes to the extent of the National Grid Yard and Corridor or the activity status of developments within. Furthermore, the overall extent of the site in the National Grid Yard and Corridor is small, with the majority of this area proposed to be rezoned General Recreation Activity Area.

(104) Consultation has been undertaken with Transpower as part of the plan change process. Transpower have confirmed that they have no concerns regarding the plan change.

(105) Given these factors, the proposed plan change is consistent with this Objective and Policy of the RPS.

Section 3.4 Freshwater

Objective 12
The quantity and quality of fresh water:

(b) safeguard the life supporting capacity of water bodies.

Policy 40
Safeguarding aquatic ecosystem health in waterbodies

Objective 13
The region's rivers, lakes and wetlands support healthy functioning ecosystems.

(106) The stormwater and ecological reports prepared by Morphum Environmental (Appendix 5) have confirmed that the site can support residential development at a density anticipated by the General Residential Activity Area. However to do so, engineering solutions would be required to manage the quality and quantity of stormwater discharge from the site. The future engineering solutions would ensure that the ecological health and function of Speedy's Stream and its tributaries and the onsite wetland could be maintained, as unmitigated development could have detrimental effects on the health and functioning of these waterbodies. An additional site specific policy and rules have been proposed for the subdivision chapter which would ensure that appropriate considerations are given to the impacts of stormwater runoff and how it is managed to ensure the ecological health of

Speedy's Stream and the onsite wetland. The proposed Plan Change (including the associated proposed provisions) is therefore consistent with the above objectives and policies of the RPS.

Section 3.6 Indigenous Ecosystems

Objective 16
Indigenous ecosystems and habitats with significant biodiversity values are maintained and restored to a healthy functioning state

Policy 23
Identifying indigenous ecosystems and habitats with significant indigenous biodiversity values

Policy 24
Protecting ecosystems and habitats with significant biodiversity values

Policy 47
Managing effects on indigenous ecosystems and habitats with significant indigenous biodiversity values

Policy 64
Supporting a whole catchment approach

(107) An ecological assessment of the site has been undertaken (Appendix 5). This ecological assessment has identified the wetland situated in the northern portion of the site as having ecological value. It is proposed to retain and protect this wetland through the proposed General Recreation Activity Area zoning. This zoning would ensure that no residential development would be able to be undertaken in this area (as a permitted activity). Any development in this area would require resource consent and the actual and potential effects would be assessed accordingly. The proposed site specific policy and rules in the Subdivision Chapter would ensure that development in the residentially zoned areas of the site would give due consideration to the effects of stormwater discharge on the onsite wetland and Speedy's Stream. With the inclusion of the policy and rules the proposed Plan Change is consistent with the intentions of the above objectives and policies.

Section 3.7 Landscape

Objective 17
The region's outstanding natural features and landscapes are identified and their landscape values protected from inappropriate subdivision use and development.

Policy 25
Identifying outstanding natural features and landscapes

Policy 26

Protecting outstanding natural features and landscape values

Objective 18
The region's special amenity landscapes are identified and those landscape values that contribute to amenity and the quality of the environment are maintained or enhanced.

Policy 27
Identifying special amenity landscapes

Policy 28
Managing special amenity landscape values

(108) A landscape and visual assessment has been undertaken as part of the proposed Plan

Change (Appendix 6). The assessment by Drakeford Williams has found that the site does not meet the required thresholds to qualify as an Outstanding Natural Feature, Outstanding Natural Landscape, or Special Amenity Landscape and therefore the above objectives and policies are not applicable to this proposed Plan Change.

Section 3.8 Natural Hazards

Objective 19
The risks and consequences to people, communities, their businesses, property and infrastructure from natural hazards and climate change effects are reduced.

Policy 29
Avoiding inappropriate subdivision and development in areas at high risk from natural hazards

Policy 51
Minimising the risks and consequences of natural hazards

Objective 21
Communities are more resilient to natural hazards, including the impacts of climate change, and people are better prepared for the consequences of natural hazard events.

Policy 29
Avoiding inappropriate subdivision and development in areas at high risk from natural hazards

Policy 51
Minimising the risks and consequences of natural hazards

(109) The site is not situated in an identified natural hazard zone. A geotechnical report has been prepared assessing the site and the earthworks that would be required to enable a future subdivision (resource consent for these earthworks was granted in December 2017). This report confirms that the site can be developed for residential purposes. As such, the site is considered to not be at a high risk from natural hazards and appropriate mitigation measures will be incorporated into the future development to ensure that any relevant natural hazard risks are addressed. As such, the proposed Plan Change is consistent with this objective and policy of the Regional Policy Statement.

Section 3.9 Regional Form, Design and Function

Objective 22
A compact well designed and sustainable regional form that has an integrated, safe and responsive transport network and:

(e) urban development in existing urban areas, or when beyond urban areas, development that reinforces the region's existing urban form;

(g) a range of housing (including affordable housing);

(h) integrated public open spaces;

(i) integrated land use and transportation; and

(k) efficiently use existing infrastructure (including transport network infrastructure);

Policy 31
Identifying and promoting higher density and mixed use development.

Policy 55
Maintaining a compact, well designed and sustainable regional form

Policy 57
Integrated land use and transportation

Policy 58
Co-ordinating land use with development and operation of infrastructure

Policy 67
Maintaining and enhancing a compact, well designed and sustainable regional form

(110) Objective 22 and the associated policies seek to ensure that development is undertaken within the existing urban environment in a manner which makes efficient use of existing infrastructure. The site is located within an urban environment and can be serviced by existing infrastructure.

(111) The proposed rezoning would facilitate more intense residential development of the site than currently provided for. The site is in close proximity to public transport (bus), is located near a main transport link (State Highway 2) and a number of public amenities including recreational facilities, a primary school and local shops. As such, it is considered appropriate that the site can support a higher level of development density than is currently allowed for under the District Plan.

(112) The proposed General Residential Activity Area allows for a variety of housing densities and development forms (subject to obtaining resource consent).

(113) Given the above factors, the proposed Plan Change is considered to be consistent with the above objective and policies of the Regional Policy Statement.

Section 3.10 Resource Management with Tangata Whenua

Objective 23
The region's iwi authorities and local authorities work together under Treaty partner principles for the sustainable management of the region's environment for the benefit and wellbeing of the regional community, both now and in the future.

Objective 24
The principles of the Treaty of Waitangi are taken into account in a systematic way when resource management decisions are made.

Objective 25
The concept of kaitiakitanga is integrated into the sustainable management of the Wellington region's natural and physical resources.

Objective 26
Mauri is sustained, particularly in relation to coastal and fresh waters.

Objective 28
The cultural relationship of Māori with their ancestral lands, water, sites, waahi tapu and other taonga is maintained.

Policy 48
Principles of the Treaty of Waitangi

Policy 49
Recognising and providing for matters of significance to tangata whenua

Policy 66
Enhancing involvement of tangata whenua in resource management decision-making

(114) The site is not identified as having any specific cultural values. As part of the plan change, consultation has been undertaken with both Ngāti Toa and Port Nicholson Block

Settlement Trust. Both of these parties in our discussions with them have indicated that they do not have any significant cultural concerns regarding the proposed plan change.

Regional Plans

(115) Section 75(4)(b) of the Resource Management Act 1991 states that a district plan must not be inconsistent with a regional plan for any matter specified in section 30(1).

Operative Freshwater Plan and Operative Soil Plan

(116) The Wellington Regional Freshwater Plan has a number of general objectives and policies, followed by more specific objectives and policies that relate to certain aspects for which rules have been developed, including specific protection required for certain waterbodies.

(117) The key policies relevant for this proposed Plan Change are summarised below:

Policy 4.2.9
Requires decision makers to have regard to a range of characteristics of watercourses when considering the protection of their natural character and the adverse effects of subdivision, use and development, including ecosystems, habitats and species, water quality, natural flow characteristics and hydraulic processes, and the topography and physical composition of watercourses.

Policy 4.2.11
Requires decision makers to avoid, remedy or mitigate adverse effects having regard to:

- *the maintenance of biological and physical processes;*
- *the maintenance of habitat for feeding, breeding and sheltering aquatic life;*
- *the maintenance of the diversity of aquatic life;*
- *the maintenance of the ability of fish to disperse and migrate;*
- *the times which will least affect feeding, spawning, dispersal or migratory patterns of fish and other aquatic species; and*
- *the prevention of irreversible adverse effects.*

Policies 4.2.35-36
Details the relevant considerations when determining the nature and extent of conditions, including the significance of adverse effects and the extent to which the community benefits from the proposal.

Policy 5.2.6
Requires Speedy's Stream and all tributaries to be managed for aquatic ecosystem purposes.

Policy 7.2.2
Provides that uses of river beds should not be allowed where there have adverse effects on a range of listed values, including tangata whenua, natural amenity, lawful public access, flood hazard, bed or bank stability, water quantity and hydraulic processes, and safety.

Policy 7.2.15
Provides that reclamation or drainage should only be carried out when there are no practicable alternatives and there are significant benefits to the community.

(118) The Wellington Regional Soil Plan focuses on avoiding, remedying or mitigating the adverse effects associated with soil disturbance and vegetation removal activities,

including accelerated erosion and sediment runoff.

(119) The key policies in relation to the earthworks and vegetation disturbance activities are provided below:

Policy 4.2.14
To avoid, remedy or mitigate the adverse effects of vegetation disturbance by promoting:

- *the maintenance and enhancement of vegetation in erosion prone areas;*
- *the conversion of erosion prone areas to forestry or soil conservation woodlots, or regeneration or active restoration to native bush;*
- *riparian management, including where this will help safeguard the life supporting capacity of aquatic ecosystems;*
- *compliance with industry recognised standards and procedures such as the Logging Industry Research Organisation's (LIRO) "Forestry Code of Practice" (Second Edition, 1993); and/or*
- *the maintenance and retention of erosion control plantings.*

Policy 4.2.15
To regulate soil disturbance activities to ensure that they are unlikely to have significant adverse effects on:

- *erosion rates;*
- *soil fertility;*
- *soil structure;*
- *flood mitigation structures and works;*
- *water quality;*
- *downstream locations;*
- *bridges, culverts and other water crossing structures;*
- *aquatic ecosystems; and*
- *historic sites with tangata whenua values.*

Policy 4.2.16
To ensure that recognised erosion control and land rehabilitation techniques are adopted to avoid, remedy or mitigate any adverse effects resulting from soil disturbance activities.

(120) The proposed Plan Change is consistent with the objectives and policies of the operative Freshwater Plan, and the operative Soil Plan. While development enabled by the proposed Plan Change could result in streambed and vegetation loss, this would not be significantly greater than what has already been approved for the property by way of resource consent. Furthermore, the ecological report prepared for the development of the site has confirmed that the vegetation and stream bed loss will not have significant ecological effects.

(121) It is recognised that the loss of streambeds would be subject to a Greater Wellington Regional Council consent (which has already been applied for). The resulting effects of this loss would be considered within this consenting framework, and if required, mitigation measures would be implemented.

(122) As part of the proposed Plan Change, a site specific policy and rules are proposed to ensure that the ecological values of Speedy's Stream and the onsite wetland are maintained. These provisions directly respond to the ecological values that these water bodies have and ensure that stormwater from the future development of the site is appropriately addressed.

(123) Under the proposed Plan Change, resource consent would be required for subdivision and development of the site. The level of earthworks required for the development would also trigger the thresholds in the District Plan. As part of any resource consent decision, it is likely that erosion and sediment control measures would need to be installed on the site. These measures would ensure that sediment runoff does not affect water quality and that the erosion risk during the site development works are addressed.

Proposed Natural Resources Plan

(124) Section 74(2)(a)(ii) of the RMA requires Council to have regard to any proposed regional plan of its region in regard to any matter of regional significance or for which the regional council has primary responsibility under Part 4 of the Act.

(125) The proposed Natural Resources Plan for the Wellington Region is a combined air, land, water and coastal plan. Once it is made operative it will replace the existing Regional Coastal Plan and the four current regional plans (Regional Air Quality Management Plan, Regional Freshwater Plan, Regional Plan for Discharges to Land and Regional Soil Plan). However, all rules within the proposed Natural Resources Plan had immediate legal effect from the date it was notified (31 July 2015).

(126) This plan change must have regard to the following objectives, policies in the proposed Natural Resource Plan:

> *<u>Objective O9</u>*
> *The recreational values of the coastal marine area, rivers and lakes and their margins and natural wetlands are maintained and enhanced.*
>
> *<u>Policy P9</u>*
> *Provides that the reduction in public access along rivers and lakes should be avoided.*
>
> *<u>Objective O17</u>*
> *The natural character of the coastal marine area, rivers, lakes and their margins and natural wetlands is preserved and protected from inappropriate use and development.*
>
> *<u>Policy P31</u>*
> *Requires aquatic ecosystem health and mahinga kai to be maintained or restored by managing the effects of use and development on physical, chemical and biological processes to achieve a range of outcomes, including minimising adverse effects on:*
>
> - *flow characteristics and hydrodynamic processes in rivers and natural wetlands*
> - *aquatic habitat diversity and quality; and*
> - *riparian habitats.*
>
> *<u>Objective O23</u>*
> *The quality of water in the region's rivers, lakes, natural wetlands, groundwater and the coastal marine area is maintained or improved.*
>
> *<u>Policy P33</u>*
> *More than minor adverse effects of activities on species known to be present in Schedule F1 watercourses, including Speedy's Stream and tributaries shall be*

avoided, including discharging contaminants, seabed disturbance during spawning season and diversion of water such that the river would be impassable to migratory species.

Objective O25

To safeguard aquatic ecosystem health and mahinga kai in fresh water bodies and coastal marine area:

(a) water quality, flows, water levels and aquatic and coastal habitats are managed to maintain aquatic ecosystem health and mahinga kai, and

(b) restoration of aquatic ecosystem health and mahinga kai is encouraged, and

(c) where an objective in Tables 3.4, 3.5, 3.6, 3.7 or 3.8 is not met, a fresh water body or coastal marine area is improved over time to meet that objective.

Policies P37 and P38

Activities in and adjacent to natural wetlands shall be managed to maintain wetland values and wetland restoration shall be encouraged.

Objective O28

The extent of natural wetlands is maintained or increased and their condition is restored.

Policies P40, P41 and P42

Requires the protection and restoration of significant indigenous ecosystems, and activities to be avoided in these areas in the first instance unless in accordance with a restoration management plan. Where avoidance is not possible, adverse effects shall be managed by:

- *avoiding more than minor adverse effects;*
- *where more than minor adverse effects cannot be avoided, remedying them;*
- *where more than minor adverse effects cannot be remedied, mitigating them; and*
- *where residual adverse effects remain it is appropriate to consider the use of biodiversity offsets*
- *Proposals for mitigation and biodiversity offsets are assessed against the*
- *principles listed in Schedule G*

Objective O48

Stormwater networks and urban land uses are managed so that the adverse quality and quantity effects of discharges from the networks are improved over time.

Policy P62

Promotes the discharge of contaminants to land rather than water particularly where adverse effects are possible.

Policy P63

Lists the ways in which the adverse effects of discharges can be minimised including by using land-based treatment, constructed wetlands or other systems to treat contaminants prior to discharge.

Policy P73

Minimise the adverse effects of stormwater discharges by using a range of measures, including good management practice and water sensitive urban design.

Policy P95

Lists the ways in which the discharge of contaminants to land shall be managed, including ensuring the discharge does not result in more than minor adverse effects on soil health, not exceeding the natural capacity of the soil and not resulting in a discharge that enters water.

Policy P97

Minimising the discharge of contaminants from earthworks using a source control approach, and using good management practices in site management, erosion and sediment control design operation and maintenance to minimise the adverse effects of sediment-laden stormwater discharges.

Policy P98

Good management practice shall be used to minimise the risk of accelerated soil erosion, control silt and sediment runoff and ensure the site is stabilised and vegetation cover restored.

Policy P102

Provides that reclamation of riverbeds (including piping over a length longer than necessary for a crossing) is to be avoided except under certain circumstances, including where it is associated with a growth and/or development framework or strategy approved by a local authority under the Local Government Act 2002 (and where no other practicable alternatives apply) or the reclamation is of an ephemeral flow path. "Ephemeral flow path" is defined as a river that does not have an active bed, or has a bed that is predominantly vegetated, and only conveys water during or immediately following heavy rainfall events, and does not convey or retain water at other times

(127) The proposed Plan Change has regard to the objectives and policies of the proposed Natural Resources Plan. While the proposed Plan Change would involve streambed loss and vegetation loss from the site as a result of a residential development, this would not be significantly greater than what has already been approved for the property by way of resource consent.

(128) It is also recognised that the loss of streambeds would be subject to a Greater Wellington Regional Council consent (which has already been applied for). The resulting effects of this loss would be considered within this consenting framework, and if required, mitigation measures would be implemented.

(129) As part of the proposed Plan Change a site specific policy and rules are proposed to ensure that the ecological values of Speedy's Stream and the onsite wetland are maintained. These provisions directly respond to the ecological values that these water bodies have and ensure that stormwater runoff from the future development of the site is appropriately managed.

District Plans in the Wellington Region

(130) Section 74(2)(c) of the RMA requires territorial authorities to consider the extent to which a plan change needs to be consistent with the plans or proposed plans of adjacent territorial authorities.

(131) The proposed Plan Change affects an area of land that is located well within the boundaries of the City of Lower Hutt. It would have no effect on the operative plans or proposed plans of any adjacent territorial authorities and as such, would not be inconsistent with them.

Local Statutory and Non-Statutory Strategies and Policies

(132) A number of non-statutory Hutt City Council strategies and policies have been considered in preparing the proposed Plan Change. These are:

- Long-Term Plan 2015;
- Urban Growth Strategy 2012 – 2032;
- Economic Development Plan 2015 – 2020;
- Environment Sustainability Strategy 2015 – 2045; and
- Housing Policy 2008.

Long-Term Plan 2015

(133) The Long-Term Plan 2015 sets the following targets in relation to Urban Development:

- Target population growth of 0.6% per annum to ensure that at least 110,000 people live in the city by 2032;
- Target increase of 250 houses per annum for the first five years and approximately 300 per annum for following five years to 2032.

(134) The Plan Change would allow for additional residential sections by providing for more intensive development on the site than what is currently allowed for under the District Plan. This increased development potential would assist Council in meeting these targets.

(135) The Plan Change is therefore considered to be consistent with the Long-Term Plan 2015.

Urban Growth Strategy 2012 - 2032

(136) In 2013, Hutt City Council approved its Urban Growth Strategy that encourages 6,000 houses to be constructed in the District over the next 20 years. A significant number of these dwellings are proposed to be provided through intensification of housing within the existing urban boundaries. The site is situated in the existing urban boundaries and the proposed Plan Change could result in an additional 165 residential allotments, and would allow for the development of large block of land in a manner that is consistent with the character of the adjacent residential environment. It is therefore considered that the proposed Plan Change is supporting the intended outcomes of the Urban Growth Strategy.

Economic Development Plan 2015 - 2020

(137) The Economic Development Plan provides a vision for economic development from 2015 - 2020. The Economic Development Plan includes four areas of focus for Hutt City Council and its strategic partners. These are:

1. Grow science, technology, engineering and manufacturing capability and businesses;
2. Rejuvenate the Hutt CBD;
3. Stimulate growth and development;
4. Continue business support.

(138) One of the measures under the Stimulate Growth and Development heading is to increase the number of residential developments from 281 per year to 310 per year and increasing the value of residential development from $66.3 million to $73 million. The Plan Change would assist Council in achieving these targets and therefore is considered to be consistent with the Economic Development Plan.

Environmental Sustainability Strategy 2015 - 2045

(139) The Environmental Sustainability Strategy sets out Council's ambitions to protect, enhance or repair the environment. The Strategy identifies seven key focus areas: water, waste, transport, land use, biodiversity, energy and risk and resilience. Each focus area is led by three overarching strategic goals – lead, protect and enhance. The proposed Plan Change incorporates measures that respond to the biodiversity and land use focus areas of the Strategy. This includes protecting the ecologically significant areas on the site (wetland) and introducing stormwater management provisions to the District Plan.

(140) It is therefore considered that the Plan Change does not conflict with the Environmental Sustainability Strategy.

Housing Policy 2008

(141) The Housing Policy 2008 seeks to provide affordable housing within the City. Two of the key objectives of the Policy are:

- To help ensure that the housing needs of Hutt City are met and to improve the affordability of housing in Hutt City by:
  - increasing the supply of residential developments;
  - ensuring there is a more balanced mix between intensive housing and non-intensive housing developments, particularly around shopping centres and key transport routes; and
  - ensuring a supply of social housing for the elderly and socially disadvantaged;
- Ensure the District Plan and associated intensive housing design guidelines recognise and maintain appropriate levels of residential amenity;

(142) The Plan Change would allow for additional residential sections by providing for more intensive development on the site than what is currently allowed for under the District Plan. The proposed zoning would allow for a range of housing sizes and development densities. It is considered that the potential development density resulting from the proposed Plan Change would be consistent with the character of the wider environment.

(143) The proposed Plan Change is therefore considered to be consistent with the Housing 2008 Policy.

City of Lower Hutt District Plan - Objectives and Policies

(144) This section reviews the relevant existing objectives and policies of the District Plan pertaining to the General Residential Activity Area, Hill Residential Activity Area, General Recreation Activity Area, Subdivision, Transport and Earthworks Chapters, and explores whether these are sufficient to provide the required level of policy support to the proposed plan change.

(145) The General Residential Activity Area provisions are currently being reviewed by proposed Plan Change 43. Proposed Plan Change 43 has been publicly notified on 9 November 2017 and the submission phase closes on 9 March 2018. Therefore the provisions proposed by Plan Change 43 have no legal effect yet and this plan change is assessed against the current operative provisions of the General Residential Activity Area.

Chapter 1 Introduction and Scope of the Plan

(146) Chapter 1 of the District Plan identifies the area wide objectives which the District Plan seeks to achieve. The area wide objectives and policies which are considered to be

relevant to the Plan Change are as follows:

1.10.1 - Resource Management and Tangata Whenua of Lower Hutt

Objective

Resource Management and the Tangata Whenua of Lower Hutt: To respond to the principles of the Treaty of Waitangi and other matters of significance to the tangata whenua as specified in the Act.

Policies

(a) To have particular regard to tangata whenua's desire to carry out kaitiakitanga.

(b) To protect waahi tapu and sites of cultural or historical significance to tangata whenua from desecration or disturbance.

(c) To recognise and protect the tangata whenua desire to maintain and enhance their traditional relationship with the environment.

(d) To consult with the tangata whenua when discharging functions and duties under the Act.

(147) Consultation has been undertaken with both the Port Nicholson Block Settlement Trust and Ngāti Toa as part of the plan change process. Neither party has identified the site as having particular cultural value. Both parties consider that the proposed policy and rules to address stormwater runoff are appropriate for the site.

1.10.2 - Amenity Value

Objective

To identify, maintain and enhance the character and amenity values of the different activity areas.

Policy

To identify within all activity areas the general character and amenity values of that activity area.

(148) The site is located in an established residential area which is serviced by existing infrastructure and social, recreational and cultural facilities (such as Kelson Primary School, reserves, the local church and local shops situated on Major Drive). It is located close to State Highway 2 and the local roading network would be able to accommodate the additional traffic flow which could result from a future subdivision of the site. Given these factors, it is considered appropriate to apply a zoning of General Residential Activity Area to the majority of the site.

1.10.3 - Residential Activity

Objective

To accommodate residential growth and development through consolidation of the existing urban area but to allow some peripheral development.

Policies

(a) To provide opportunities for gradual intensification of residential densities by:

(i) Enabling higher densities along major transport routes and near suburban focal points,

(ii) Providing for infill development throughout the established residential

areas to appropriate minimum standards, and

(iii) Managing the rate at which land at the periphery of the urban area is developed for residential purposes.

(149) The Area Wide Objectives and Policies of the District Plan recognise that properties within the General Residential Activity Area are readily able to be developed either as a result of their natural topography, or as a result of bulk earthworks undertaken as part of the subdivision which created those properties. While the plan change site is sloping, there are many examples on the eastern and western hills of Lower Hutt where properties which have a similar slope angle are zoned General Residential Activity Area. It is therefore considered that the General Residential Activity Area is appropriate for the topography of the site, and it is also consistent with the zoning of other properties within wider Lower Hutt which have similar attributes. A resource consent was granted in 2009 that allowed for bulk earthworks to be undertaken on the site and a further resource consent was granted in December 2017 for earthworks associated with preparing the site for residential development.

1.10.6 - Recreation and Open Space

Objective

Open Space and Recreation Objective To provide and maintain a diverse range of open space and recreation facilities for the enjoyment of residents and visitors which meet the needs of different sectors of the community.

Policies

(a) To ensure the adequate provision of open space for the passive recreational needs of the community.

(b) To ensure adequate provision of larger open space areas for active and passive recreation.

(c) To ensure the protection and enhancement of areas of special recreation amenity.

(d) To ensure the conservation of natural and heritage features and landscapes.

(150) As part of the plan change, the northern portion of the site is proposed to be rezoned to the General Recreation Activity Area. As a result this portion of the site could be available for informal recreational activities in the local environment.

(151) Overall, it is considered that the Plan Change would contribute to achieving the Area Wide Objectives of the District Plan. It is considered that rezoning the site to the General Residential and General Recreation Activity Areas would achieve a balance between maintaining the amenity values and character of the local environment, while ensuring that the most appropriate development form for the site can be achieved.

Chapter 4A General Residential Activity Area

(152) Chapter 4A of the District Plan sets out the Objectives and Policies for the General Residential Activity Area. The Objectives and Policies relevant to this plan change are as follows:

4A 1.1.1 - Residential Character and Amenity Values

Objective

To maintain and enhance the amenity values and residential character of the General Residential Activity Area of the City.

Policies

(a) That opportunity be provided for a diversity of residential activities.

(b) To restrict the range of non-residential, and commercial activities to those which will not affect adversely the residential character or amenity values.

(c) To ensure residential amenity values are retained, protected and enhanced through the establishment of a net site area per dwelling house.

(d) That adverse effects arising from noise, dust, glare, light spill and odour be managed.

~~*(e) That vegetation and trees which add to the particular amenity values of the area be retained where practicable.*~~

~~*(f) That the clearance of vegetation be managed to avoid, remedy or mitigate any adverse effects on the intrinsic values of ecosystems.*~~ *[Policies 4A 1.1.1 (e) and (f) are proposed to be deleted by Proposed Plan Change 36 – Notable Trees and Vegetation Removal Provisions]*

(153) The majority of the suburb of Kelson is situated in the General Residential Activity Area. The proposed rezoning would allow for a development form on the site that is consistent with the established pattern of development within the suburb. In this regard, the proposed Plan Change is consistent with the character of the wider area.

(154) Policies (a) and (c) anticipate and provides for a range of residential activities within the General Residential Activity. The proposed General Residential Activity Area zoning would be consistent with the majority of the developed residential sites which adjoin the external site boundaries. The existing General Residential Activity Area rules would ensure that any future development undertaken as a result of this plan change would be consistent with the anticipated character and amenity values of the local environment.

(155) For controlled activity subdivisions, the District Plan sets a net site area of 400m² within the General Residential Activity Area. The rule framework of the District Plan however does provide for higher density development through provisions for medium density residential developments (however such developments are identified as restricted discretionary activities and must be assessed through the resource consent process). The rules that control density would be applicable to the site once rezoned and would provide for development densities that are consistent with those of existing development in the adjacent residential area.

(156) It is also recognised that the subdivision of the site that was approved by the 2009 resource consent allows for a density of development that is similar to what would be anticipated as a result of the proposed Plan Change. In this regard, the outcome that would result from the plan change is considered to be consistent with the policy expectations outlined under policy (c).

(157) The ecological report prepared for the site identifies significant vegetation in the northern portion of the property. Given the rule framework of the General Residential Activity Area (which generally enables residential housing) and that the northern part of the site is intended to be recreational space, it is considered that the General Recreation Activity Area would be more suitable to maintain the ecological values of this area. As such, it is not appropriate to rezone the entire site to General Residential Activity Area.

4A 1.2.1 - Building Height, Scale, Intensity and Location:

Objective

To avoid, remedy or mitigate adverse effects caused by building height, intensity

and location on the amenity values of adjacent residential sites and the residential character of the surrounding residential area.

Policies

(a) To establish a minimum net site area and maximum site coverage requirement to ensure medium density development is achieved.

(b) To ensure all new development is of a height and scale, which is compatible with surrounding residential development.

(c) To ensure a progressive reduction in height of buildings the closer they are located to a site boundary, to maintain adequate daylight and sunlight to adjoining properties.

(d) To manage the siting of all buildings so as to minimise detraction from the character and visual attractiveness of the surrounding residential activity area.

(e) To manage the siting of all buildings so as to minimise detraction from the amenities of adjoining properties.

(f) To establish a minimum permeable surface area to assist with the sustainable management of stormwater.

(g) That where practicable, the siting of accessory buildings be managed to maintain safety and visibility during manoeuvres.

(158) This objective and the supporting policies are largely consistent with objectives and policies across a number of the residential zones within the District Plan, including the Hill Residential Activity Area. Essentially the District Plan seeks to ensure that residential buildings maintain the amenity values and residential character of neighbouring properties. The proposed General Residential Activity Area zone would ensure that the amenity values of the neighbouring properties are maintained through the existing bulk and location rules in this chapter. (It is noted that many of these rules are the same or similar as what is contained in the existing Hill Residential Activity Area zoning for the site.)

(159) A Landscape and Visual Assessment of the proposed Plan Change (Appendix 6) concludes that the development form that could result from the General Residential Activity Area is in keeping with the character of the wider environment. As such, it is considered that the site is able to support a higher density of development than what is envisioned under the existing Hill Residential Activity Area.

(160) The above policies are specific to the bulk and location of buildings. While no buildings are proposed as part of this plan change, the existing rules in the General Residential Activity Area Chapter are considered to be appropriate to ensure future buildings and structures are in keeping with the development character and patterns of the local environment. The existing provisions of the General Residential Activity Area are considered to achieve the outcomes sought by these policies and therefore no site specific rules are proposed by this plan change.

Chapter 4D Hill Residential Activity Area

4D 1.1.1 - Residential Character and Amenity Values

Objective

To maintain and enhance the distinct characteristics and amenity values associated with the hillside residential areas of the City.

Policies

(a) That the visual appearance and nature of earthworks be managed to minimise the adverse effects on the visual amenity values of the hillside environment.

(b) That the clearance of vegetation be managed to avoid, remedy or mitigate any adverse effect on the visual amenity values of the hillside environment or the intrinsic values of ecosystems.

(c) That where practicable significant trees which contribute to the amenity values of the hillside areas be retained.

(d) That where practicable, the natural appearance of the skyline be preserved from development to maintain its visual appearance.

(e) To ensure residential amenity values are maintained, protected and enhanced through the establishment of a net site area.

(161) The plan change site exhibits several properties that make it consistent with the Hill Residential Activity Area (such as vegetated gullies, streams etc.). However, resource consents have been granted in 2009 and 2017 that authorise extensive modification of the site. If these earthworks are undertaken, the site would lose many of the characteristics that align it to the Hill Residential Activity Area and it would result in a landform and vegetation cover that is more typical of the General Residential Activity Area. As such, it is considered that this objective and associated policies become less relevant once the consented earthworks have been undertaken.

(162) A Landscape and Visual Assessment of the proposed Plan Change has been prepared by Drakeford Williams Ltd (Appendix 6). The assessment considers that the resulting development form that would be enabled by the General Residential Activity Area is in keeping with the character of the wider environment. It is considered that the site is able to support a higher density of development than what is envisioned under the existing Hill Residential Activity Area.

(163) The small wetland in the northern portion of the site is a key contributor to the physical characteristics and amenity values of the site (and wider area) as identified in the landscape and ecological assessments. This particular area of the site is not appropriate for residential development as this type of habitat is rare and threatened in the region. In this regard, the existing Hill Residential Activity Area for this aspect of the site is considered to be inappropriate as it envisions a residential use for this area of the property. It is proposed to rezone this portion of the site to General Recreation Activity Area.

4D 1.2.1 - Site Stability

Objective

To ensure future development does not affect adversely the stability of the site.

Policy

(a) That earthworks and the clearance of vegetation be managed to ensure the stability of the site and to avoid, remedy or mitigate any consequential adverse effects on neighbouring properties.

(164) This objective and policy are useful in that they identify a fundamental outcome that should be sought by all development that occurs on sloping property. However, it is also noted that the outcomes sought under this objective are also sought under the earthworks chapter and Section 106 of the Act. In this regard, if this objective and policy is no longer applicable to the site (because the General Residential Activity Area does not contain this

policy), then this would not result in an outcome that is not covered by other aspects of the District Plan and RMA. Furthermore, a geotechnical report for the site has been prepared by Cook Costello Ltd (Appendix 7). The report concludes that the site is not constrained to any particular degree by the topography and that it is suitable for residential development.

4D 1.2.2 - Building Height, Scale, Intensity and Location

Objective

To avoid, remedy or mitigate adverse effects caused by building height, intensity and location on the amenity values of adjacent residential sites and the residential character of the surrounding residential area.

Policies

(a) To establish a minimum net site area and maximum site coverage to ensure low density development is achieved.

(b) To ensure all new development is of a height and scale which is compatible with surrounding residential development.

(c) To ensure a progressive reduction in height buildings the closer they are located to a site boundary to maintain adequate daylight and sunlight for adjoining properties.

(d) To manage the siting of all buildings so as to minimise detractions from the character and visual attractiveness of the surrounding residential activity area.

(e) To manage the siting of all buildings so as to ensure that any detraction from the amenities of adjoining properties are no more than minor.

(f) That the scale and siting of garages and carports be managed to reduce the need for extensive excavation into the hillside, and to enhance the streetscape and amenity values of adjoining sites.

(165) The wording of this objective and policies are largely consistent across a number of the Residential subzones within the District Plan, including the General and Hill Residential Activity Areas. The outcomes sought under this objective are relevant and appropriate for the site. However, as the General Residential Activity Area contains a similar worded objective it is considered that the plan change would not result in a change in the overall outcomes sought from constructing residential buildings (albeit at a higher density as allowed for under the General Residential Activity Area when compared to the Hill Residential Activity Area).

(166) A Landscape and Visual Assessment of the proposed Plan Change has been prepared by Drakeford Williams Ltd (Appendix 6). The assessment considers that the resulting development form that would be enabled by the General Residential Activity Area is in keeping with the character of the wider environment. As such, it is considered that given this finding the site is able to support a higher density of development than what is envisioned under the existing Hill Residential Activity Area.

(167) The above policies are specific to the bulk and location of buildings. These policies are very similar to the policies for the General Residential Activity Area. The main difference is that the Hill Residential policies (specifically Policy (a)) envision a lower density of development than the General Residential policies. In this regard, it is considered that given the site is located in an existing urban zone, has an approved development on it for 142 lots, and is mostly adjacent to residential properties in the General Residential Activity Area, the low density outcome sought under this policy does not represent the most efficient use of the site. As such, it can be considered that the corresponding objective

and policies in the General Residential Activity Area represent a more appropriate outcome for the site, than the objective and policies outlined above.

Chapter 7A General Recreation Activity Area

(168) Chapter 7A of the District Plan sets out the objectives and policies for the General Recreation Activity Area. As this plan change proposes the rezoning of the northern portion of the site to General Recreation, the following objectives and policies are relevant:

> ***7A 1.1.1 - Adverse Effects of Recreation Activities on Adjoining Residential Activity Areas***
>
> *Objective*
>
> *To ensure that recreation activities have adverse effects, which are no more than minor on adjoining residential activity areas.*
>
> *Policies*
>
> *(a) To ensure that recreation activities are of a scale and character that amenity values of adjoining residential activity areas are not affected adversely.*
>
> *(b) To ensure that adverse effects, such as noise, glare, light spill and odour, generated by activities in the General Recreation Activity Area, are managed to ensure that residential amenity values are maintained.*

(169) Objective 7A 1.1.1 is a broad objective that seeks to ensure that recreation activities do not have significant effects on the adjoining residential activities. This objective recognises that a variety of activities can be undertaken on recreationally zoned land, and in some instances it is appropriate that the effects of these are controlled through the District Plan rules.

(170) Policies 7A 1.1.1 (a) and (b) seek to ensure that recreational activities are of a scale and character that maintains the amenity values of the adjoining residential properties. The proposed area to be rezoned General Recreational Activities would adjoin residential properties. Due to the topographical and ecological constraints, any recreational activities undertaken are likely to be low intensity and informal (like walking). These activities are considered to maintain the amenity values of the adjoining residential properties.

(171) The outcomes sought under this objective and associated policies remain relevant and the current wording of this objective and associated policies is appropriate and no changes are proposed as part of this plan change.

> ***7A 1.1.2 - Recreation Areas Need to be Compatible with the Characteristics of the Land***
>
> *Objective*
>
> *To ensure that recreation activities carried out are compatible with the physical characteristics of the land.*
>
> *Policies*
>
> *(a) To encourage land of suitable topography to be developed and used for formal and active forms of recreation.*
>
> *(b) To avoid bush-clad areas of high amenity values from being used and developed for formal and active forms of recreation.*
>
> *(c) To ensure that bush-clad areas are protected from inappropriate use and development.*

(d) To ensure that recreation activities carried out in bush-clad areas do not compromise visual amenity values.

(172) This objective and associated policies recognise that the recreational activities carried out on a site respond to the corresponding physical characteristics of the land. In the Hutt Valley, the General Recreation Activity Area covers a variety of land characteristics including flat sports fields, through to vegetated hillsides. The area proposed to be rezoned to General Recreation Activity Area is a vegetated hillside containing a small wetland and is only intended to accommodate informal recreational activities (possibly walking tracks). This would be consistent with other parcels of land that are situated in the same zone within the Hutt Valley. As such, this objective and associated policies are considered to be appropriate for the proposed Plan Change.

Chapter 11 Subdivision

(173) The following Objectives and Policies in the Subdivision chapter of the District Plan are relevant for this plan change:

11.1.1 - Allotment Standards

Objective

To ensure that land which is subdivided can be used for the proposed use or development.

Policy

(a) To ensure that allotments have minimum design standards such as, minimum size, shape and frontage, which are suitable for the proposed use or development.

(174) The above objective and policy are applicable regardless of the zoning of the site. They are broad and ensure that any allotments created are fit for the purpose that is determined by the underlying zoning. This is supported through the rule framework of the District Plan that sets minimum allotment sizes, shapes and frontage requirements for the various zones of the District Plan. It is considered that given the broad nature of this objective and policy, the current wording is appropriate and would ensure that suitable environmental outcomes for the site are achieved.

11.1.2 - Engineering Standards

Objective

To ensure that utilities provided to service the subdivision protect the environment and that there are no adverse effects on the health and safety of residents and occupiers.

Policy

(a) To ensure that utilities provided comply with specified performance standards relating to such matters as access, street lighting, stormwater, water supply, wastewater, gas, telephone, electricity and earthworks.

(175) This engineering objective recognises that utilities need to protect the environment and that there are no adverse effects on the health and safety of residents. The ecological report identifies that the site is in a sensitive environment, in that it forms part of the catchment of Speedy's Stream and there is a wetland located on the property. The Stormwater Report (Appendix 5) for the site recognises this sensitivity and proposes measures to ensure that future development maintains the ecological and hydrological value of these water bodies. The broad wording of this objective is appropriate to support

the proposed provisions that relate to maintaining the ecological values of Speedy's Stream and the onsite wetland.

(176) The related policy provides an emphasis on ensuring that subdivisions comply with performance standards relating to utilities. As previously identified the site is in an ecologically sensitive environment. It is important that the engineering provisions that are relevant for future development of the site recognise these values, and ensure that this environment is not degraded as a result of future development. To ensure the identified values on and around the site are appropriately considered it is proposed to introduce a site specific policy.

11.1.4 - Special Areas

Objective

To ensure that land in the coastal environment, areas adjoining lakes and rivers and other environmentally sensitive areas are protected from inappropriate subdivision.

Policy

(a) To ensure that land in the coastal environment, areas adjoining rivers and lakes and other environmentally sensitive areas are not subdivided to an extent or manner where amenity values, ecological, social, cultural and recreational conditions are adversely affected.

(177) This objective and policy recognises the need for environmentally sensitive areas to be protected from inappropriate subdivision. The site contains an environmentally sensitive area (wetland) and adjoins the boundary of another environmentally sensitive area (Speedy's Stream). This objective and policy requires the protection of these areas from inappropriate subdivision and that the ecological and amenity values of these areas are not adversely affected. As such, the plan change proposes to limit the development potential of this area by applying the General Recreation Activity Area zoning. Additionally, stormwater management measures would be required to ensure the on-going ecological health of these areas.

Chapter 14 General Rules

(178) The following objectives and policies in the General Rules chapter of the District Plan are relevant for this plan change:

Chapter 14A Transport

14A (i) 1.1 - Separation of Local and Through Traffic

Objective

To accommodate a roading network that is safe, convenient and efficient; and which avoids or mitigates any adverse effects on the community and the environment.

Policies

(a) That adequate levels of service for access and movement are provided to meet the travel demand of pedestrians, cyclists and motorised traffic during the off-peak period, with maximum safety for all users and local residents at all times.

(b) That the safety and amenity values of local access areas be protected from the intrusion of through traffic, particularly speeding vehicles, large volumes of traffic, and heavy commercial vehicles, using the Roading Hierarchy.

(c) That the location of activities with intense traffic generation characteristics be controlled to avoid adverse effects on the safety and efficiency of all Distributor Roads.

(179) The above objective and policies seek to ensure that an appropriate level of roading access is provided to meet the expected level of demand, in a safe manner, while having particular regard to amenity values of the local area. The continued use of the above policies will assist with the provision of appropriate roading connections to the area, and in a manner that requires the consideration of the amenity values of the local environment. A Traffic report has been prepared as part of the Proposed Plan Change (see Appendix 8). The report concludes that adequate connections are available to the site and that the anticipated demand resulting from the change to the zoning can be accommodated within the existing roading network.

(180) Chapter 14A Transport is currently being reviewed by Plan Change 39 which proposes a new Transport Chapter. Plan Change 39 is expected to become operative shortly and any future development would be assessed against the new provisions once they are operative.

Chapter 14I Earthworks

14I 1.1 - Natural Character

Objective

To ensure that earthworks are designed to maintain the natural features that contribute to the City's landscape.

Policies

(a) To ensure that earthworks are designed to be sympathetic to the natural topography.

(b) To protect significant escarpments, steep hillside areas, and the coastal area by ensuring that earthworks are designed to retain the existing topography, protect natural features, and prevent erosion and slips.

(181) It is acknowledged that in its current state, the site is relatively unmodified and that the residential development of this site would modify this landform. However, the 2009 and 2017 resource consents allow for extensive modification of the site through earthworks and vegetation clearance. If these earthworks are undertaken, they will modify the sites natural characteristics while retaining its general topography.

(182) The site does not contain any significant escarpments and is not located in a coastal area.

(183) The most significant natural feature on the site is the wetland. The proposed Plan Change would retain and protect this wetland through the General Recreation Activity Area zoning. No significant earthworks are envisioned within this wetland as part of development of the site.

(184) A geotechnical report for the site has been prepared (Appendix 7). The report concludes that the site is not constrained to any particular degree by the topography and that it is suitable for residential development.

(185) It is therefore considered that the proposed Plan Change is consistent with the outcomes sought under the above objective and policies of the District Plan, particularly given the existing consents that allow for the site to be extensively modified.

14I 1.2 - Amenity, Cultural and Historical Values:

Objective

To ensure earthworks do not affect adversely the visual amenity values, cultural values or historical significance of an area, natural feature or site.

Policies

(a) To protect the visual amenity values of land which provides a visual backdrop to the City.

(b) That rehabilitation measures be undertaken to mitigate adverse effects of earthworks upon the visual amenity values.

(c) To protect any sites with historical significance from inappropriate earthworks.

(d) To recognise the importance of cultural and spiritual values to the mana whenua associated with any cultural material that may be disinterred through earthworks and to ensure that these values are protected from inappropriate earthworks.

(186) While the site is located on the hillside, the landscape assessment prepared for the proposed Plan Change considers that the site is not visually prominent when viewed from the wider environment due to the orientation of the property and the screening from the topography of the local area. As such, the site does not form a backdrop to the city.

(187) It is acknowledged that in its current state, the site is relatively unmodified, and is covered with a variety of vegetation types. However, the 2009 and 2017 resource consents allow for extensive modification to the site through earthworks and vegetation clearance. Mitigation measures are required by conditions of both of those consents that address the effects on amenity values from those earthworks and vegetation clearance.

(188) The most significant natural feature on the site is the wetland. The proposed Plan Change would provide for this wetland through the General Recreation Activity Area zoning and no significant earthworks are envisioned in this part of the site.

(189) The site is not identified in the District Plan as having any unique historical or cultural significance. Consultation has been undertaken with both Ngāti Toa and the Port Nicholson Block Settlement Trust and they have not raised any concerns regarding the proposed Plan Change.

(190) It is therefore considered that the proposed Plan Change is consistent with the outcomes sought under the above objective and policies of the District Plan, particularly given the existing consents that allow for the site to be extensively modified.

Proposed District Plan Change 39: Transport

(191) Proposed Plan Change 39 is a review of the transport provisions of the District Plan. The Plan Change proposes a new Transport Chapter for the District Plan (Chapter 14A) as well as some consequential changes throughout the Plan. The Plan Change proposes changes to both the policy framework for transport issues and well as the rules and standards that relate to the transport network.

(192) Proposed Plan Change 39 was publicly notified for submissions on 4 October 2016 and has progressed through the submission and hearing stages of the plan change process. A decision on the Plan Change was publicly notified on 16 January 2018 and the provisions of the Plan Change have had legal effect from that date. The Plan Change is currently open to appeals from submitters.

(193) The key part of the Plan Change that would impact a residential development at the site is

the introduction of provisions to address High Trip Generators.

(194) Under Appendix Transport 2 of the Plan Change, any residential development or subdivision that enables more than 60 dwelling houses is classed as a High Trip Generator. Rule 14A 5.1(c) of the Plan Change requires resource consent for High Trip Generators as a restricted discretionary activity. A resource consent application for a High Trip Generator needs to include an Integrated Transport Assessment that addresses the effects of the development on the transport network.

(195) While the Plan Change is still open to appeals from submitters, as there were no submissions on the High Trip Generator provisions for residential developments, these provisions will not be able to be appealed.

(196) It is anticipated that the rezoning of the site to General Residential Activity Area would result in a subdivision that would provide for well in excess of 60 dwelling houses. While Proposed Plan Change 48 would require resource consent for that subdivision as a restricted discretionary activity through the proposed subdivision provisions, the subdivision would also require resource consent as a High Trip Generator, and the effects of the subdivision on the transport network would need to be addressed as part of that resource consent process.

Proposed District Plan Change 43: Residential and Suburban Mixed Use

(197) Proposed Plan Change 43 "Residential and Suburban Mixed Use" was publicly notified on 7 November 2017. This proposed Plan Change reviews the General Residential Activity Area provisions and proposes the introduction of two new activity areas, providing for medium density residential development and suburban mixed use in targeted areas. The purpose of proposed Plan Change 43 is to provide for greater housing capacity and a wider range of options for housing styles and sizes at medium densities within the existing urban area.

(198) Proposed Plan Change 43 provides for some additional infill and limited medium density development in the General Residential Activity Area. However, it envisions this zone would still be characterised by one to two story detached houses set back from property boundaries. Proposed Plan Change 43 includes objectives to ensure that residential activities are the dominant activities in General Residential areas, and to ensure that built development is compatible with the amenity levels associated with low to medium density residential development.

Effects of the Proposed Plan Change

(199) The proposed Plan Change seeks to rezone the site at 64 Waipounamu Drive, Kelson from Hill Residential Activity Area to General Residential Activity Area and General Recreation Activity Area under the District Plan. It also proposes the introduction of a site specific policy and rules to the subdivision chapter to address specific environmental constraints associated with the development of the site. These provisions are primarily designed to ensure that stormwater runoff from a future developed site does not adversely affect the ecological integrity of the onsite wetland or Speedy's Stream and its tributaries. No new objectives are proposed as part of this plan change as the existing District Plan objectives pertaining to the General Residential Activity Area, General Recreation Activity Area, Subdivision and Earthworks chapters are considered appropriate.

(200) An assessment of the potential environmental effects resulting from the proposed Plan Change is provided as this assists with informing the appropriateness of the proposed Plan Change (and the associated proposed provisions).

Amenity and Character Effects

(201) The site is a vacant property that is currently zoned Hill Residential Activity Area. It is adjoined by developed properties zoned General Residential Activity Area to the south, east and north-east, by General Recreation Activity Area zoned land to the west and a property zoned Hill Residential to the north. While the density of development provided for under the current Hill Residential Activity Area zoning (being a minimum net site area of 1000m^2) is less than that of the adjoining General Residential Activity Area (minimum net site area of 400m^2), development on the site under Hill Residential Activity Area would still be likely to contain a road network, streetlights, footpaths, services and residential buildings up to 8m high, covering a maximum of 35% of their respective net site areas. The landscape and visual assessment for the proposed Plan Change, prepared by Drakeford Williams, concludes that the development form enabled by the proposed change in zoning is appropriate within the context of the local environment, and would be consistent with the established residential character of the Kelson area.

(202) A resource consent granted in 2009 allows for bulk earthworks across the majority of the site and for a 142 lot residential subdivision. The density of this consented development is greater than currently provided for under the existing zoning and more closely aligns with the proposed General Residential Activity Area zoning. If this consent was implemented it would result in a development form that is not inconsistent with the density of development located in the residential areas of Kelson.

(203) Any new subdivision layout seeking higher density development than what has been previously approved for the site, would require a new resource consent.

(204) The District Plan identifies the criteria which must be taken into account when considering an application for a subdivision consent as a Controlled Activity. These criteria include:

> *"Subdivisions should be designed in a manner which recognises and gives due regard to the natural and physical characteristics of the land and adverse effects are avoided, remedied or mitigated."*

(205) This assessment criteria allows Council to have control over the final form of the subdivision and to ensure that its layout, form and density is consistent with the topography of the site and the intended character and amenity values of the local environment. While the proposed Plan Change would make subdivision of the site a Restricted Discretionary Activity, this assessment criteria would still provide guidance on the layout, form and density of development that is anticipated for the site as part of the General Residential Activity Area.

(206) The existing District Plan bulk and location rules will control the form of the final dwellings on the site. Aside from net site area, the bulk and location rules pertaining to individual dwellings (for example site coverage, maximum height, setbacks etc.) are the same across both General Residential and Hill Residential Activity Areas. In this regard, the proposed Plan Change would not allow for larger or taller buildings than the existing zone. If a future dwelling does not comply with one or more of the bulk and location rules, a resource consent would be required and the resulting environmental effects would require consideration.

(207) The proposed General Residential Activity Area also provides opportunities for higher density forms of development, or multi-unit residential development. This form of development is subject to the resource consent process (starting as a Restricted Discretionary Activity), and assessed on a case by case basis, to ensure potential adverse effects are at a level that is deemed acceptable.

(208) The zoning of the northern area of the site to General Recreation Activity Area would limit

the development potential of this area. Given this is the most ecologically significant area of the site, the stringent development controls that exist within the rule framework of the General Recreation Activity Area are considered appropriate to ensure potential effects are managed to ensure the visual amenity values of the site are maintained.

(209) The Landscape and Visual Assessment (Appendix 6) found that the site did not meet the threshold for being considered an outstanding natural landscape or special amenity landscape and therefore no specific protections were required. It is acknowledged that to facilitate development of the site under both the current and proposed zones, substantial earthworks would be required to create suitable building areas and a roading network to provide access to future allotments/dwellings. Presently any earthworks on a site zoned Hill Residential Activity Area require resource consent approval. The proposed General Residential Activity Area would allow for limited earthworks to occur as a Permitted Activity. Up to 50m³ of earth could be disturbed, and the existing ground levels could be altered by up to 1.2m (cut or fill) without triggering the need for resource consent. Given the scale of the earthworks required to facilitate a residential subdivision of the site, these provisions would not be met and resource consent would be required. The resource consent process would allow for the Council to consider several effects associated with the proposed earthworks including:

- *Amenity Values: The extent to which any earthworks proposal will affect adversely the visual amenity values of the area, and the extent to which the earthworks will cause unnecessary scarring and be visually prominent. Consideration must be given to adverse effects on visual amenity values, and the value of the site as a visual backdrop to the city. The extent to which replanting or rehabilitation works are included as part of the proposal to mitigate adverse effects. Earthworks should not result in the permanent exposure of excavated areas.*

(210) This matter would allow for Council to require changes to the design of the earthworks or impose conditions of consent that ensure the amenity effects from the earthworks are appropriately mitigated, remedied or avoided.

(211) The residential development of the site would also require vegetation clearance. Under the current provisions of the District Plan, resource consent would be required for the removal of vegetation in excess of 500m² or 35% of the site in both Activity Areas, General Residential and Hill Residential. However proposed Plan Change 36 Notable Trees and Vegetation Removal Provisions seeks to delete this vegetation clearance limit for the General Residential Activity Area and modify it for the Hill Residential Activity Area. While the proposed provisions of Plan Change 36 for the Hill Residential Activity Area are currently under appeal the removal of vegetation clearance provisions for the General Residential Activity Area has not been challenged and is expected to become operative shortly.

(212) The Landscape and Visual Assessment (Appendix 6), finds that while development of the site under the General Residential Activity Area provisions has the potential to have effects on the landscape values these effects would be similar to the visual effects of the 2009 resource consent. The assessment comes to the conclusion that when viewed from within Kelson the development will be perceived as an extension of the existing suburban housing area and therefore the proposed zoning as General Residential Activity Area is appropriate for this site from a landscape and visual perspective.

(213) The Assessment further finds that the proposed rezoning of the northern area of the site to General Recreation Activity Area provides an opportunity to maintain landscape values of the areas of wetland and vegetation along the lower slopes of the site and adjoining

Speedy's Reserve. In addition, it is likely that resource consent would be required from Greater Wellington Regional Council for disturbance of the wetland.

Ecological Effects

(214) Under the Hutt City Council District Plan, large substantive stands of significant vegetation are identified as a Significant Natural Resource. These Significant Natural Resources cover a large area of the Hutt Valley. The site is not located within an identified Significant Natural Resource.

(215) The ecological report for the site (Appendix 5) has identified the onsite wetland and the off-site Speedy's Stream as having ecological value. Accordingly, the proposed zoning of the wider area around the wetland and the surrounding mature native vegetation to General Recreation Activity Area is considered appropriate to adequately protect the ecological values of this area, as this zone generally discourages development.

(216) Furthermore to maintain the ecological value, an additional policy and rules are proposed to be added to the Subdivision chapter. The proposed policy and rules require the management of stormwater from any future development of the site. This stormwater management would ensure that the existing aquatic conditions of Speedy's Stream and the onsite wetland would be maintained and any the effects of any development of the site on the ecological values of these water bodies would be managed.

(217) Speedy's Stream which is located outside the plan change area is categorised as a Class 2 stream in the Proposed Natural Resources Plan. Additional to the District Plan controls, Greater Wellington Regional Council's Regional Freshwater Plan and Proposed Natural Resources Plan have objectives, policies and rules regarding works in and around waterbodies. This provides an additional layer of protection to the wetland and other waterbodies in this area.

Natural Character Effects

(218) The District Plan seeks to ensure that earthworks do not result in unnecessary scarring of the landscape. This is supported through Policies 14I 1.1 (a) *"To ensure that earthworks are designed to be sympathetic to the natural topography."* and 14I 1.1 (b): *"To protect significant escarpments, steep hillside areas, and the coastal area by ensuring that earthworks are designed to retain the existing topography, protect natural features, and prevent erosion and slips."*

(219) To facilitate residential development on the site, earthworks would be required for roading, house platforms, and services installation. As such, modification of the site would be expected as a result of the residential zoning of the site.

(220) Under the existing Hill Residential Activity Area zone, all earthworks require resource consent. The proposed General Residential Activity Area would allow for a level of earthworks to occur as a Permitted Activity. Up to 50m³ of earth could be disturbed, and the existing ground levels could be altered by up to 1.2m (cut or fill) without triggering the need for resource consent. Given the scale of the earthworks required to facilitate a residential subdivision, these provisions would not be met and resource consent would be required under either zoning. The resource consent process would allow for the Council to consider several effects associated with the proposed earthworks including:

- *Existing Natural Features and Topography: The extent the proposed earthworks will alter the natural topography. Earthworks in these activity areas should be designed to retain the natural topography and protect natural features.*

(221) This would allow Council to require changes to the design of the earthworks or impose

conditions of consent that ensure the environmental effects from the earthworks in relation to natural character are appropriately mitigated, remedied or avoided.

(222) The northern portion of the site is proposed to rezoned to the General Recreation Activity Area to ensure that the wetland and surrounding vegetation is protected. The wetland represents the most significant natural feature on the site and the retention of this area assists with maintaining the most significant natural character feature on the property.

(223) The existing District Plan provisions for earthworks and the proposed General Recreation Activity Area zoning for the wetland and surrounding vegetation, would address any effects from the development of the site for residential purposes appropriately and the proposed Plan Change would not result in unacceptable environmental outcomes in relation to natural character as a result of earthworks.

Infrastructure Effects

(224) The proposed General Residential Activity Area would allow for a greater level of residential development to be undertaken on the site when compared to the existing zoning. However the 2009 resource consent already provides for subdivision and development of the site of a scale that is similar to the General Residential Activity Area provisions. A review of the capacity of the services within the local area has been undertaken by Cuttriss Consultants Limited, with findings detailed in the report attached in Appendix 4.

(225) The infrastructure report considered the water, wastewater, power, telecommunications and stormwater capacity in the local area. The report concludes that this existing infrastructure has sufficient capacity to accommodate the additional demand generated by a future residential development of the site.

(226) To support the Cuttriss Consultants infrastructure assessment an assessment has been undertaken by Morphum which considers the stormwater discharge into the gullies of Speedy's Stream from a future residential development (Appendix 5). In response a policy and rules have been proposed to ensure the effects of a future residential development of the site take into account the ecological sensitivity of the onsite wetland and Speedy's Stream.

Natural Hazard Effects

(227) The site is not located in an identified natural hazards zone. While the site contains streams, these are headwaters of the bodies of water and therefore the site is not subject to significant risk from inundation. The main potential natural hazard risk present on the property is slope instability. In this regard, a geotechnical report for the site has been prepared (Appendix 7). The report concludes that the site is not constrained to any particular degree by the topography and that it is suitable for residential development.

Recreational Effects

(228) The site is currently privately owned, with no ability for the public to use the site for recreational purpose. As part of the plan change, it is proposed to rezone the northern portion of the property to General Recreation Activity Area to facilitate its future use as passive reserve. In this regard, the proposed Plan Change has positive recreational benefits as it creates an area of recreational zoning that does not currently exist, thereby allowing for an increase in reserve land in the local environment.

Historical and Cultural Effects

(229) The site is not identified in the Plan as having any unique historical or cultural significance. Consultation has been undertaken with Ngāti Toa and the Port Nicholson Block

Settlement Trust and they have not raised any concerns regarding the proposed Plan Change.

(230) Therefore, it is considered that the Proposed Plan Change would not result in any significant historical or cultural effects and any historical or cultural effects arising from future development can be appropriately managed by the existing District Plan rules.

Traffic Effects

(231) The potential traffic related effects of the proposed rezoning of the site to General Residential Activity Area and resulting residential development have been assessed in the traffic assessment contained in Appendix 8.

(232) This assessment focuses on the traffic effects which could result from potential development enabled by the change in zoning and whether any traffic safety or efficiency effects would arise within the existing traffic environment.

(233) The traffic report has assessed the local transport environment, including its capacity, and the impact of the indicative developments on this environment. The report concludes that in terms of traffic effects the site represents a suitable location for residential zoning. The traffic assessment further concludes that the local road network could accommodate the additional traffic generated from the expected level of development, without compromising the network's safety and efficiency. In addition, the site would be able to accommodate an appropriate road layout, access, street design and parking so that there would be no resulting internal traffic safety and efficiency effects.

(234) Overall, it is considered that the Proposed Plan Change would not result in any significant traffic effects and any traffic effects arising from future development can be appropriately managed by the existing District Plan rules.

Economic Effects

(235) While the economic effects of the proposed Plan Change have not been quantified, they are considered to be positive. This is due to the proposed General Residential Activity Area allowing for a greater intensity of residential development on the site. This means an increased yield in the number of residential properties, and therefore an increased number of people living in the local area. This will assist with supporting local shops as well as retail, service and commercial businesses in the wider environment.

(236) The proposed Plan Change provisions relating to stormwater management would result in additional costs to the construction of the proposed subdivision as well as any resulting dwellings. However, these additional costs would be small relative to the total costs associated with the subdivision of the site or the construction of the dwellings. As such, these additional costs are considered to not result in undue economic effects that would prevent residential development from occurring.

Evaluation of Options

(237) Section 32(2)(b) requires that if practicable the benefits and costs of a proposal are quantified. Quantifying costs and benefits would add significant time and cost to the s32 evaluation. Given the moderate scale and significance of the proposed Plan Change, exact quantification of the benefits and costs is not considered necessary to distinguish between the available options.

(238) During the preparation of this plan change the following three options have been considered:

- **Option A:** Retain the existing Hill Residential Activity Area;
- **Option B:** Rezone the entire site to General Residential Activity Area;
- **Option C:** Rezone the majority of the site to General Residential Activity Area with site specific subdivision standards for stormwater treatment and runoff and rezone the northern portion of the site to General Recreation Activity Area.

Table 2: Evaluation of benefits, costs, efficiency and effectiveness

Option A: Retain the existing Hill Residential Activity Area
Opportunities for Economic Growth and Employment A.1. The potential economic growth for the site is limited under the District Plan which requires a minimum lot size of 1000m². The approved resource consent allows for 142 residential allotments but lapses in 2019.
Benefits A.2. There is an existing resource consent for the site, which would allow for the creation of 142 lots. A.3. If the resource consent lapsed, then the site could be developed in under the existing Hill Residential Activity Area provisions. There is a degree of certainty associated with these provisions around the density of development that could be achieved. A.4. There would be no costs associated with the Plan Change process.
Costs A.5. The development potential of a serviced site within the existing urban boundaries would not be fully realised. A.6. Any changes to the approved resource consent or future resource consent would need to be assessed against the provisions of the Hill Residential Activity Area. A.7. The existing resource consent does provide the same long term protection for the onsite wetland and the downstream environment, including Speedy's Stream. A.8. It would be difficult to require the treatment of stormwater as part of the development as there are no specific policies or rules in the District Plan requiring this. As such, the development of the site under the existing provisions of the District Plan could result in poorer environmental outcomes for the onsite wetland and the downstream environment, including Speedy's Stream. A.9. There are potential cultural issues associated with the degradation of the wetland and Speedy's Stream as a result of stormwater runoff.
Risk of Acting or Not Acting A.10. Council would forego an opportunity to ensure the appropriate zoning of the site to meet the objectives expressed in the Urban Growth Strategy and giving effect to the National Policy Statement for Urban Development Capacity. A.11. If the existing consent lapses, there is a risk that the site would be developed at an intensity that is more at a level that is envisioned under the Hill Residential Activity Area zone (being 1,000m² lots), which would represent an opportunity cost.
Efficiency and Effectiveness A.12. The effectiveness of this option is low because retaining the existing zoning would reduce development potential of a site located within the existing urban boundary,

would be less consistent with the existing development form in the area.

Overall Assessment of Option

A.13. This option is not recommended as it does not strike a balance between development potential of the site being realised and the ecological values of the local environment being protected. The option would lead to poorer environmental outcomes and reduced development potential.

Option B: Rezone the entire site to General Residential Activity Area

Opportunities for Economic Growth and Employment

B.1. This option provides for the maximum economic growth as it allows for the entire site to be developed for residential purposes. This would result in the maximum potential yield from the site to be realised, which would provide the greatest employment and economic opportunities for the site.

Benefits

B.2. The density of development arising from this option would be comparable to what could be achieved on the residential properties to the south and east of the site.

B.3. There would be certainty associated with any further intensification of the site as this would be considered against the existing objectives, policies and rules pertaining to the General Residential Activity Area.

B.4. Allows the Council to better meet its housing supply requirements under the National Policy Statement for Urban Development Capacity, when compared to the existing zone and resource consent decision.

Costs

B.5. The costs associated with the plan change process, including the preparation of expert reports to support the plan change.

B.6. There is the potential for development to occur on the site with no recognition of the effects from stormwater runoff, which could result in poorer environment outcomes for the onsite wetland and the downstream environment, including Speedy's Stream.

B.7. There would be a lost opportunity of providing additional informal recreational activities in the local environment (through the protection of the wetland).

B.8. There are potential cultural issues associated with the degradation of the wetland and Speedy’s Stream as a result of stormwater runoff.

Risk of Acting or Not Acting

B.9. By not acting Council would it forego an opportunity to meet the objectives expressed in the Urban Growth Strategy as well as giving effect to the National Policy Statement for Urban Development Capacity.

B.10. If the entire site was to be rezoned General Residential there would be increased risk of development pressure on the identified wetland.

Efficiency and Effectiveness

B.11. While the proposed Plan Change would be effective in providing for additional development potential of the site it would not be effective in protecting the onsite wetland and managing the effects of stormwater runoff.

B.12. The option is not efficient because the potential environmental costs outweigh the benefits.

Overall Assessment of Option

B.13. This option is not recommended as it would not provide sufficient protection for identified ecosystems on and around the site (being the onsite wetland and Speedy's Stream).

Option C: Rezone the majority of the site to General Residential Activity Area with site specific subdivision standards for stormwater treatment and runoff and rezone the northern portion of the site to General Recreation Activity Area (Recommended Option).

Opportunities for Economic Growth and Employment

C.1. This option provides for enhanced economic growth as it provides for additional development potential of the site.

Benefits

C.2. Would provide for additional development potential compared to the existing zoning and the existing consent for the site while maintaining the environmental values of the site.

C.3. Would enable a density of development that is comparable to existing densities on adjacent residential properties to the south and east of the site. Resulting development form would be consistent with the wider environment.

C.4. Future development of the site would be considered against the existing objectives, policies and rules pertaining to the General Residential Activity Area.

C.5. Would allow for the implementation of engineering measures that ensures the ecological values of the onsite wetland and Speedy's Stream are maintained.

C.6. Would allow for the protection of the onsite wetland through the proposed General Recreation Activity Area zoning, thereby ensuring that the ecological values of this area are maintained.

C.7. Would potentially introduce a new informal recreational opportunity compared to the existing situation.

C.8. Would enable Council to better meet its housing supply requirements under the National Policy Statement for Urban Development Capacity, when compared to the existing zone and resource consent.

Costs

C.9. Costs associated with the plan change process.

C.10. Costs associated with the implementation of mitigation measures to ensure that stormwater from the site is appropriately controlled.

C.11. Reduced development potential when compared to Option 2, that allows for the

entire site to be rezoned to the General Residential Activity Area.
Risk of Acting or Not Acting C.12. By not acting Council would it forego an opportunity to meet the objectives expressed in the Urban Growth Strategy as well as giving effect to the National Policy Statement for Urban Development Capacity. C.13. By not acting Council would forego an opportunity to protect the onsite wetland and manage the stormwater effects on the environment through site specific provisions.
Efficiency and Effectiveness C.14. The efficiency of this option is high because the benefits significantly outweigh the costs. C.15. This option would be effective in providing for additional residential development while protecting identified areas of ecological value and managing the stormwater effects of future developments.
Overall Assessment of Option C.16. This option is recommended because it finds an appropriate balance between providing additional development potential for the site while recognising and providing for the ecological sensitivities associated with the site. The rezoning of the northern portion of the property to General Recreation Activity Area will provide protection for the onsite wetland from future development, and the introduction of provisions around stormwater management will ensure the ecological function of the downstream environment of Speedy's Stream, is maintained. C.17. This option would be consistent with the statutory requirements of the RMA and consistent with the objectives and policies of the Regional Policy Statement.

(239) Option C is the recommended option for the Proposed Plan Change as it is considered to be the most appropriate for achieving the purpose of the Act as it provides a balance between enabling an appropriate level of residential development on the site, while ensuring the ecological values of the onsite wetland and Speedy's Stream are accounted for.

Evaluation of Proposed Objectives

(240) The proposed Plan Change does not include any new objectives as it is considered that the existing objectives for the General Residential Activity Area, General Recreation Activity Area and the Subdivision and Earthworks Chapters of the Plan are appropriate.

Evaluation of Proposed Policies

(241) The proposed Plan Change seeks to introduce one new policy to Chapter 11 Subdivision, which is evaluated below:

11.1.2 Engineering Standards Policies (b) Use engineering practices to maintain the ecological values of Speedy's Stream and the onsite wetland from stormwater runoff resulting from the subdivision of the land identified in Appendix Subdivision 7.
Why this Policy is proposed Policy 1.1 Proposed Policy 11.1.2 (b) provides clear direction that engineering practices need to be implemented into the design of the future subdivision of the site to ensure that the ecological values of both Speedy's Stream and the onsite wetland are maintained. The existing objective under which this proposed policy would be located, directly references the consideration of the environment from engineering practices, and therefore would support a specific policy of this nature. This policy provides the context to the proposed rules which require the management of stormwater on the site.
How this Policy achieves the Objectives Policy 1.2 Objective 11.1.2 recognises that infrastructure needs to protect the environment. Proposed Policy 11.1.2 (b) would achieve the intent of Objective 11.1.2 by managing effects from the future development of the site to maintain the ecological values of Speedy's Stream and the onsite wetland. The preservation of these ecological values protects the environment, thereby ensuring the outcomes sought by Objective 11.1.2 are achieved

Evaluation of Proposed Rules

(242) The Plan Change proposes the introduction of a new site specific Restricted Discretionary Activity rule and related Matters to which Council has restricted its discretion, and a new site specific Discretionary Activity rule to *Chapter 11 - Subdivision* to ensure that the outcomes sought under the existing objectives and proposed policy are achieved. The proposed rules and matters of discretion are evaluated below:

11.2.3 Restricted Discretionary Activities … **(d)** Any subdivision of the site identified in Appendix Subdivision 7. 11.2.4 Discretionary Activities … **(l)** Any subdivision of the site identified in Appendix Subdivision 7 that does not comply with the standards and terms for controlled activity under Rule 11.2.2.1 in respect of (a) Allotment Design.
Purpose of the Proposed Rule Rule 1.1 Proposed Rule 11.2.3 (d) ensures that subdivision consent applications on the

site would be processed as Restricted Discretionary Activities rather than Controlled Activities. The Restricted Discretionary Activity consent status ensures that while subdivision activities are still provided for, the adverse effects of the subdivision (particularly with regard to the effects of stormwater runoff, which have been identified to be potentially significant) are appropriately managed.

Rule 1.2 Proposed Rule 11.2.4 (l) provides that subdivision proposals that breach the Controlled Activity standards for allotment design would be Discretionary Activities. This would ensure that more intensive subdivision design with additional potential for significant adverse effects could be considered with full discretionary powers.

Rule 1.3 The existing controlled activity rules and standards do not afford direct consideration to the ecological health of the downstream receiving environment. The proposed rule therefore elevates any subdivision application into the Restricted Discretionary Activity framework. This elevation of the activity status will not only allow for the consideration of application without the presumption of approval; it will also allow for the direct consideration of the downstream receiving environment through the matters listed in proposed standard 11.2.3.1(c)(xiv)

Rule 1.4 Consideration was given to the inclusion of a new Controlled Activity standard, instead of elevating the activity status to Restricted Discretionary from the outset. However, this did not eventuate due to the difficulty of inserting a measurable standard for maintaining ecological values of the onsite wetland and Speedy's Stream cleanly into the Plan. As such, there was a risk that by starting the consent assessment as a Controlled Activity, Council would have to approve the consent, even if there were adverse effects on the ecological value of either the wetland or Speedy's Stream. The Restricted Discretionary Activity status prevents this from occurring and ensures that a balance struck through the proposed approach still gives effect to the policy direction proposed.

Rule 1.5 The risk of not including the proposed rules is that poor environmental outcomes could arise from subdivisions applications where stormwater is not managed appropriately and the downstream receiving environment is compromised. As per the findings of the Morphum Stormwater and Ecology report, additional measures are required to maintain the ecological health of Speedy's Stream and the onsite wetland.

11.2.3.1 Matters in which Council has restricted its discretion

…

(c) Any subdivision of the site identified in Appendix Subdivision 7.

(i) Amenity Values:

The extent to which any earthworks proposal will affect adversely the visual amenity values of the area, and the extent to which the earthworks will result in unnecessary scarring and be visually prominent.

The effects on the amenity values of neighbouring properties including dust and noise.

The extent to which replanting, rehabilitation works or retaining structures are included as part of the proposal to mitigate adverse effects. Earthworks should not result in the permanent exposure of excavated areas or visually dominant retaining structures when viewed from adjoining properties or public areas, including roads.

(ii) Existing Natural Features and Topography:

The extent to which the proposed earthworks reflect natural landforms, and are sympathetic to the natural topography.

(iii) Historical or Cultural Significance:

The extent to which the proposed earthworks will affect adversely land and features which have historical and cultural significance.

(iv) Construction Effects:

The extent to which the proposed earthworks have adverse short term and temporary effects on the local environment.

(v) Engineering Requirements:

The extent of compliance with NZS 4431 1989 (Code of Practice for Earth Fill for Residential Development).

The extent of compliance with Part 2 NZS 4404:2004 (Land Development and Subdivision Engineering).

(vi) Erosion and Sediment Management:

The extent of compliance with the "Erosion and Sediment Control Guidelines for the Wellington Regional 2003" and "Small Earthworks – Erosion and Sediment Control for small sites" by Greater Wellington Regional Council.

(vii) The design and layout of the subdivision, including the size, shape and position of any lot, any roads or the diversion or alteration to any existing roads, access, passing bays, parking and manoeuvring standards, and any necessary easements;

(viii) The provision of servicing, including water supply, waste water systems, stormwater control and disposal, roads, access, street lighting, telephone and electricity;

(ix) Management of construction effects, including traffic movements, hours of operation and sediment control;

(x) Avoidance or mitigation of natural hazards;

(xi) The design and layout of the subdivision where any lot may affect the safe and effective operation and maintenance of and access to regionally significant network utilities (excluding the National Grid) located on or in proximity to the site;

(xii) The outcome of consultation with the owner and operator of

regionally significant network utilities (excluding the National Grid) located on or in proximity to the site;

(xiii) Those matters described in Section 108 and 220 of the Resource Management Act 1991;

(xiv) The engineering measures proposed to manage stormwater runoff to ensure the ecological health of Speedy's Stream and the onsite wetland. To assist, expert assessment shall be undertaken, and provided with any subdivision application. This report shall identify the following:

i. The existing ecological values of Speedy's Stream and the onsite wetland;

ii. The stormwater runoff rates for both the wetland and Speedy's Stream to maintain these ecological values (including for smaller frequent events like the 1 in 1 year and 1 in 2 year rainfall events);

iii. The acceptable level of contaminants in the stormwater to maintain the ecological values of both the wetland and Speedy's Stream;

iv. The engineering practices (for example bio-retention devices and detention tanks) required to treat and control all stormwater runoff to ensure that the identified ecological values are at least maintained and the stormwater runoff rates and treatment identified in the points above are achieved. These engineering practices shall control all runoff generated by the 85-90th percentile rainfall depth. This is defined as treating the stormwater volume generated by the 27mm rainfall depth; and

v. Any potential conditions that may need to be imposed on the subdivision consent to ensure that these engineering measures are undertaken and appropriately maintained.

11.2.4.1 Assessment Criteria for Discretionary Activities

…

(e) For the site identified in Appendix Subdivision 7, those matters to which Council has restricted its discretion under Rule 11.2.3.1(c).

Purpose of the Proposed Rule

Rule 2.1 For Restricted Discretionary Activities, the proposed matters to which Council restricts its discretion cover:

- matters (except those known not to apply to the site) Council has retained its control over when assessing all Controlled Activity subdivision consent applications,
- additional matters considered in restricted discretionary activity subdivision consent applications, and

- additional matters specific to the site.

Rule 2.2 The site-specific matters give Council the ability to impose conditions on future subdivisions to ensure engineering measures for stormwater are designed and implemented to maintain the ecological health of Speedy's Stream and the onsite wetland.

Rule 2.3 The matters provide flexibility in that the applicant is able to choose the engineering measures appropriate to the site to ensure protection of the ecological values of Speedy's Stream and the onsite wetland.

Rule 2.4 For Discretionary Activities, the Council has full discretion, including over the above Restricted Discretionary matters.

Opportunities for Economic Growth and Employment

Rule 2.5 The provisions are neither supportive nor restrictive of economic growth.

Benefits

Rule 2.6 The provisions are clear and outline what information needs to be provided with a subdivision application, which provides certainty to plan users. The majority of the proposed provisions are replicated from what is contained in the Controlled Activity standards. The applicability of these provisions and how they are implemented are well understood. These existing provisions also have strong linkages to the existing objective and policy framework.

Rule 2.7 The key benefits relate to ecology and water quality protection as a result of requirements for stormwater management.

Costs

Rule 2.8 The implementation of stormwater treatment measures into the subdivision has a direct additional financial cost associated with the development process.

Risk of Acting or Not Acting

Rule 2.9 The risk of not acting is that poor environmental outcomes could arise from untreated stormwater runoff and changes to the catchment hydrology for Speedy's Stream and the onsite wetland.

Efficiency and Effectiveness

Rule 2.10 The proposed provisions are efficient because the benefits outweigh the costs. The provisions are well understood and can be readily implemented.

Rule 2.11 The proposed provisions are effective in achieving the desired protection of ecology and water quality values.

Overall Assessment

Rule 2.12 The proposed provisions balance the enabling of development with ensuring that the required environmental effects associated with the subdivision are addressed. The proposed provisions are clear and outline what information needs to be provided with a subdivision application, which provides certainty to plan users. The majority of the proposed provisions are replicated from what is contained in the Controlled Activity standards. The applicability of these provisions and how they are implemented are well understood. These existing provisions also have strong linkages to the existing objective and policy

framework. As such, the proposed provisions are considered to be appropriate for the site.

(243) Overall, it is considered that the proposed rules are the most appropriate to achieve the existing objectives and proposed new policy of the Plan.

Quantification

(244) Section 32(2)(b) requires that if practicable the benefits and costs of a proposal are quantified. Given the assessment of the scale and significance of the proposed Plan Change above it is considered that quantifying costs and benefits would add significant time and cost to the s32 evaluation processes, therefore exact quantification of the benefits and costs in this report was not considered necessary, beneficial or practicable. Rather, this report identifies where there may be additional costs or cost savings.

Conclusion

(245) Proposed Plan Change 48 seeks to rezone the majority of the site at 64 Waipounamu Drive, Kelson from Hill Residential Activity Area to General Residential Activity Area. It also proposes to rezone the northern portion of the site from Hill Residential Activity Area to General Recreation Activity Area and to introduce new site specific provisions to the Subdivision Chapter

(246) The potential effects from a development that is enabled by the proposed rezoning of the majority of the site to General Residential Activity Area can be appropriately managed through existing and proposed objectives, policies and rules of the District Plan.

(247) The proposed Plan Change has been evaluated under the requirements of Section 32 of the RMA and is the most effective and efficient approach for Council to meet its statutory requirements and achieve the sustainable management purpose of the RMA.

Appendices

Appendix 1 Area Proposed to be Rezoned

Appendix 2 Indicative Scheme Plan

Appendix 3 Pre-notification Correspondence

Appendix 4 Infrastructure Assessment – Cuttriss Consultants Ltd

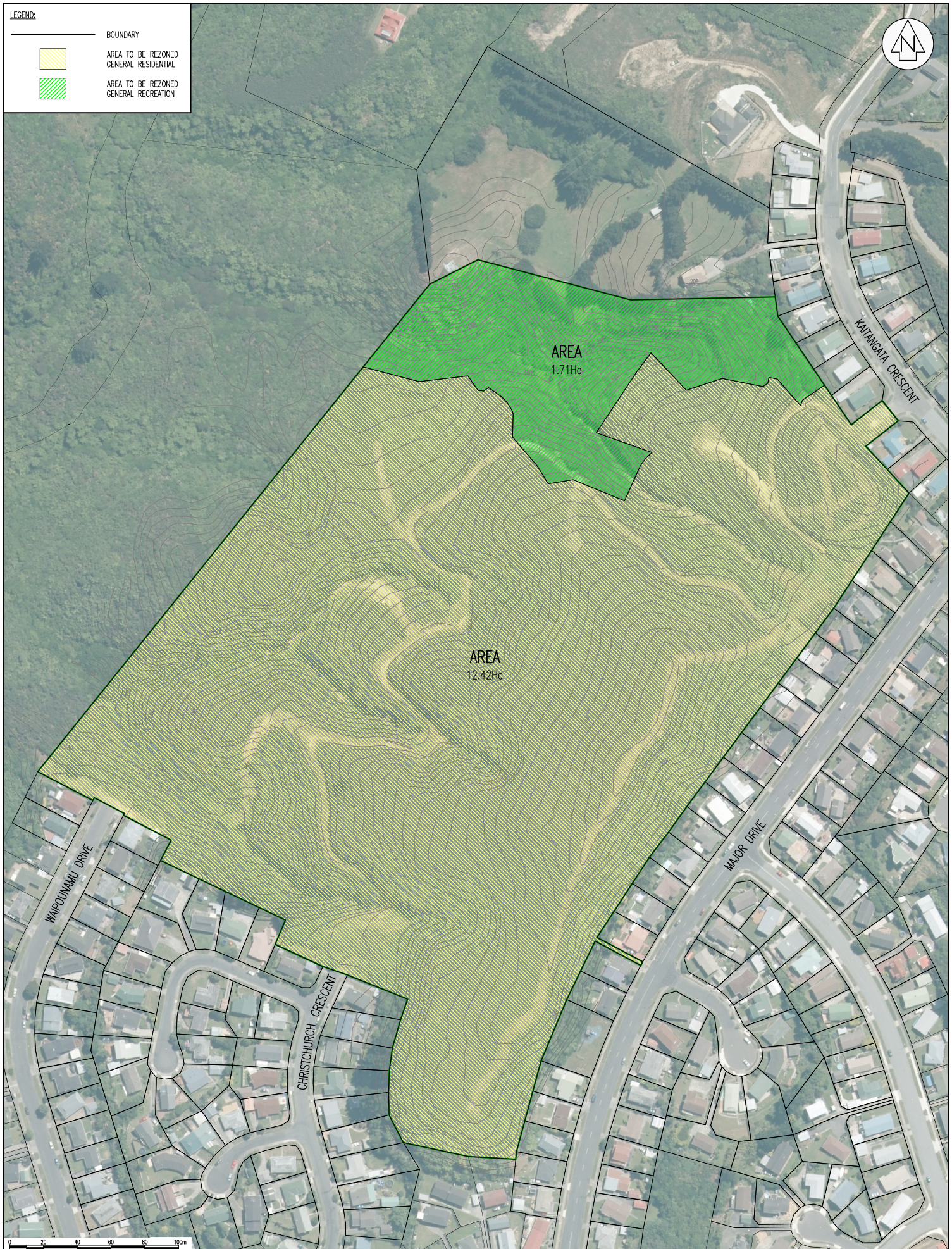
Appendix 5 Stormwater Management Assessment and Ecological Impact Assessment – Morphum Environmental Ltd

Appendix 6 Landscape and Visual Assessment – Drakeford Williams Ltd

Appendix 7 Geotechnical Report – Cook Costello Consulting Engineers

Appendix 8 Transportation Assessment – Harriet Fraser Traffic Engineering & Transportation Planning

Appendix 1 Area Proposed to be Rezoned



Cuttriss
Surveyors. Engineers. Planners.

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Paraparaumu Branch - 33 Kapiti Road, Paraparaumu
Postal Address - PO Box 386, Paraparaumu 5254
Telephone (04) 904 5420 Email kapiti@cuttriss.co.nz

JOB

PROPOSED REZONING OF LOT 1 DP 91313, 64 WAIPOUNAMU DRIVE, KELSON

CLIENT

KELSON HEIGHTS LIMITED

SCALE 1:1000 (A3 1:2000) SIZE A1

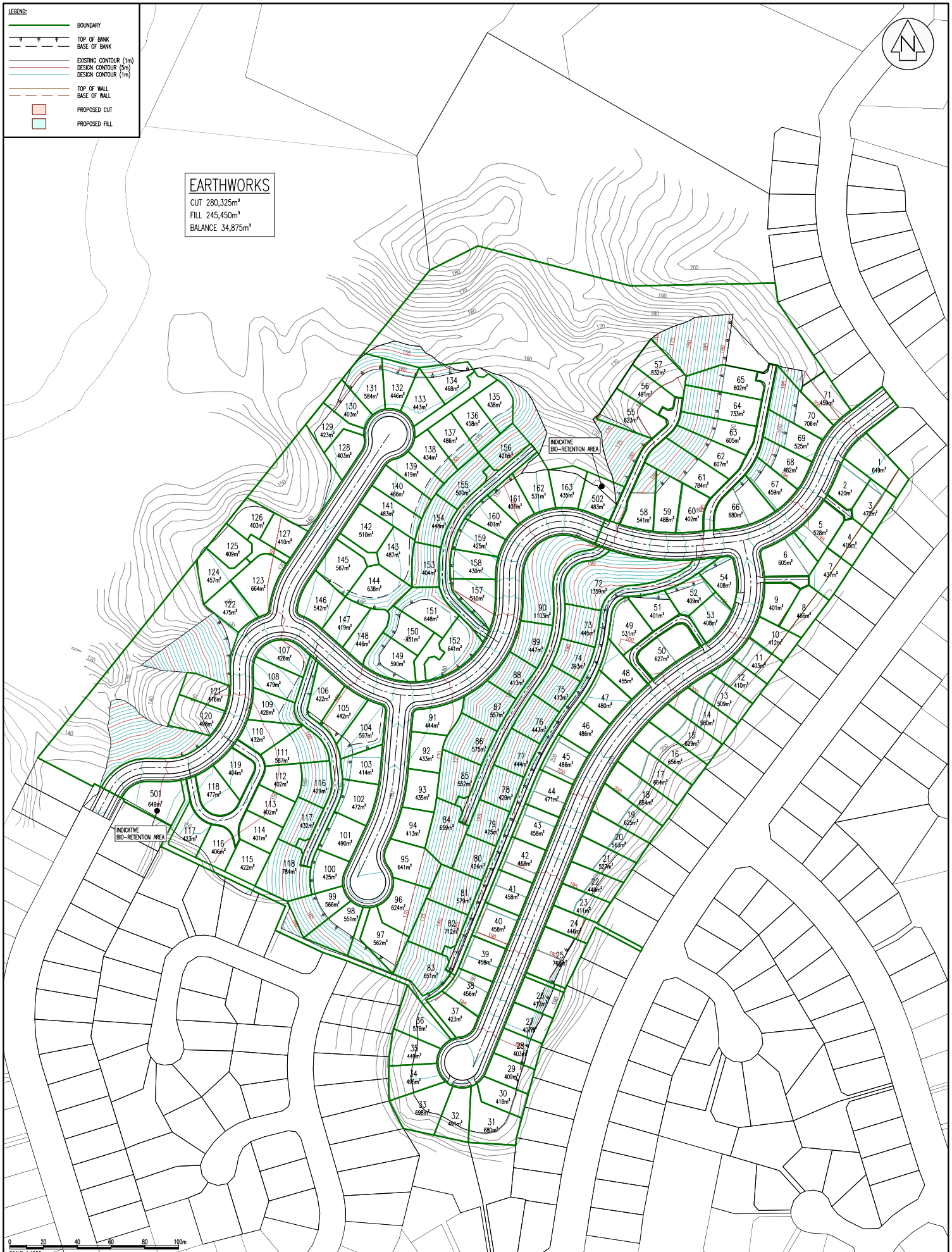
	NAME	DATE
FIELDWORK	–	–
DESIGNED	CRM	01/16
DRAWN	KML	02/17
CHECKED	SG	02/17

DRAWING NUMBER 28923SK4

SHEET 1 OF 1 SHEETS

REVISION –

Appendix 2 Indicative Scheme Plan



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JOB

POSSIBLE SUBDIVISION ON LOT 1 DP 91313, 64 WAIPOUNAMU DRIVE, KELSON
INDICATIVE RESIDENTIAL DEVELOPMENT – LAYOUT

CLIENT

KELSON HEIGHTS LIMITED

SCALE 1:1000 (A3 1:2000)			SIZE A1
	NAME	DATE	DRAWING NUMBER
FIELDWORK	–	–	28923SK6
DESIGNED	CRM	01/16	
DRAWN	KML	07/17	SHEET 1 OF 1 SHEETS
CHECKED	SG	07/17	REVISION –

Appendix 3 Pre-notification Correspondence

From: John McSweeney
To: "sam.gifford@cuttriss.co.nz"
Subject: Private plan change request for 64 Waipounamu Drive
Date: Monday, 31 July 2017 08:46:05

Dear Sam,

Thank for your notice dated 17 July 2017 and received 24 July 2017 from Kelson Heights Ltd, relating to the proposed re-zoning of land at 64 Waipounamu Drive from Hill Residential Activity Area to General Residential Activity Area and General Recreation Activity Area.

The Council does not propose to make a submission on this proposed plan change.

regards

John McSweeney
District Plan Manager | City Planning | Level 7 MOB | Wellington City Council
P 04 803 8557 | M 021 247 8557 | F
E John.McSweeney@wcc.govt.nz | W Wellington.govt.nz |

http://wellington.govt.nz/~/media/Images/email-signatures/wcc-banner-new.jpg

Cuttriss Consultants Ltd
PO Box 30-429
Lower Hutt 5010

Attention: Sam Gifford

4 August 2017

Proposed Plan Change – 64 Waipounamu Drive

Wellington Tenths Trust as an iwi authority in the PortNicholson Block, have examined the proposal to change the existing Hill Residential Activity Area to General Residential Activity Area and General Recreational Area. We note and support the new policies proposed regarding Speedy's Stream.

We are not aware of any particular Maori cultural issues around these proposals given the proposed policy to avoid significant ecological degradation from stormwater runoff on Speedy's, on-site wetland such that the runoff from the site after development does not exceed the pre-development flows with respect to the site.

No reira, heoi ano

Morris Te Whiti Love

Chairman

P O Box 25499
Wellington 6146
Telephone: 04 9013332

Archived: Friday, 20 October 2017 11:35:25
From: Jenna McFarlane
Sent: Wed, 2 Aug 2017 23:11:58
To: Sam Gifford
Cc: Rebecca Eng
Subject: RE: Proposed Plan Change - 64 Waipounamu Drive
Importance: Normal

Hi James,

As initially indicated, I do not have any concerns with the proposed plan change, given the rules within the Hutt City District Plan that will apply. Furthermore there is no development proposed within close proximity to the lines, only reserve. This is ideal for us.

Please let myself or Rebecca know if you require anything further from us.

Kind Regards,
Jenna

JENNA MCFARLANE
Senior Environmental Planner
Environmental Policy and Planning Team

Transpower New Zealand Ltd
Gate 1, Otahuhu Substation - Gridco Road, Otara, Auckland
PO Box 17215, Greenlane, Auckland 1546
P 09 590 6851 (extn 6851)
M 021 646 772
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Level 5, Majestic Centre
100 Willis Street
PO Box 5084, Lambton Quay
Wellington 6145
New Zealand
T 64 4 894 5200
F 64 4 894 3305
www.nzta.govt.nz

07 August 2017

Sam Gifford
Cuttriss Consultants Limited
PO Box 39-429
Lower Hutt 5010

Via email: sam.gifford@cuttriss.co.nz

Dear Sam

Proposed Plan Change - 64 Waipoumamu Drive

Thank you for the opportunity to provide early feedback on your clients proposed private plan change at 64 Waipounamu Drive, Kelson. The NZ Transport Agency (Transport Agency) has considered the information you have provided, as well as the existing consent for the site.

The Transport Agency recommends you reassess the data informing your traffic assessment. As an example, the draft report states a cycle run time of 120 seconds, during peak the cycles run at 140 seconds. The longer phase cycle on the state highway means a long wait time on the local road. The impacts of this should be considered in the traffic assessment.

On the understanding that there is no significant policy change, the Transport Agency has no other feedback to provide at this point in time. Should the extent of the proposed private plan change alter from what was provided to the Transport Agency in a letter date 17 July 2017, and a subsequent email[1], we request that you again seek feedback from the Transport Agency regarding any proposed changes.

If you have any questions or have further enquiries, these can be sent to wroplanning@nzta.govt.nz.

Yours sincerely

Caroline Horrox
Manager - Consents and Approvals
System Design and Delivery

Correspondence can be sent to: wroplaning@nzta.govt.nz

[1] Sent to Kathryn Barrett on 31 July 2017

Appendix 4 Infrastructure Assessment – Cuttriss Consultants Ltd

Infrastructure Capacity

A desktop investigation has been undertaken to ascertain the capacity of the existing public infrastructure surrounding the application site. The following conclusions have been drawn:

1.0 WATER SUPPLY

Allowance has been made in the existing water reticulation in this area for the future development of this site. There are three existing Φ150mm water mains in Kaitangata Crescent, Waipounamu Drive, and Christchurch Crescent which have blanked off connection points into the site. These mains can be extended into the site to provide fire and domestic water supply to Hutt City Council and New Zealand Fire Service standards.

This area is serviced from the Liverton Reservoir, which is located nearby above Kaitangata Crescent. The top water level in this reservoir is RL241.0m in terms of Mean Sea Level. The ground level of the highest lots in the developed site will be approximately RL202.0m. Allowing for head losses in the reticulation, this will give nominally 35.0m of pressure at these highest lots. Council's minimum pressure at the point of supply for domestic supply is 30.0m.

2.0 SEWAGE DISPOSAL

Allowance has been made in the existing wastewater reticulation in this area for the future development of this site. There are two existing Φ150mm wastewater mains in Waipounamu Drive and Christchurch Crescent which can be extended into the site to provide gravity wastewater reticulation for the development of this site. This wastewater system will meet Wellington Water's Regional Standard for Water Services and Hutt City Council requirements.

3.0 STORMWATER RETICULATION

Please refer to Morphum Environmental Report in Appendix 4

4.0 POWER AND TELECOMMUNICATIONS

Power and telecom services will be extended from existing reticulation in Kaitangata Crescent, Waipounamu Drive, and Christchurch Crescent to provide these services to the development.

5.0 ACCESS

Please refer to the Harriet Fraser Traffic Engineering & Transportation Report in Appendix 7

Report prepared by

Jim McMenamin
Senior Civil Engineer
Cuttriss Consultants Ltd

Appendix 5 Stormwater Management Assessment and Ecological Report – Morphum Environmental Ltd

MORPHUM ENVIRONMENTAL LTD

Engineers & Consultants

Stormwater Management Assessment

64 Waipounamu Drive

Proposed Plan Change

Final

Prepared for Kelson Heights Ltd by Morphum Environmental Ltd
November 2017

04 8024987 | info@morphum.com | www.morphum.com

Engineers & Consultants

Document Control

Client Name: Kelson Heights Ltd

Project Name: 64 Waipounamu Drive – Plan Change

Project Number: P01076

Document: Stormwater Management Assessment

Revision History

Status	Date Issued	Author	Reviewed By	Released By
Final	14/11/2017	Stu Farrant	Reuben Ferguson	Caleb Clarke

Reviewed by:

Reviewer: Reuben Ferguson **Signature:**

Released by:

Reviewer: Caleb Clarke **Signature:**

9 Tory Street, Te Aro, Wellington 6011
04 802 4987 | info@morphum.com | www.morphum.com

Contents

Figures

1.0 Introduction

Morphum Environmental Ltd (Morphum) has been engaged by Kelson Heights Ltd to prepare a Stormwater Management Assessment for the proposed 64 Waipounamu Drive plan change from Hill Residential to Residential.

The plan change proposal is subsequent to the proposal lodged in June 2017 for the Stage 1 bulk earthworks for 64 Waipounamu Drive. A separate Ecological impacts assessment was prepared by Morphum Stage 1.

The 64 Waipounamu Drive site (Lot 1 DP 91313) covers approximately 14 ha between Belmont Regional Park to the west and Major Drive to the east in Kelson, Lower Hutt. The site is bounded to the north and south by Kaitangata Crescent and Waipounamu Drive. Figure 1 shows the location of the Waipounamu development site. The site is currently includes areas of Hill Residential Zone with this report prepared in support of a change to General Residential for the entire site. This report is intended to address the potential stormwater related impacts resultant from this change and potential interventions to reduce the risk of negative environmental impacts on the immediate and downstream receiving environments. It is noted that these impacts are apparent regardless of development under the Hill or General zoning and the potential methods to avoid these impacts are similar under either situation. It is considered that development of the land under the General Resedential zone can be undertaken to adequately avoid or reduce impacts.

Figure 1: Location of proposed subdivision

This assessment also includes an analysis of a potential site wide stormwater management strategy for the development of the site under the General Residential rules (refere Appendix A). This is based on a preliminary layout which complies with appropriate lot sizes and density. This is provided as an example only and would need to be refined based on the final agreed layout.

2.0 Existing site conditions

2.1 Location and context

The Waipounamu site is positioned at the upper headwaters of tributaries of Speedys Stream. Speedys Stream itself is a tributary of the Hutt River with its confluence immediately south of the Fairway Drive Bridge near the bottom of Major Drive. The main stem of Speedy's stream and the majority of iots tributaries are within the boundaries of Belmont Regional Park extending to the headwaters. Historically large parts of this catchment have been actively farmed with unrestricted stock access and unvegetated riparian margins, particularly in the upper reaches. Belmont Stream converges with Speedy's Stream immediately upstream of SH2. Whilst not assessed as part of this work it is thought that the existing culverts beneath the Fairview Drive onramp and SH2 support a reasonable level of fish passage and therefore increase the ecological significance of Speedys Stream and its tributaries.

Development of 64 Waipounamu Drive will require the infilling of up to 724 m of existing stream. An existing resource consent was granted in 2009 which results in over 500 m of infilling with minmal mitigation. Comprehensive mitigation for the entire 724 m is now proposed including riparian planting within Belmont Stream, restoration planting around the existing wetland (within proposed reserve) and extensive erosion and sediment control during clearance and bulk earthwoirks. These works are covered in the ecological impact assessment which accompanied the stage 1 earthworks consent application (Morphum 2017).

2.2 Existing ecological context

Two main tributaries drain the site. These are referred to in earlier plans as Gully A and B (herein referred to as Northern), Gully C and D (herein referred to as Southern. All tributaries drain to Speedy's Stream which discharges to the Hutt River and ultimately to Wellington Harbour.

An existing perched wetland is present in the northern tributary and has been identified as an uncommon ecosystem type and has been prioritised for protection. The site falls within the Wellington Ecological District. This district is characterised by steep strongly faulted hills and ranges. With an underlying geology of argillite and greywacke. Valleys are predominantly alluvial, peaty soils and the steep slopes are predominantly leached stony soil with variable loess material overlying greywacke. The site is classified as moderately steep to steep (21-35°) hill country, ranging from 135 m to 220 m a.s.l.

Previous work on the site (as part of the existing 2009 resource consent, and more recently) has identified the ecological value of the remnant waterways of the site and noted the connectivity with the downstream reaches. Further community analysis was undertaken by freshwater ecologists from Cardno in September 2017. This concluded that overall, the MCI and QMCI scores indicated good to excellent stream health with 10 highly tolerant taxa recorded within the existing streams. This is considered to be a reflection of the currently undeveloped condition of the catchment and the good existing canopy cover. The existing waterways did however show relatively low taxonomic richness of the macroinvertebrate community.

The diversity of fish species was very low with the general fish community comprising almost exclusively of Koura *(Paranephrops Planifrons)*. A total of 56 Koura were sampled within the Northern Tributary. One shortfin eel *(Anguilla australis)* and eight Koura were sampled within the Southern Tributary.

Based on this it was concluded that the upper tributaries of Speedy's Stream showed relatively low taxonomic richness of both the macroinvertebrate and fish communities.

Figure 2 shows the existing waterways on the site, the location of SEV transects and the expected extent of waterway reclaimation.

Figure 2; Existing streams on subject site and location of SEV assessments

Three Stream Ecological Valuations (SEVs) were conducted on the site within the northern gully (Northern Long, previously referred to as Gully A and B) and the southern gully (Southern Short and Southern Long, previously referred to as Gully C and Gully D, respectively). SEV scores for these sites ranged from 0.77 to 0.87 which represent a moderate to high measure of ecological function for open watercourses.

The wetland area within the northern gully is not explicitly identified within either the Regional Policy Statement or the Proposed Natural Resources Plan for the Wellington Region although it is noted that the PNRP includes the objective that *The extent of natural wetlands is maintained or increased and*

their condition is restored. Wetlands are also valued as an uncommon ecosystem type in accordance with the second national priority objective ('To protect indigenous vegetation associated with sand dunes and wetlands; ecosystem types that have become uncommon due to human activity' (MfE, 2007)) and through the provision of ecosystem services.

2.3 Hydrology and post developed stormwater

Development of the site for residential development will result in the loss of headwater habitat and function with residual groundwater and event based stormwater conveyed in drainage installed in the base of the existing streams as part of infilling. All infilling shall include stripping of riparian vegetation and placement of compacted engineered fill. Reclamation will effectively extend from the headwaters downstream with no isolated stream habitat remaining above (and therefore no requirement for fish passage).

The ecological value of the site has been addressed through proposed mitigation package presented as part of the Consent Application for Stage 1 earthworks.

Whilst the intent of any stream loss mitigation approach is to compensate for the loss or degradation of the reaches of stream within the development site, it only partially considers the potential post-development impact on the downstream receiving waters. There is potential for urban development to cause ongoing degradation beyond the property boundary if not addressed. The long-term impacts on the downstream receiving waterways has the potential to extend beyond the development site regardless of mitigation for physical impacts within the development boundary.

In particular, there are a number of water quality and quantity issues which are known to adversely impact on the ecosystem health of freshwater systems as result of development. These include:

- Changes in the frequent flow hydrology such as reduced baseflow, increased flowrates in minor rainfall events and increased overall volume of runoff. These changes increase stress on biota and can worsen scour and erosion downstream. Typically, attenuation of 2-year ARI rainfall events (based on an isolated event based analysis) is supported to reduce the risk of channel scour but changes in the flowrates, frequency and duration of lesser events result in persistent stress on biota following development.
- Increased temperature of stormwater flows from impervious surfaces such as roofs, roads and paved areas following summer rainfall.
- Discharge of contaminants including suspended solids, heavy metals, nutrients and hydro-carbons from vehicles, building materials, residential gardens and atmospheric loads.

It is noted that natural systems are typically resilient to peak flowrates from less frequent large rainfall events and are more susceptible to adverse impacts from increased frequency of small 'flashy events'.

3.0 Development related impacts

The unmitigated development of undeveloped land will result in changes to water quality and quantity with negative downstream impacts. There is currently limited clear requirements in the Wellington Region to mitigate these impacts in terms of quantified objectives or limits. It is intended that the Wellington and Hutt Valley Whaitua committee process will in time develop these objectves and limits for the catchment which includes the Waipounamu site. These will then become an operative part of the Natural Resources Plan and shall be given effect by the Hutt City Council District Plan requirements. This process is expected to take between 2 – 4 years. Therefore future stormwater management policy will reflect the mandated objectives of the NPS Freshwater Management, in particular the need to maintain or improve water quality.

It is noted that whilst the intent of the existing Hill Residential zoning is for larger lot sizes (and potentially reduced relative imperviousness), without dedicated stormwater management, the combined impacts of roading, roofs and other paved surfaces will continue to impact on downstream environments. The change in planning overlay and development typology to General Residential will could potentially result in relatively greater negative impacts without mitigation. This is a reflection of the increased imperviousness compared to the current undeveloped condition. It is therefore considered that the change in zone from Hill Residential to General Residential will not in itself have a manifest negative impact but rather the unmitigated development under either zone will.

Development under either scenario can therefore be undertaken to respond to the site specific receiving environment and development intent with well designed stormwater management interventions employed to reduce potential for long term impacts. This approach is discussed in the following section.

Morphum has undertaken preliminary analysis and modelling on a potential indicative subdivision layout associated with development under the General Residential zone to demonstrate the intent for 64 Waipounamu Drive. This is summarised separately in Appendix A. A similar approach could be equally undertaken on other development scenarios with greater or lesser intensity with the infrastructure requirements able to respond to variable development outcomes.

4.0 Proposed Stormwater Management

In response to the ecological context of the site, and the intent to provide appropriate mitigation for ongoing impacts, the following stormwater management objectives are proposed to be adopted for the development under the General Residential zoning:

- Prioritise the protection of the existing perched wetland in the north catchment from changes in hydrology and water quality
- Mitigate potential adverse impacts from changes in frequent flow hydrology on the south tributary
- Reduce pollutant loads from urban development
- Reduce temperature impacts on downstream receiving environments

These objectives are proposed to be met through an integrated approach to stormwater management which adopts the following general strategies to avoid impacts on the existing wetland and mitigate the potential impacts on the south tributary. This is achieved through the following actions which are discussed within this report.

a) Implement rainwater harvesting and reuse, and modify the catchment extents to mimic as close as practical the pre-development frequent flow hydrology entering the existing perched wetland. This should include efforts to match the mean annual volume of discharge, the mean flowrate and the frequency of discharges. This is best achieved through the inclusion of internal (constant throughout the year) and external (varies seasonally) non-potable demands on rainwater.
b) Implement rainwater harvesting and reuse to mitigate flows into the southern tributary. This shall be focussed on reducing the mean annual volume of discharge and the frequency of discharges.
c) Capture and treat stormwater runoff prior to discharge through dedicated stormwater treatment systems (such as raingardens or wetlands) to remove contaminants including sediments, metals, hydrocarbons and nutrients, reduce temperature impacts

The design and performance of particular stormwater treatment objectives shall align with appropriate local or national guidance and ideally be tested through computational modelling on the intended development layout. This must accurately reflect the imperviousness and landuse under the proposed General residention. Such modelling undertaken by Morphum demonstrates that development under the intensities supported by the General Residential zone can be undertaken with Engineered stormwater systems to negate the adverse impacts from stormwater discharge.

It is noted that due to the small contribution of the development area to the wider Speedy's & Belmont Stream catchment, the absence of existing or potential flooding within the downstream watercourse and high proportion of land within the catchment which is protected in reserves and undergoing ongoing revegetation means that management of peak flow events from a flooding perspective is not required.

APPENDIX A; INDICATIVE STORMWATER MANAGEMENT SUMMARY

1.0 Stormwater modelling methodology

The performance of the proposed stormwater treatment systems has been assessed using a continuous simulation modelling approach. Continuous simulation uses historical gauged rainfall, as opposed to the statistically-derived 'design rainfall' that underpins most hydraulic modelling undertaken in New Zealand. The traditional event based approach is well suited to quantifying changes in runoff from certain magnitude events (such as for flood mitigation) but does not support assessment of systems under expected real rainfall conditions and dry spells. Continuous simulation enables the analysis of integrated solutions (such as rainwater harvest and reuse) to be evaluated alongside centralised treatment solutions to support decisions relating to water quality and quantity. In particular, this enables a robust assessment of the impact and mitigation of changes in the frequent flow hydrology which is needed to ensure appropriate levels of protection for the downstream receiving environment. In this case this is considered especially important given the occurrence of the perched wetland immediately downstream of the site and the risks associated with increased flowrates and volumes on this important ecosystem.

The Model for Urban Stormwater Improvement Conceptualisation (MUSIC) model was used for the simulation using five-minute rainfall data over a five year period. The model simulates the interaction between catchment characteristics, treatment devices and pollutant generation and removal at each time step to provide a thorough assessment of the pollutant removal process. MUSIC has been developed over more than a decade. It is based on research results from the last 15 years on the pollutant removal performance of different treatment systems and is the subject of numerous publications (see http://www.toolkit.net.au/Tools/MUSIC).

MUSIC is specifically designed to simulate hydrology, and pollutant generation and removal processes in urban catchments. Whilst the main focus of the analysis for the Waipounamu site is related to mitigation of the hydrological impacts on the receiving environment it is noted that MUSIC was developed to also model the generation and removal of typical urban contaminants, these being total suspended solids (TSS), total nitrogen (TN) and total phosphorous (TP). The results of the integrated approach are discussed further in Section 2.0.

1.1 Climate data

Five-minute rainfall data were gathered from the Greater Wellington Regional Council (GWRC) rainfall gauge at Birch Lane in Lower Hutt. This site is approximately 4.5 km from the Waipounamu development site and is considered to provide the best representation of rainfall for the locality given its location on the eastern side of the Belmont Hills.

A complete rainfall data set (at five-minute increments) for the period 2003-2007 was provided by GWRC for the purposes of modelling. This time series provided rainfall depth per five-minute increment and has an average annual rainfall depth of 1,324 mm/y. This compares closely to the Hutt Valley's long-term average of 1,270 mm/y (measured at Wallaceville which is approximately 100-150 m lower elevation).

Evapotranspiration rates were sourced from NIWA and applied in MUSIC to support modelling of pre-development conditions and the post-development water balance in response to forested areas, pervious landcover (lawns and gardens) and soil moisture storages. A mean annual Potential Evapotranspiration (PET) rate of 754 mm/y was used in MUSIC, adjusted on a monthly basis as summarised in Table 1.

Table 1: Monthly Potential Evapotranspiration (PET) rates used for modelling												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Mean PET (mm)	128	100	76	40	20	10	15	27	48	76	97	119

1.2 Rainfall-Runoff parameters

The MUSIC model includes a suite of catchment parameters which are used to derive the flow characteristics and hydrology for the site. These values are based on calibration against a range of typical urban development scenarios and are considered reflective of the compacted engineered fill (and pre-developed weathered greywacke) for the Waipounamu site. Full calibration against a downstream gauged flow monitoring station in the catchment or region was not feasible given the absence of data. Whilst it is considered that model calibration could result in change to some of the input parameters, the extensive use of MUSIC on comparable development conditions (with compacted fill and shallow soils) provides confidence in the parameters provided in Table 2. It is noted that development runoff is more sensitive to locally specific rainfall patterns and rates rather than properties for pervious landcover.

Table 2: Rainfall-Runoff parameters applied in MUSIC modelling		
	Units	**Value**
Impervious landcover parameters		
Rainfall threshold	mm/day	1.0
Pervious landcover parameters		
Soil storage capacity	mm	30
Initial storage	% of capacity	25
Field capacity	mm	20
Groundwater and interflow parameters		
Daily groundwater recharge rate	%	25
Daily baseflow rate	%	5
Daily deep seepage (loss)	%	0

1.3 Rainwater harvesting and reuse

Managing runoff from frequent small rainfall events to reduce impacts on receiving environments requires solutions which directly influence the volume and rate of stormwater discharges, particularly into the existing wetland area. Conversion of pervious landcover to impervious (roads, roofs and general paving) result in an increase in runoff from all rainfall events. Options to reduce the overall extent of the impervious cover are limited due to the density of the development, the need for trafficable access to properties and the topography which results in steep grades and corners which are considered unsuited to alternatives such as permeable paving. In addition, it is noted that the nature of site soils and requirements for large areas of constructed fill reduces the viability of targeted infiltration which will have low infiltration rates and could increase future risks of piping and/or ground instability.

It is therefore proposed to use domestic rainwater harvesting as a means of capturing and reusing a portion of the frequent rainfall to partially mitigate the post-development hydrological impacts. To ensure that this is effective, the timing and seasonality of reuse is critical. Whilst internal demands (toilet flushing and laundry) remain relatively constant throughout the year, irrigation rates vary significantly depending on climate and seasons. Therefore, the inclusion of these constant internal water demands is important to ensure that any tanks do not remain at capacity throughout winter months, negating

the benefit of this management approach. Table 3 provides the parameters used to model rainwater tanks. Table 4 shows the distribution of the irrigation rates applied across the year.

Table 3: Modelling parameters applied to rainwater tanks

	Unit	Value	Comment
Average roof area draining to tank	m^2	100	Considered to be minimum achievable roof area considering lot sizes and pitch design etc.
Tank size per dwelling	L	3,000	
Daily demand per person	L	50	Based on toilet flushing and cold water laundry usage
Average number people per dwelling		3	
Total constant daily demand	L/house/day	150	Applied as a constant demand throughout year for internal use
Seasonally-adjusted irrigation demand	kL/house/year	50	Based on irrigation of 100 m^2 garden with 500 mm/y applied.

Table 4: Monthly distribution of irrigation rates (%)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly irrigation distribution (%)	15	20	15	10	5	0	0	0	5	5	10	15

1.4 Bioretention systems

Bioretention systems (often referred to as raingardens) are vegetated filter systems whereby untreated stormwater is discharged to the surface of the filter bed and allowed to percolate through the prescribed media with treatment performed via a mix of physical and biological processes. In New Zealand, bioretention has typically been restricted to small-scale systems with direct inflows from kerb and channel. Whilst these can be effective and add to the streetscape, they significantly increase the maintenance burden on utility managers and can be challenging to integrate into all road typologies, particularly where steep grades are present. Internationally, bioretention systems are routinely used at a sub-catchment scale and can be configured to receive piped inflows from the reticulated network with appropriate scour protection at the inlets and provision for maintenance.

Bioretention systems operate based on a level surface with extended detention provided to enable the temporary ponding of inflows which exceed the infiltration capacity of the filter media. Flows are treated through the media and discharged via underdrains. The inclusion of a saturated zone beneath the underdrainage layer enables storage of water between events which is available to plants and enhanced nutrient treatment through chemical processes in the anoxic conditions.

Bioretention systems provide water quality benefits as well as some retention of water through evapotranspiration in the inter-event dry spells (particularly when a saturated zone is included). They can be designed to support landscape amenity and biodiversity outcomes and provide long-term performance.

Table 5 provides the key design parameters which have been applied in modelling the proposed sub-catchment bioretention systems at Waipounamu. These are based on industry best practice and the design of a number of similar systems in New Zealand and Australia.

Table 5: Bioretention design parameters used for modelling		
Parameter	**Unit**	**Quantity**
Filter media depth	mm	600
Hydraulic conductivity	mm/h	180
Saturated zone depth	mm	450
Extended detention depth	mm	250
Exfiltration rate	mm/hr	0

1.5 MUSIC modelling architecture

The MUSIC platform works through a user interface whereby 'nodes' are created to represent areas with similar characteristics for modelling purposes. This includes position within drainage catchments, landuse type/cover and connections with downstream catchments. Treatment elements are then included within the modelling architecture and connected with drainage links to represent pipe or overland flow. In the case of Waipounamu, the development site was broken into sub-catchments and modelled for the pre- and post-developed cases.

1.5.1 Pre-development model schematisation

The pre-developed scenario is based on the existing catchment characteristics which are broadly defined by the existing topography. This includes two main receiving waterways referred to as the north tributary (includes the existing perched wetland) and south tributary. These were both modelled as 100% pervious with regenerating scrub cover, with 3.05 ha draining to the wetland and 6.78 ha draining to south tributary. An additional 2.52 ha of land outside the development site currently drains into the wetland catchment. This includes roads and residential development and was estimated to be 35% total impervious based on aerial photographs. All pre-development flows are considered to be unmanaged.

Figure 3 shows the existing topographic catchments in relation to the proposed development. Figure 4 shows the set-up of the pre-developed scenario in the MUSIC interface.

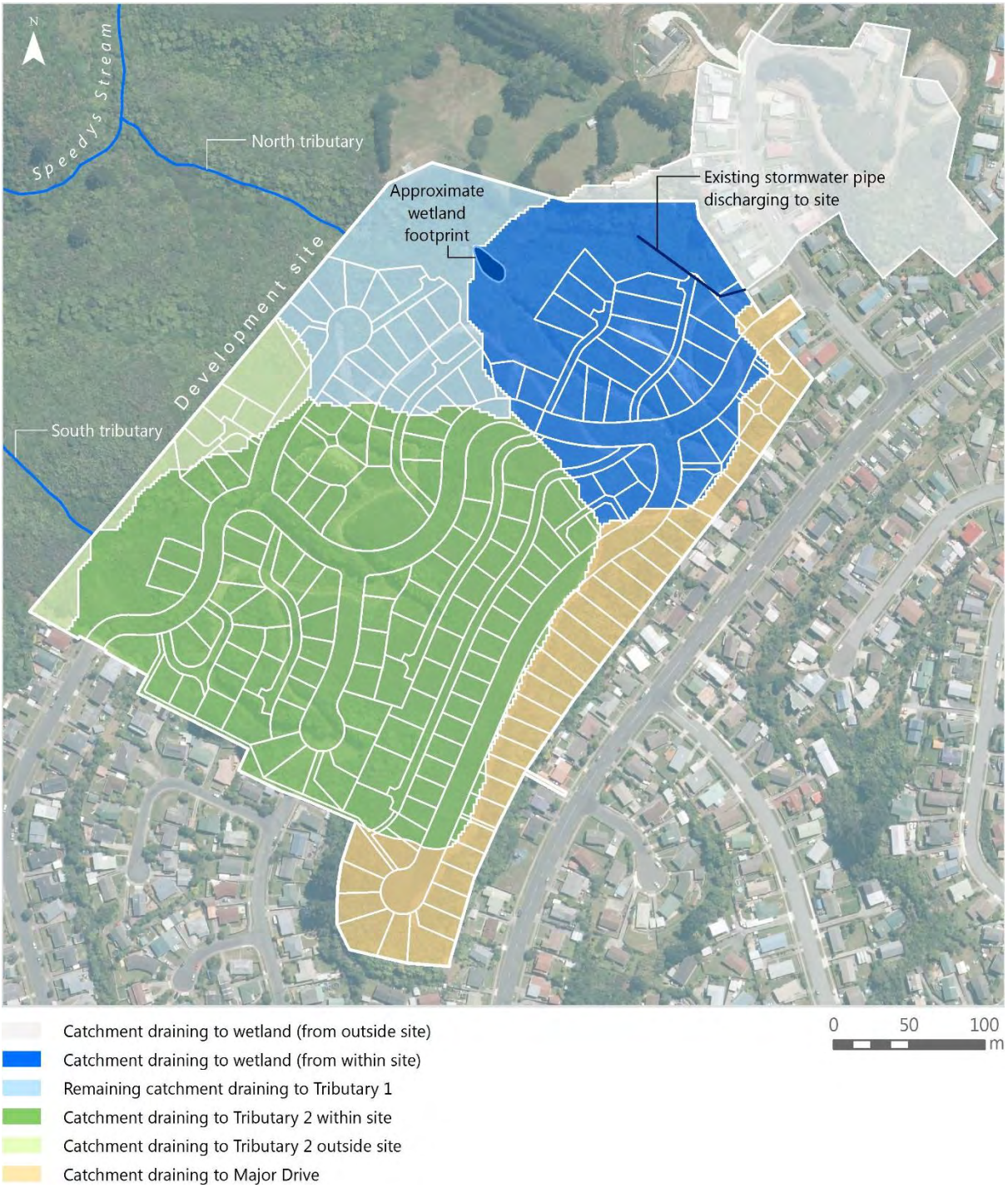

Figure 3. Pre-development catchments and drainage patterns

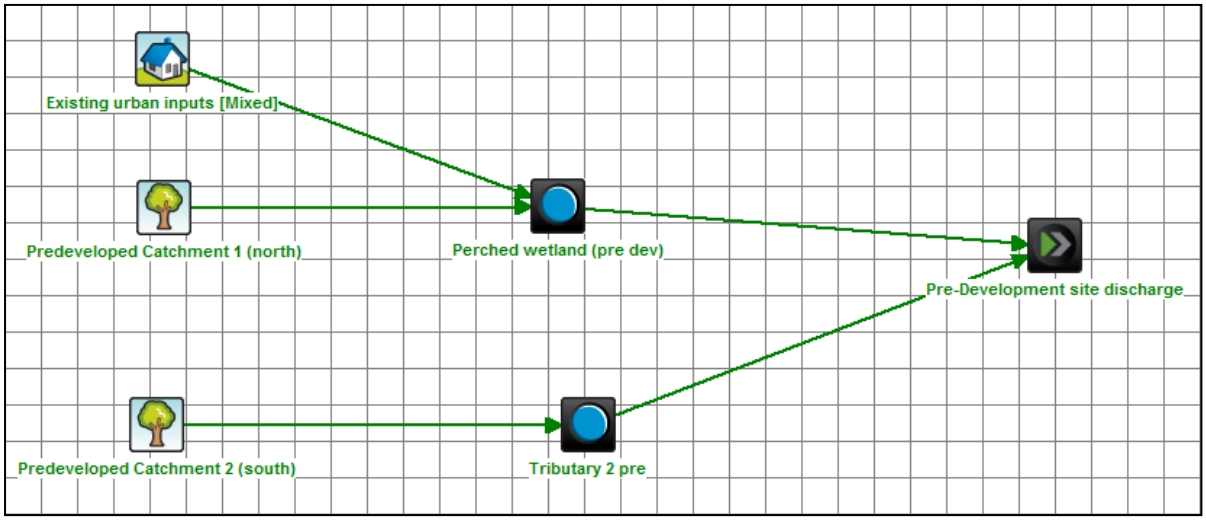

Figure 4. Model set-up for pre-developed case

1.5.2 Post-development model schematisation

Post-development modelling was undertaken on an iterative basis to test the optimum configuration to support the stated objectives. Due to the scale of earthworks, there are potential changes to sub-catchment boundaries and scope to modify these through alignment of stormwater lines etc. Multiple model runs are therefore able to be run to assess the response in terms of runoff to determine the most efficient and effective overall layout and integrated water management approach.

Figure 5 shows the configuration of lots within the development and their allocation to the respective treatment devices. Figure 6 shows the final set-up of the post-development scenario in MUSIC which is based on the following management interventions:

- Combined roof areas (100% imperviousness) are connected to lumped rainwater tanks (with lumped demands applied in accordance with Table 3).
- Remaining lot areas are combined and modelled at 35% imperviousness.
- Combined road areas are calculated and included separately (90% imperviousness).
- Areas draining to centralised treatment (including overflow from rainwater tanks) are connected to discharge into bioretention systems. Sub-catchment 1 (wetland) includes a 250 m^2 bioretention system, and sub-catchment 2 (south) includes a 500 m^2 bioretention system.
- Areas which are unable to be conveyed to treatment are modelled separately to bypass the bioretention systems and discharge directly to receiving waters.
- All catchment nodes ultimately drain to defined confluence points for reporting (such as the wetland area).
- Existing urban areas (outside development) which currently drain to the wetland catchment are included (and remain unchanged pre- and post-development).

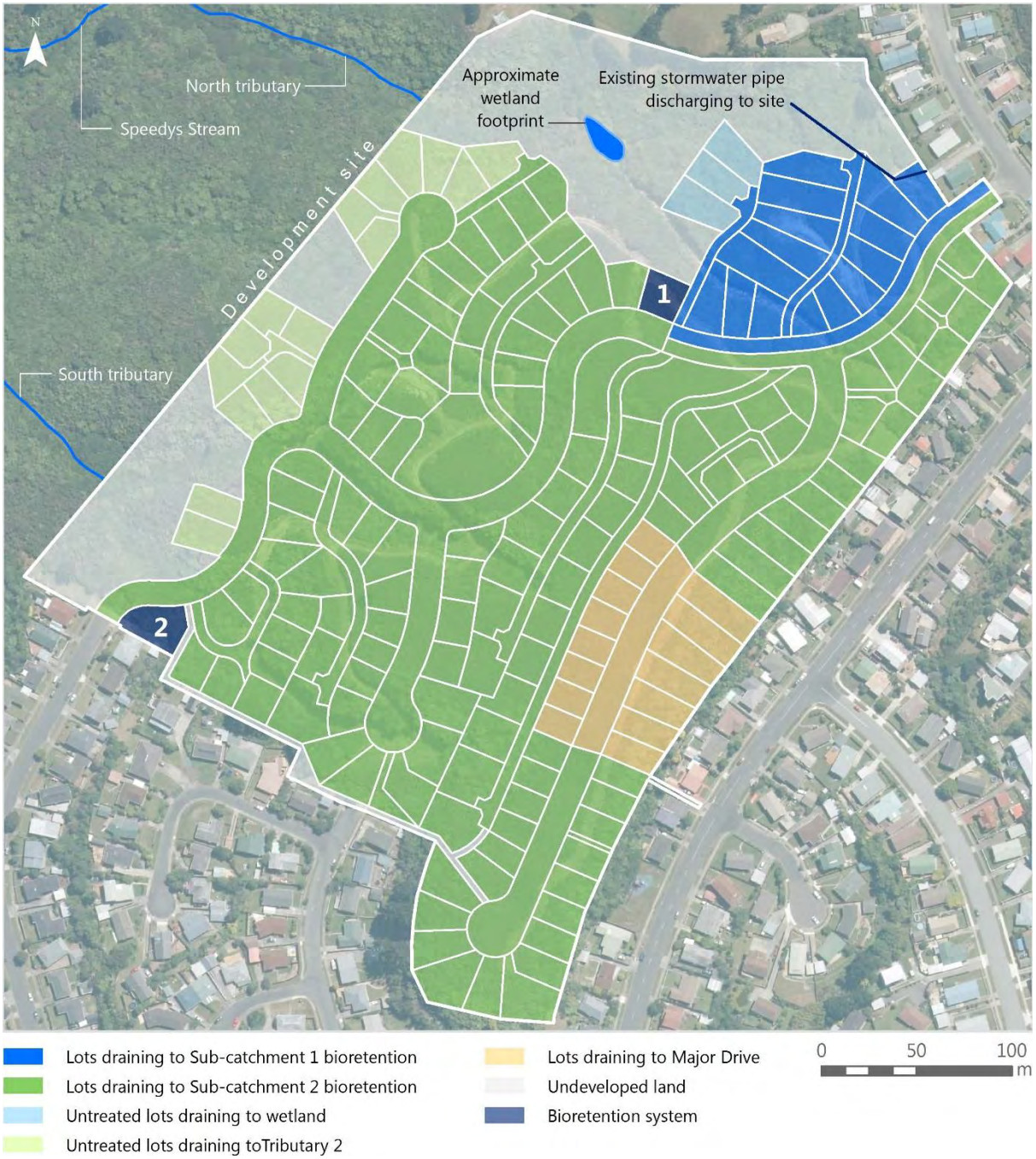

Figure 5. Lot configuration and treatment locations within the development

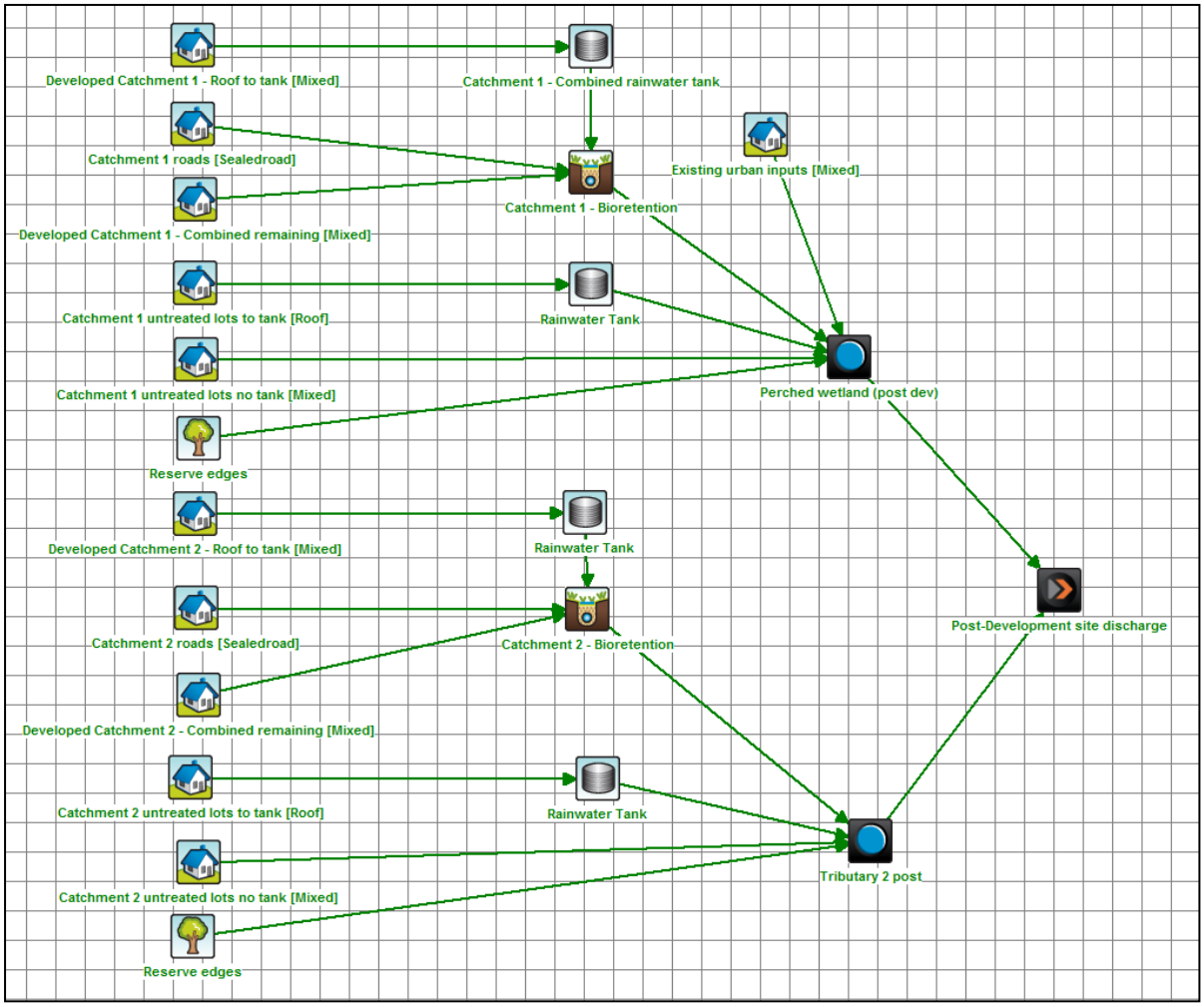

Figure 6. Model set-up for the post-developed case (includes integrated stormwater management)

Table 6 provides a detailed breakdown of the respective catchment areas applied in the MUSIC modelling, and the respective tank sizes and reuse demands. It is noted that these areas represent the final proposed scheme based on refinement to achieve eco-hydrological objectives. Comparison between the proposed development and an unmitigated case (refer Section 11) is based on a larger catchment draining to the wetland area based on the existing topography and the cost-efficient stormwater reticulation network. Under that scenario, the lot area for the north tributary (to bioretention) is 2.03 ha which results in significantly more runoff volume and increased flowrates in frequent events to the existing wetland. It is noted that the catchment discharging to Major Drive does not include treatment and the two reserve area (retained vegetation) are independent of any development.

Table 6. Sub-catchment breakdown used in modelling

Post-developed sub catchment	No. lots draining	Lot area (ha)	Road area (ha)	Roof to tank (ha)	Tank daily demand (kL/d)	Tank annual demand - Irrigation (kL/y)	Remainder lot area to SW (ha)	Combined tank volume (kL)
Catchment 1 to bioretention	16	0.86	0.27	0.16	2.4	800	0.70	48
Catchment 2 to bioretention	126	5.87	2.42	1.26	18.9	6300	4.61	378
Catchment 1 untreated	10	0.48	0.00	0.1	1.5	500	0.38	30
Catchment 2 untreated	9	0.39	0.02	0.09	1.35	450	0.30	27
Catchment 1 reserve		1.05						
Catchment 2 reserve		0.5						
Major Drive catchment	15	0.66	0.18					
Total	**176**	**9.81**	**2.89**	**1.61**	**24.15**	**8050**	**5.99**	**483**

2.0 Post-development outcomes

Based on the computational modelling method discussed in Section 8, the stated stormwater management objectives (refer Section 4.0) shall be achieved. These are focussed on mitigating both the water quality and water quantity impacts from the development. Performance has been assessed for both the wetland catchment (north) and the southern tributary, and are discussed separately.

2.1 Existing perched wetland sub-catchment

As discussed in Section **Error! Bookmark not defined.**, stormwater runoff which discharges to the existing wetland will be managed to mimic the natural flow patterns and rates as much as practical. This is achieved through a combination of controlling the post-developed catchment extent, retaining flows on lots through rainwater reuse, and detaining/treating flows in a dedicated 250 m^2 bioretention system prior to discharge.

Comparative analysis against the option to undertake development without integrated stormwater management is included to demonstrate the overall performance of the proposed interventions. It is noted that the post-developed unmitigated catchment is based on the full catchment which naturally drains to the wetland and would typically be maintained through the stormwater network.

Table 7 summarises the comparative analysis of the development related hydrology for the north tributary.

Table 7: Hydrological analysis of flows into the wetland area (northern tributary)

	Unit	Pre-developed catchment (existing)	Post-developed catchment (unmitigated)	Post-developed catchment (mitigated)
Mean annual inflow	m^3	24,400	41,500	22,600
Mean flowrate to wetland	L/s	0.772	1.31	0.717

The results presented in Table 7 demonstrate the combined benefit of the proposed integrated water management, with post-development flows closely matching the pre-developed flows and delivering a 45% reduction in annual inflow compared to the unmitigated case. Importantly, the mean flowrate also closely matches the pre-developed case, particularly when compared with the unmitigated case.

Cumulative frequency analysis of the flowrates was undertaken to assess the relative change in flows across a range of event frequencies and magnitudes encapsulated within the five year modelling time series. As Figure 7 highlights, inflows to the wetland under the unmitigated case (green line) diverge from the existing regime at or about 60%, meaning that approximately 40% of the time flowrates would exceed the existing case.

With the proposed mitigation in place (red line), flowrates are consistent for approximately 92% of time with comparatively less divergence from the cumulative frequency plot of the current conditions (blue line). This correlation, based on the continuous simulation methodology, highlights the performance of the integrated approach to stormwater management based on the analysis across a range of rainfall intensities and durations throughout the time series. This is considered to better reflect the rainfall-runoff relationship rather than a more static 'design storm' approach which is less suited to the complexities of stormwater management in series, and solutions which include the harvest of rainwater/stormwater.

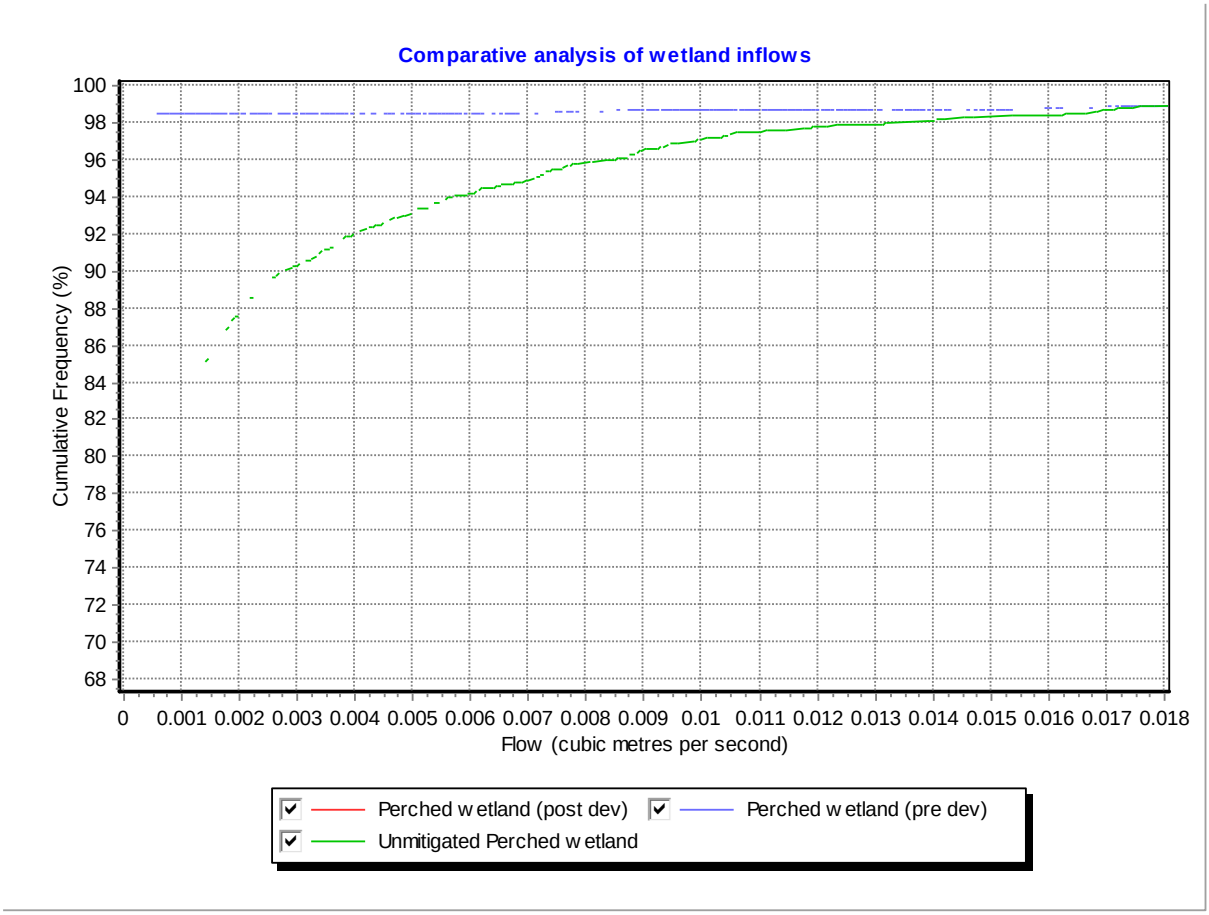

Figure 7. Cumulative frequency plot of inflows to perched wetland (plot exported from MUSIC)

MUSIC is also used to estimate the water quality performance of management options. This includes load reductions quantified through dedicated treatment elements (in this case bioretention) as well as reductions resultant from capture and reuse of rainwater. These are calculated at the 5 minute time step based on extensive research into the treatment performance in both controlled laboratories and field conditions. As discussed in Section 1.0, the MUSIC tool reports pollutant removal for total suspended solids (TSS), total nitrogen (TN) and total phosphorous (TP). These parameters have been specifically selected to best represent the range of particulate and dissolved pollutants which are observed in urban stormwater. Therefore through managing these constituents it has been demonstrated that other pollutants such as heavy metals are also accounted for. MUSIC also reports water balance data at any point of interest enabling detailed assessment of system performance.

In terms of water quality treatment performance, in the mitigated scenario, over 9,300 m^3/year of stormwater will be treated through the 250 m^2 bioretention system. This is 100% of the flows which discharge via the reticulated network (additional flows from undeveloped reserve and 10 lots unable to be diverted to treatment). This is estimated to provide an overall 67% reduction in TSS (2,570 kg/y) and a 49% reduction in TN (25.2 kg/y) for flows into the wetland area (including those which are unable to be treated) compared to an unmitigated scenario. Whilst the MUSIC modelling does not quantify the reduction in heavy metals, it is inferred that the effective management of sediments and dissolved nutrients correlate with reductions in particulate and dissolved metals. Bioretention systems are also especially well suited to the treatment of hydrocarbons through the interaction with the prescribed filter media.

2.2 Southern tributary

Stormwater which discharges to the southern tributary is to be managed to reduce the overall volume and to mitigate the flashiness of post-development flow characteristics as much as is practical. The retention of flows on lots, through rainwater reuse and detaining/treating flows in a dedicated 500 m^2 bioretention system prior to discharge, has been modelled.

Comparative analysis against the option to undertake development without integrated stormwater management is included to demonstrate the overall performance of the proposed stormwater management approach.

Table 8 summarises the comparative analysis of the development related hydrology on the southern tributary.

Table 8: Hydrological analysis of flows into the southern tributary

	Unit	Pre-developed catchment (existing)	Post-developed catchment (unmitigated)	Post-developed catchment (mitigated)
Mean annual inflow	m^3	54,200	94,000	84,300
Mean flowrate to wetland	L/s	1.72	2.98	2.67

These results demonstrate the combined benefit of stormwater management delivering a 10% reduction in annual inflow compared to the unmitigated case. It is noted that the increase in mean annual volume (compared to the existing) is largely a result of the increased catchment area resulting from the proposal to provide the very high level of protection for the existing wetland area as a priority (discussed in Section **Error! Reference source not found.**). This is also apparent in the increased mean flowrate, but again the proposal delivers a 10% reduction compared to an unmitigated scenario.

Cumulative frequency analysis of the flowrates was undertaken to assess the relative change in flows across a range of event frequencies and magnitudes. As Figure 8 highlights, the inflows to the tributary under the unmitigated case (green line) diverge from the existing regime at or about 70% meaning that approximately 30% of the time flowrates would exceed the existing case. With the proposed mitigation in place (blue line), flowrates are comparable to those of the current condition (red line) for approximately 90% of events.

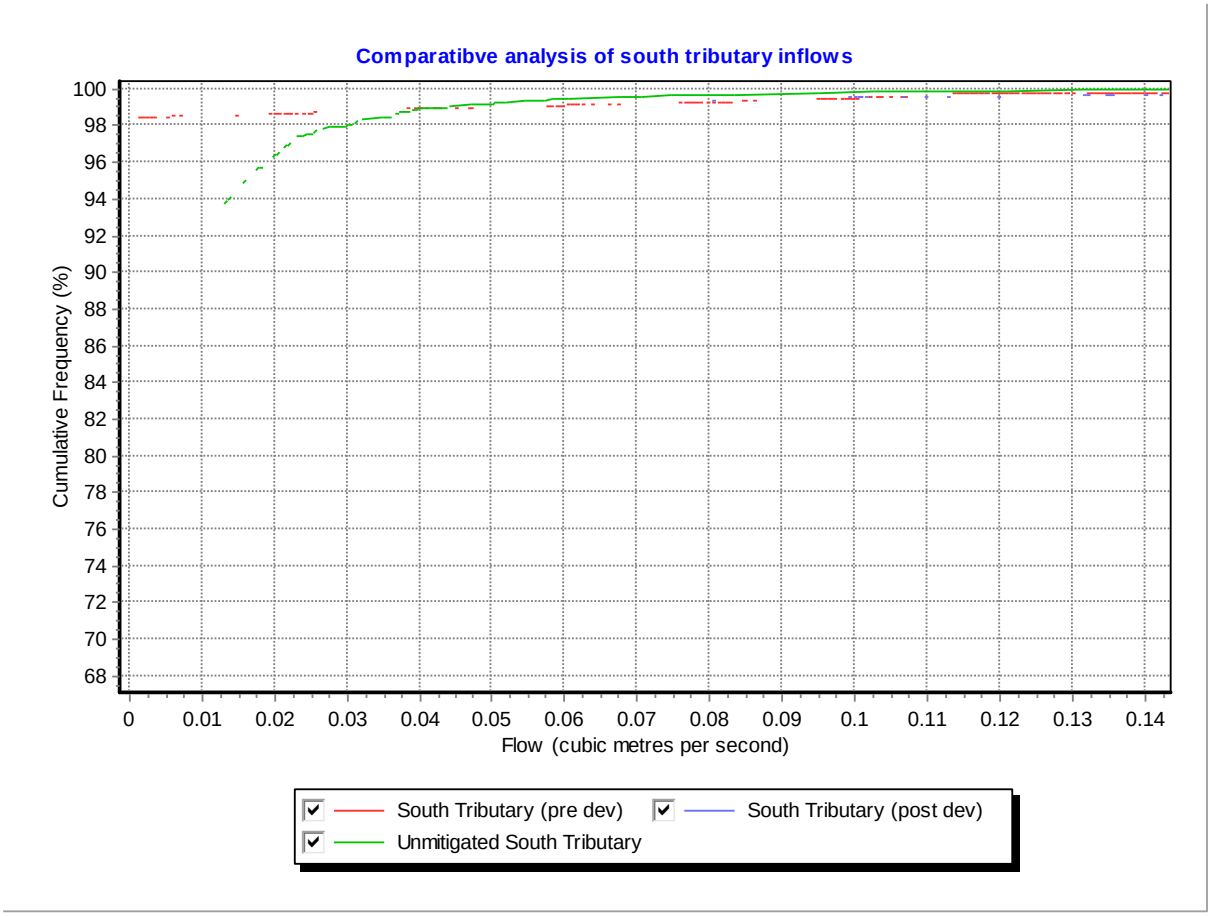

Figure 8. Cumulative frequency plot of inflows to South tributary (plot exported from MUSIC)

In terms of water quality treatment performance, in the mitigated scenario over 51,700 m^3 of stormwater will be treated through the 500 m^2 bioretention system. This is 66% of the flows which discharge via the reticulated network (additional flows are from the undeveloped reserve and 10 lots unable to be diverted to treatment). This represents an 82% reduction in TSS (17,870 kg/y) and a 55% reduction in TN (134 kg/y) for flows into the head of the tributary area compared to an unmitigated scenario. Whilst the MUSIC modelling does not quantify the reduction in heavy metals, it is inferred that the effective management of sediments and dissolved nutrients correlates with reductions in particulate and dissolved metals. Bioretention systems are also especially well-suited to the treatment of hydrocarbons through the interaction with the prescribed filter media.

2.3 Overall development performance

The overall water management performance of the proposed Waipounamu site has also been quantified with MUSIC through reporting at the combined outlet point. This is a theoretical boundary which encapsulates the combined pollutant generation and treatment for the entire site including both the north and south tributaries. Table 9 summarises the site wide performance and demonstrates the benefit of the integrated approach. It is noted that whilst there are currently no explicit load reduction targets for the Wellington region these compare favourably with targets adopted elsewhere. In particular, Auckland typically requires a 75% reduction in TSS and Australian states require reductions of 85%, 45% and 45% for TSS, TN and TP respectively.

Based on this it is concluded that in addition to the hydrological benefits (assessed at the respective tributary discharge points) the site wide water management delivers best practice water quality outcomes also.

Table 9. Overall stormwater management performance for site

	Unit	Total generated	Total discharged	% Reduction
Mean annual flow	m^3	108,000	97,100	10
Total suspended solids	kg/yr	22700	4290	81
Total nitrogen	kg/yr	266	118	56
Total phosphorous	kg/yr	43	23	47

MORPHUM ENVIRONMENTAL LTD

Engineers & Consultants

Ecological Impact Assessment for Earthworks Consent

Waipounamu Residential Development

Final-Updated s92

Prepared for Kelson Heights Ltd by Morphum Environmental Ltd
October 2017

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Engineers & Consultants

Document Control

Client Name: Kelson Heights Ltd

Project Name: Ecological Impact Assessment for Earthworks Consent

Project Number: P01072

Document: Waipounamu Residential Development

Revision History

Status	Date Issued	Author	Reviewed By	Released By
Final	11/05/2017	Rhian Ingley/Stu Farrant	Mark Lowe	Damian Young
Final (Updated)	12/10/2017		Mark Lowe	Damian Young

Reviewed by:

Reviewer: Mark Lowe **Signature:**

Released by:

Reviewer: Damian Young **Signature:**

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Executive Summary

Morphum Environmental Ltd were engaged by Kelson Heights Ltd to prepare an ecological impact assessment for proposed earthworks within a portion of Lot 1 DP 91313 (14 ha) in Kelson, Lower Hutt. Morphum Environmental understand that the purpose of the proposed earthworks is to facilitate a future subdivision of the site.

A resource consent has previously been granted for the site (RM20-W11-64/6; 2009), allowing development to create 142 residential allotments and 2.86 ha of reserves, including the associated earthworks and streamworks to develop the roads, infrastructure, and building platforms. A new consent is now being sought to undertake earthworks to enable development to proceed, based on a revised design.

Ecological values of the freshwater and terrestrial environments on site have been reassessed in this report to support the application for a new consent reflective of the revised scale and intensity of development. This assessment also reflects the changes in planning documentation, best practice guidelines for ecological impact assessment, and evolving case law, including:

- The National Policy Statement for Freshwater Management
- Stream Ecological Valuation Guidelines (Storey *et al.* 2011)
- Ecological Impact Assessment Guidelines for use in New Zealand Terrestrial and Freshwater Ecosystems (EIANZ, 2015)
- Greater Wellington Regional Council Proposed Natural Resources Plan (2016)
- Guidance on Good Practice Biodiversity Offsetting in New Zealand (DoC, 2014)

This report presents the findings of an ecological impact assessment for both freshwater and terrestrial ecological values and outlines recommended mitigation and offset requirements. Detailed mitigation plans have not been prepared as part of this assessment and it is recommended that these are prepared as conditions of consent in accordance with the principles outlined in this report.

This report has been updated based on the request for further information received from GWRC and meeting with Francis Forsyth (Wildlands) and Mark Heath GWRC. This has included changes to the proposed offsite mitigation area, changes to some of the previous SEV scoring and further commentary on the terrestrial impacts.

Summary of Key Ecological Values

Three Stream Ecological Valuations (SEVs) were conducted on the site within the northern gully (Northern Long, previously referred to as Gully A and B) and the southern gully (Southern Short and Southern Long, previously referred to as Gully C and Gully D, respectively). SEV scores for these sites ranged from 0.77 to 0.87 which represent a moderate to high measure of ecological function for open watercourses.

The wetland area within the northern gully also has value as an uncommon ecosystem type in accordance with the second national priority objective ('To protect indigenous vegetation associated with sand dunes and wetlands; ecosystem types that have become uncommon due to human activity' (MfE, 2007)) and through the provision of ecosystem services.

It is considered likely that the chronically threatened ('At Risk-Declining') barking gecko and ornate skink occur on site and are likely to occur, either permanently or occasionally, in all scrub and forest vegetation community types on site. Therefore, the majority of the site may be considered to have high ecological value under the fourth national priority for the protection of biodiversity ('To protect habitats of acutely and chronically threatened indigenous species' (MfE, 2007)).

The site does not meet the other national priority objectives. The majority of the vegetation communities on the site are nationally and locally common, with low diversity due. The site is not known to provide habitat for any threatened bird species although detailed avian surveys have not been undertaken.

Summary of Key Ecological Impacts, Mitigation, and Offset

The hierarchy of impact management should be adhered to whereby impacts are to be avoided where practicable, and remedied or mitigated on site if adverse effects cannot be avoided. Any residual adverse impacts following appropriate mitigation should be offset with an aim of achieving no net loss of biodiversity with respect to species composition, habitat structure, and ecosystem function.

724 m of permanent and intermittent stream is proposed to be reclaimed as part of this application. The proposed reclamation of watercourses has an adverse effect on the ecological function of the streams on the subject site (demonstrated by a reduction in SEV scores). In addition, the ultimate change in landuse can also have adverse effects on downstream waterways due to changes in frequent flow hydrology, discharge of urban contaminants and changes in physical characteristics (such as temperature). These effects require mitigation through management of site generated runoff as part of the subdivision design to ensure there are no significant residual impacts. A fish translocation plan shall be prepared prior to commencement of works.

It is proposed that riparian planting is undertaken on the main stem and tributaries of Belmont Stream within the Belmont Regional Park. This includes planting a 20 m wide riparian corridor on either side of the stream where feasible to offset the impacts associated with reclamation of 724 m of watercourse. Due to the position of the access road relative to the steam there are sections which will be less than 20 m, these are reflected in the calculations. It is recommended that a detailed planting plan is developed as a condition of consent following confirmation of the proposed offset site in consultation with GWRC.

Ecological impacts of the proposed earthworks are summarised in the table below. The total area of vegetation (including gorse) clearance proposed is approximately 92,000 m^2, accounting for 66% of the total site area. The overall magnitude of impact of the loss of all indigenous vegetation types is considered to be 'moderate' on balance of the within site and landscape level impacts.

The loss of vegetation and associated habitat features on site also represents a loss of 89,000 m^2 of potential habitat (scrub and forest vegetation types) for threatened lizard species (66% of potential habitat on site).

A Lizard Management Plan has been prepared by a qualified herpetologist in consultation with the Department of Conservation and Council. Given the abundance and diversity of lizards within the vicinity of the subject site. An application for a project specific Wildlife Act Authority to live capture lizards for relocation within 500m has also been applied for and submitted to Department of Conservation.

Summary of Ecological Impacts, Avoidance, Mitigation, and Offsetting for the proposed Stage 1 earthworks

Impact	Area	Avoidance	Proposed Mitigation/Offset
Freshwater			

Total length of watercourse reclamation	724 m	165 m northern gully (including wetland)	Offset stream planting of 1,490 m length, 20 m riparian margin (50,038 m^2)
Direct mortality of fish	NA		Fish Translocation Plan (to be prepared)
Erosion and sediment	NA	Mange site to reduce erosion	Undertake earthworks in accordance with ESCP (Cook Costello)
Terrestrial			
Total area of vegetation clearance	92,316 m^2	Retention of 26,022 m^2 including northern gully and wetland	None
Loss of threatened lizard habitat	89,165 m^2		Lizard Management Plan/Wildlife Act Authority (prepared)
Direct mortality of lizards	NA		Lizard Management Plan (prepared)
Direct mortality of birds	NA		Avoid vegetation clearance during breeding season.

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1.0 Introduction

1.1 Scope

Morphum Environmental Ltd (Morphum) were engaged by Kelson Heights Ltd to undertake analysis and reporting on the environmental implications of undertaking earthworks required to facilitate future residential development within a site in Kelson, Lower Hutt. Specifically, the ecological impacts of vegetation removal and the loss of stream channels associated with earthworks were assessed. The site is currently zoned for residential development, and resource consent has previously been granted (2009) for the development of a 142-lot subdivision with access from Waipounamu Drive and Kaitangata Crescent. Morphum were not involved in any aspects of this earlier work or the deliberations related to the mitigation approved.

Since the granting of the 2009 consent, further development planning has looked at more cost effective ways to develop the site, with an option of a second stage of development to be pursued. We understand that this further development will coincide with re-zoning of existing Hill Residential land through a plan change application.

Any such plan change or subdivision application will be supported by a comprehensive approach to site wide stormwater management to ensure that future hydrological and water quality impacts are mitigated in addition to terrestrial vegetation and aquatic habitat impacts addressed in this report.

Since the original consent being issues in 2009, the approach to assessing offset requirements for streamworks has been refined through the adoption of the Stream Ecological Valuation assessment methodology in the Wellington Region. Consequently, the residual ecological impacts (following avoidance and mitigation) of the currently proposed works have been assessed to enable estimates of offsetting to be calculated. This report presents the findings of an ecological impact assessment for both freshwater and terrestrial ecological values, and outlines recommended mitigation and offset requirements. Detailed mitigation plans have not been prepared as part of this assessment; it is recommended that these are prepared conditions of consent in accordance with the principles outlined in this report.

1.2 Site Overview

The subject site (Lot 1, DP 91313) covers approximately 14 ha in Kelson, Lower Hutt. The site is bounded by Belmont Regional Park to the west, Major Drive to the east, and to the north and south by Kaitangata Crescent and Waipounamu Drive, respectively (Figure 1).

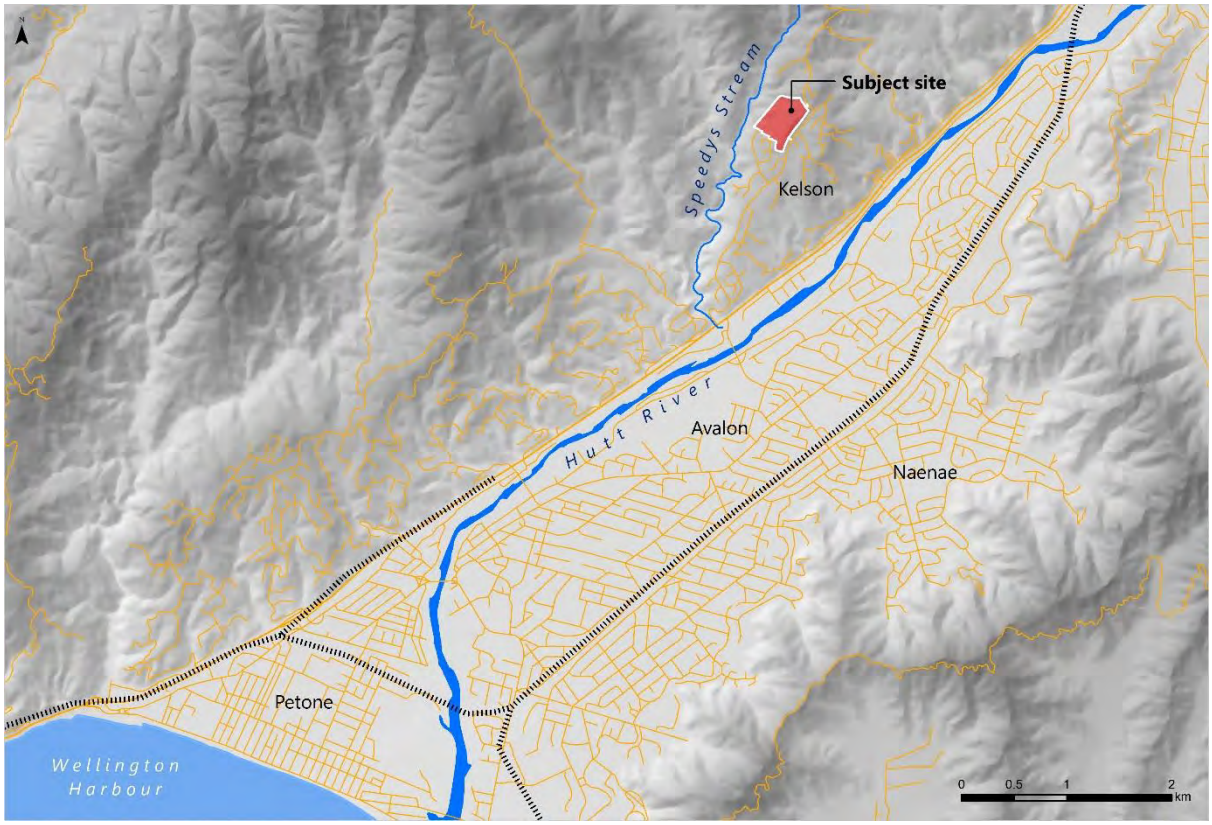

Figure 1. Location of the subject site

Three main tributaries drain the site. These are referred to in earlier plans as Gully A and B (Northern), Gully C (Southern Long) and D (Southern Short). Gully E is a short tributary located in the middle of the property on the western boundary. All tributaries drain to Speedys Stream which discharges to the Hutt River and ultimately to Wellington Harbour.

The site falls within the Wellington Ecological District. This district is characterised by steep strongly faulted hills and ranges. With an underlying geology of argillite and greywacke. Valleys are predominantly alluvial, peaty soils and the steep slopes are predominantly leached stony soil with variable loess material overlying greywacke. The site is classified as moderately steep to steep (21-35º) hill country, ranging from 135 m to 220 m a.s.l.

1.3 Background and Existing Subdivision Consent

A resource consent has previously been granted (RM20-W11-64/6; 2009) to allow development of the site including earthworks and streamworks. Morphum were not involved in any aspect of this earlier consent process.

Key actual and potential ecological impacts identified as being associated with the 2009 subdivision plan included:

- the reclamation of streams (and associated downstream impacts)
- the loss of terrestrial vegetation
- the loss of associated habitat values, loss of biodiversity within the development footprint, impacts on ecosystem services, and other direct adverse effects on indigenous fauna

In the decision of the Joint Hearing Panel of Hutt City Council and Wellington Regional Council dated 18/02/09, it was found that the subdivision of the residential zoned land in accordance with plans

WO5459 CS 21D (and other supporting plans) was an appropriate form of development, consistent with the sustainable management purpose of the Resource Management Act 1991.

A summary of their key findings in relation to the reclamation of streams, and the loss of terrestrial vegetation are outlined below. These earlier findings are revisited in this report given the time lapse from the original consent (2009) and changes in planning documentation, best practice guidelines for ecological impact assessment, and evolving case law, including:

- The National Policy Statement for Freshwater Management
- Stream Ecological Valuation Guidelines (Storey *et al.* 2011)
- Ecological Impact Assessment Guidelines for use in New Zealand Terrestrial and Freshwater Ecosystems (EIANZ, 2015)
- Greater Wellington Regional Council Proposed Natural Resources Plan (2016)
- Guidance on Good Practice Biodiversity Offsetting in New Zealand (DoC, 2014)

1.3.1 Freshwater Impacts and Mitigation

The original length of stream to be reclaimed due to earthworks (based on the 2009 development) was calculated as 566 m in the original application by Boffa Miskell. It was argued that the required compensation, based on the 'stream ecological valuation' method was approximately 1:2 resulting in a length of 1,132 m to be restored. Based on the assumption that these works would include 5 m width of riparian planting, this was estimated to cost $61,138. This suggestion was not supported in favour of an alternative offer of the sum of $40,000 to contribute to the costs of fencing riparian margins in Belmont Regional Park.

This was accepted in combination with riparian planting in the vicinity of the existing wetland and preservation of the lower reaches of the two tributaries as an appropriate mitigation package for the reclamation of the streams. Discussion on the impacts on downstream waterways focussed on potential changes in hydrology and the risks of sedimentation during construction works and subsequently due to scour in the channels. This informed some high level conditions around protection of the existing wetland but was vague on how this might be achieved.

Note that the terms 'ephemeral' and 'intermittent' were used interchangeably throughout the decisions report.

1.3.2 Terrestrial Impacts and Mitigation

Based on the 2009 consent, the total area of vegetation clearance was considered to be a minor adverse effect of the proposed development. This included a total area of 51,587 m^2 of gorse-dominated scrub and 58,792 m^2 of mahoe-dominated scrub and regenerating forest.

The designation of 2.86 ha of land as public reserve was considered to be a positive feature of the 2009 proposal and these were considered to be both ecological and scenic assets to the catchment.

Some reconfiguration of the boundaries and road alignment was required to increase the width of retained vegetation along the ridgeline of Major Drive. All existing semi-mature vegetation adjacent to the downhill boundary was recommended to be retained where possible and protected by private covenant with a minimum width of 5 m.

The mitigation plan also included revegetation planting on the batters adjacent to the proposed reserve area. The proposed planting plan included native trees that provide food resource for native birds. No other mitigation or compensation was required for the loss of existing vegetation, habitat values, impacts on lizards or loss of lizard habitat.

2.0 Proposed Activity

2.1 Summary of Activities

Since the 2009 consent being issued, the applicant has revisited the original design and layout for the site and refined the intention for works. It is proposed to initially undertake enabling earthworks to support the development of the already consented area (east of site) and access from Waipounamu Drive. Civil design of the enabling works phase has been undertaken by Cuttriss Consultants and Cook Costello. This has identified that further infilling of existing gully's will be required to manage earthworks cut/fill ratios (to avoid offsite disposal of large quantities), provide access roads for temporary works and to service the ultimate development area. This will require additional infilling of existing streams beyond the extents consented in 2009 and a revised extent of vegetation clearance.

This ecological assessment has therefore been prepared in line with the current proposal and the use of contemporary assessment techniques for quantifying mitigation requirements. Due to the increased length of existing streams proposed to be infilled, the assessment and mitigation recommendations have revisited the 2009 consent and considered stream loss across the entire site with the mitigation package reflective of the entire length of stream to be impacted.

The proposed enabling earthworks for Stage 1 of the development within Lot 1 DP 91313 will include the following activities that will impact on ecological values.

2.1.1 Earthworks

The total area of Stage 1 earthworks estimated in the cut-fill summary indicated in Drawing 12652-002 by Cook Costello (dated 02/03/17) is 92,316 m^2, not including undercutting of any unsuitable material encountered (Figure 2). Earthworks and drainage are designed to ensure site stability in cut fill areas and efficient drainage without scouring or erosion. Site wide erosion and sediment controls shall be constructed as part of earthworks.

We understand that future development of the site (dependant on plan change) will require further earthworks across the site to facilitate the full development. We understand that the intention is for the majority of bulk earthworks to be undertaken in Stage 1 to create building platforms in the already consented portion of the site and road connections with future works to be focussed on site contouring to support future development in the western portion. All earthworks shall be managed strictly in accordance with the Erosion and Sediment Control Plan (ESCP) which has been prepared by Cook Costello (14/03/17). This has been developed to meet the requirements of GWRC and conform to best practice during the active earthworks phase.

2.1.2 Stream Reclamation

724 m of existing stream will be reclaimed through infilling. This will result in the loss of headwater habitat and function with residual groundwater and event based stormwater conveyed in drainage installed in the base of the existing streams as part of infilling. All infilling shall include stripping of riparian vegetation and placement of compacted engineered fill. Reclamation will effectively extend from the headwaters downstream with no isolated stream habitat remaining above (and therefore no requirement for fish passage).

Fish translocation shall be undertaken in advance of reclamation in accordance with industry best practice. Any retrieved fish shall be released downstream of the site with uninhibited access to other parts of the largely undeveloped Speedys Stream catchment.

Figure 2. Extent of proposed earthworks for Stage 1

2.1.3 Vegetation Clearance

The proposed Stage 1 earthworks will result in the removal of vegetation corresponding to the extent indicated in Figure 2. This equates to 92,316 m^2, covering approximately 65% of the total site area. This is the maximum extent of clearance; islands of vegetation will be retained in the interim as indicated in the report dated 11 May 2017 but have not been included in calculations for clarity. Removal comprises approximately 48,672 m^2 of predominantly native vegetation, and 43,644 m^2 of gorse-dominated scrub (Figure 3). These values are based on the vegetation classification of Boffa Miskell (2006) with field

validation (undertaken by Morphum 2017) undertaken to confirm that no significant changes in vegetation structure had occurred in the subsequent period.

Figure 3. Proposed vegetation removal resulting from Stage 1 earthworks

2.2 Avoidance

Consideration was given to avoidance in priority to mitigation of impacts. As discussed previously, the existing 2009 consent includes the reclamation of 566 m of stream (including the full headwaters) with a mitigation package which is considered to not reflect current best practice. It is considered that this

earlier consent did not adequately reflect the requirements for access (during construction and post development) or the potential impacts of disposing large volumes of excavated material offsite.

Alternative cut/fill scenarios were considered by the civil designers but discounted for a range of reasons. While partial avoidance of reclamation could be achieved through removing cut material from site, this would result in substantially reduced yields and could potentially contribute to reclamation of streams in other areas of the region.

In accordance with the 2009 consent, the current proposal avoids earthworks within the northern gully, including the stream, wetland, and the associated riparian vegetation. It also avoids construction within the small gully in the middle of the western boundary (which is currently consented for reclamation). No earthworks or vegetation clearance will be conducted within these retained areas.

2.2.1 Stormwater Management

The existing wetland at the confluence of two minor tributaries in the northern tributary has been identified as an important ecological feature for the site and stipulated to be protected and enhanced under the existing consent. An inspection of the wetland and its contributing inflows indicates that the wetland is likely a result of elevated sediment loads and scour from development of the dwellings within the head of the north tributary in the 1970s/80s. It is inferred that this resulted in the progressive sedimentation of the natural stream at the confluence of two minor tributaries resulting in an area of deep (>1 m) sediments which has ultimately blocked the northernmost tributary and recently forced it to flow north of the wetland with scour and incision evident as it forms a new channel which bypasses the wetland. The accumulated sediments have subsequently been colonised by exotic weeds (primarily rank grass and buttercup) with regenerating forest around the perimeter.

The presence of juvenile kahikatea (~5 m height) is considered to be the result of other fruiting mature trees in vicinity as numerous smaller seedlings were observed in the forest and stream edge in proximity to the wetland. Based on the current condition of the wetland we would classify it as a swamp (in accordance with 'The Wetland types New Zealand') with only small pockets of standing/surface water and otherwise constantly saturated soil substrates. It is probable that the current bypass of the northernmost tributary will result in ongoing drying of the wetland which may ultimately result in the reformation of a stream channel through the middle.

Despite its unnatural condition, we assert that the wetland needs well-considered and comprehensive measures to avoid potential adverse impacts which could mobilise a large volume of presently captured sediments. This will include direct protection from physical works in addition to ongoing protection through stormwater management and restoration planting to be undertaken as part of the development. By nature, wetlands are low energy environments which rely on distributed flows and low velocities. For this reason they are especially vulnerable to changes in hydrology (both in terms of intensity and duration of runoff) with a risk of scour creating a defined channel with ongoing incision resulting in a progressive loss of the wetland habitat.

Protection of the wetland through avoidance of adverse effects is considered a priority for the development and shall inform a stormwater management plan for the site. This will be designed at a later date as part of the subdivision design with an aim to reduce the overall volume and flashiness of post-development flow characteristics and discharge of pollutants to the downstream receiving environments of both the northern and southern tributaries.

3.0 Freshwater Ecological Values

3.1 Stream Ecological Valuation (SEV) Method

The SEV method quantifies the current ecological value of a stream, and predicts the ecological value under impacted (with proposed development) and potential (with practical enhancement) scenarios. The methodology was developed to quantify the ecological value of Auckland streams and has subsequently been modified for application to Wellington conditions (Storey *et al*. 2011). The method assesses fourteen functional values of the stream (Table 1).

Ecological function values are derived from a combination of transect-scale and reach-scale samples and observations. SEV scores for the sites were calculated using the SEV Data Analysis Spreadsheet Version 2.1 which has been modified for use in the Wellington Region.

Table 1. Stream Ecological Value categories and functions

Ecological categories	Ecological functions
Hydraulic functions	Natural flow regime
	Floodplain effectiveness
	Connectivity for natural species migrations
	Natural connectivity to groundwater
Biogeochemical functions	Water temperature control
	Dissolved oxygen levels
	Organic matter input
	In-stream particle retention
	Decontamination of pollutants
Habitat provision functions	Fish spawning habitat
	Habitat for aquatic fauna
Biodiversity provision functions	Fish fauna intact
	Invertebrate fauna intact
	Riparian vegetation intact

3.2 Site SEV Assessment

Morphum undertook SEV assessments within three tributaries of Speedys Stream within Lot 1, DP 91313, Kelson, Lower Hutt on 10 July 2015 in order to quantify the existing ecological condition of the tributaries on site. Fish and invertebrate sampling were not undertaken as these values are not used in ecological compensation ratio calculations. This is due to difficulties in predicting likely species assemblages and numbers in both the potential state of the impacted stream and in the off-site mitigation streams. They are therefore excluded from all calculations. It is noted that subsequent to this, electrofishing was undertaken along two 200 m sections of watercourse with only a single eel found.

SEV sites were located on the lower reaches of the tributaries below the length that was to be piped under the previously granted resource consent (RM20-W11-64/6, GWRC WGN080187). However, as this application amounts to a new consent (rather than a variation to the existing consent), the value and required compensation for this previously consented length is recalculated here. This is recommended as the compensation required for the loss of these stream values calculated in the previous consent predates current best practice guidelines (Storey *et al.* 2011).

The SEV values calculated for the lower reaches of the three tributaries are applied to the upper reaches for the purpose of calculating Environmental Compensation Ratios (ECR). This is considered to be a conservative approach as the potential SEV scores calculated for the reaches surveyed are considered high and the value of upper reaches will not exceed this due to impacts relating to historical track construction and clearance and the fact that the impacted stream widths progressively reduce upstream as the watercourse transitions to an intermittent condition.

Further ecological assessments (existing community analysis) were undertaken by Cardno in September 2017. The findings from this work concluded that the diversity of fish species was very low (Koura *(Paranephrops planifrons)* and single short fin eel *(Anguilla australis*)) and a relatively low taxonomic richness of both the macroinvertebrate and fish communities. No fish species were identified through electrofishing over 200 m reaches in both the southern and northern tributaries. The upper intermittent reaches were not fished (due to low water) with only macroinvertebrate sampling undertaken in the perennial and intermittent reach. Overall the MCI and QMCI scores indicated good to excellent water quality within the steam which is supported by the currently undeveloped catchment conditions. The findings of this assessment (Speedy's Stream Ecological Assessment, Cardno 2017) have been provided separately and should be referred to for further detail.

The total length of stream reclamation under the current application is approximately 724 m. The locations of SEV transect points are shown in Figure 4.

Figure 4. Location of SEV transect points on tributaries not previously consented to be piped

3.3 SEV Waterway Descriptions

The three SEV reaches are referred to throughout this report as Southern Short, Southern Long, and Northern Long (Figure 4).

The Southern Short and Southern Long reaches each had overall current SEV scores of 0.87 and 0.86, respectively, indicating *very high* performance, based on key ecological functions. The Northern Long reach had an overall score of 0.77, which indicates *high* performance. The individual scores calculated for the constituent ecological functions for each reach are shown in Table 2.

The primary differences between the Northern Long reach and the southern reaches is in the natural flow regime and the riparian vegetation intact functions (both owning to the presence of a stormwater outlet at the head of the Northern Long reach).

3.3.1 Southern Short Tributary

The Southern Short tributary (refer Figure 4) is a silt/gravel-bottomed stream grading to bedrock at the downstream end. The channel has a high diversity of habitat types forming riffle-run-pool sequences with undercut banks and abundant woody debris and leaf litter upstream of a 4 m high waterfall which was located immediately upstream of the confluence with the Southern Long reach.

Channel shading along the reach is very high, formed exclusively by native species. The canopy comprises stands of mahoe (*Melicytus ramiflorus*) approximately 6 m tall, with mamaku (*Cyathea medullaris*) also present. The understory is relatively open, with native shrubs and ferns, and plentiful cover of woody debris and leaf litter. There is negligible direct human impact on the lower reach of the stream and currently no piped stormwater inflows.

Upstream of the SEV locations, the stream transitions into a gully which has been infilled with unconsolidated earth as part of the construction of the main access track. This has completely covered the original streambed with no defined channel present and sections with subterranean flow paths through the rubble. This disturbed earth is extensively covered in exotic weeds such as *Tradescantia*, arum lily and blackberry. It is inferred that the transition from intermittent to ephemeral is within the reach, with the flow path upstream of the access track ephemeral. It is recognised that the intermittent and ephemeral reaches of streams represent habitat values unique to their respective flow characteristics. In this instance, these have been degraded due to historical earthworks and hence the SEV assessment was not redone for these sections. It is intended that a portion of off-site mitigation planting will include intermittent transition zones to reflect this loss in habitat from the project site.

This reach exhibited high performance for hydraulic and biogeochemical functions. The score was restricted by the SEV methodology with regards to suitable galaxid spawning habitat due to the steep gully sides. This fact does not represent a deviation from the natural condition and it was noted by Wildlands that some galaxids are observed to spawn amongst instream substrate, however; the fish spawning value in the SEV method is based solely on the provision of low slope floodplains which are absent within the system. The biodiversity provision score is also reduced by the relatively low diversity, early succession riparian vegetation. It is noted that the SEV score would be reduced in the upstream reach due to the degraded stream bed and riparian margins (with uncontrolled infilling of the streambed in parts) and therefore this assessment is considered conservative.

3.3.2 Southern Long Tributary

This reach was similar to the Southern Short Reach in terms of hydrologic heterogeneity, habitat diversity, and hydraulic and biogeochemical functions. The site also has a 5 m high waterfall immediately upstream of the confluence.

A more open understory includes kawakawa (*Macropiper excelsum*), wheki-ponga (*Dicksonia fibrosa*), seven finger (*Schefflera digitata*), hangehange (*Geniostoma rupestre*) and rangiora (*Brachyglottis repanda*). Several exotic plant species, including gorse (*Ulex europaeus*) and inkweed (*Phytolacca octandra*), are present in the upper part of the assessed reach where the native canopy opens.

As with the Southern Short reach, the stream transitions into a gully which has been infilled with unconsolidated earth as part of the construction of the main access track. This has completely covered the original streambed with no defined channel present and sections with subterranean flow paths through the rubble. This disturbed earth is extensively covered in exotic weeds such as *Tradescantia*,

arum lily and blackberry extending to the access track. It is inferred that the transition from intermittent to ephemeral is within the reach, with the flow path upstream of the access track ephemeral.

3.3.3 Northern Long Tributary

Instream and riparian habitat was similar to the southern reaches however a notable difference is the presence of a wetland on the true left bank near the confluence with a shorter tributary.

While the Northern Long tributary drains a steep gully, in common with the Southern tributaries, it has near-flat banks for a greater proportion of its length resulting in high potential fish spawning habitat values.

A single 375 mm concrete stormwater pipe discharges stormwater runoff from the road into the upstream end of reach. Some channel scour is apparent near the outlet. This results in reduced hydraulic and biodiversity functions relative to the southern tributaries.

Table 2: Summary of current SEV values for sampling undertaken on 10 July 2015

Ecological functions	SEV values		
	Southern Short	**Southern Long**	**Northern Long**
Hydraulic			
Natural flow regime	1.00	0.99	0.29
Floodplain effectiveness	0.88	0.88	0.70
Connectivity for natural species migrations	1.00	1.00	1.00
Natural connectivity to groundwater	1.00	1.00	0.99
Mean score	**0.97**	**0.97**	**0.75**
Biogeochemical			
Water temperature control	1.00	0.94	0.96
Dissolved oxygen levels	1.00	1.00	1.00
Organic matter input	1.00	1.00	1.00
In-stream particle retention	1.00	0.98	0.94
Decontamination of pollutants	0.73	0.75	0.67
Mean score	**0.95**	**0.93**	**0.91**
Habitat provision			
Fish spawning habitat	0.16	0.10	0.35
Habitat for aquatic fauna	1.00	0.99	0.85
Mean score	**0.58**	**0.55**	**0.60**
Biodiversity provision			
Riparian vegetation intact	0.68	0.68	0.44
Mean score	**0.68**	**0.68**	**0.44**
SEV value	**0.87**	**0.86**	**0.77**

Southern Short SEV site

Southern Long SEV site

Northern Long SEV site

Figure 5. Instream and riparian habitat examples

4.0 Freshwater Ecological Impact Assessment

4.1 Predicted (Impacted) SEV Values

The predicted SEV scores for the impacted streams have been calculated using the SEV methodology and professional judgement. This approach recognises that a piped stream retains some ecological value, albeit in a highly modified state. It is considered that the SEV scoring system does not adequately reflect the effects of piping a stream for its entire length, with a tendency to overestimate SEV scores. In particular, it is difficult to translate the water temperature and dissolved oxygen variables to a piped scenario. A fully enclosed pipe in theory provides temperature benefits, due to 100% shading, but in practice has limited beneficial effects due to the efficient conveyance and grade which restrict the cooling potential for stormwater.

Therefore, to more accurately represent the loss of ecological function due to piping, values for the water temperature control (WTC) and dissolved oxygen levels maintained (DOM) functions were both reduced to 0.25 by manipulating their underlying variables (V_{shade} and V_{dod}) (see Table 3 to Table 5). This resulted in a predicted SEV score of 0.14 for the post-development piped scenario including recognition of the temperature regulation and habitat provision functions of pipes. This approach can be discussed further with GWRC if required. This score has been used in all subsequent calculations.

4.2 Potential (Enhanced) SEV Values

The assessed streams all score highly in their current state so their capacity for improvement is relatively low. The potential SEV scores are therefore not much greater than the current scores. Remedial works could include supplementary planting of the riparian understory to increase its diversity and density. This would improve the riparian zone roughness (V_{rough}) and riparian filtering ($V_{ripfilt}$) scores by increasing the capacity to filter runoff.

The naturally steep gully sides preclude engineering works to increase the amount of floodplain available for fish spawning habitat.

Table 3: Current, potential and predicted SEV scores for the Southern Short stream reach

Ecological functions	SEV values		
	SSi-C	SSi-P	SSi-I
Hydraulic			
Natural flow regime	1.00	1.00	0.07
Floodplain effectiveness	0.88	1.00	0.00
Connectivity for natural species migrations	1.00	1.00	0.30
Natural connectivity to groundwater	1.00	1.00	0.30
Mean score	**0.97**	**1.00**	**0.17**
Biogeochemical			
Water temperature control	1.00	1.00	0.25
Dissolved oxygen levels	1.00	1.00	0.25
Organic matter input	1.00	1.00	0.00
In-stream particle retention	1.00	1.00	0.20
Decontamination of pollutants	0.73	0.88	0.11
Mean score	**0.95**	**0.98**	**0.16**
Habitat provision			

Fish spawning habitat	0.16	0.16	0.05
Habitat for aquatic fauna	1.00	1.00	0.20
Mean score	**0.58**	**0.58**	**0.13**
Biodiversity provision			
Riparian vegetation intact	0.68	0.80	0.00
Mean score	**0.68**	**0.80**	**0.00**
SEV value	**0.87**	**0.90**	**0.14**

Table 4: Current, potential and predicted SEV scores for the Southern Long stream reach

Ecological functions	**SEV values**		
	SLi-C	**SLi-P**	**SLi-I**
Hydraulic			
Natural flow regime	0.99	1.00	0.07
Floodplain effectiveness	0.88	1.00	0.00
Connectivity for natural species migrations	1.00	1.00	0.30
Natural connectivity to groundwater	1.00	1.00	0.30
Mean score	**0.97**	**1.00**	**0.17**
Biogeochemical			
Water temperature control	0.94	1.00	0.25
Dissolved oxygen levels	1.00	1.00	0.25
Organic matter input	1.00	1.00	0.00
In-stream particle retention	0.98	1.00	0.20
Decontamination of pollutants	0.75	0.90	0.11
Mean score	**0.93**	**0.98**	**0.16**
Habitat provision			
Fish spawning habitat	0.10	0.10	0.05
Habitat for aquatic fauna	0.99	1.00	0.20
Mean score	**0.52**	**0.53**	**0.13**
Biodiversity provision			
Riparian vegetation intact	0.68	0.80	0.00
Mean score	**0.68**	**0.80**	0.00
SEV value	**0.86**	**0.90**	**0.14**

Table 5: Current, potential and predicted SEV scores for the Northern Long stream reach

Ecological functions	**SEV values**		
	NLi-C	**NLi-P**	**NLi-I**
Hydraulic			
Natural flow regime	0.29	0.30	0.02
Floodplain effectiveness	0.70	1.00	0.00
Connectivity for natural species migrations	1.00	1.00	0.30
Natural connectivity to groundwater	0.99	1.00	0.30
Mean score	**0.75**	**0.83**	**0.16**
Biogeochemical			

Water temperature control	0.96	1.00	0.25
Dissolved oxygen levels	1.00	1.00	0.25
Organic matter input	1.00	1.00	0.00
In-stream particle retention	0.94	1.00	0.20
Decontamination of pollutants	0.67	0.90	0.11
Mean score	**0.91**	**0.98**	**0.16**
Habitat provision			
Fish spawning habitat	0.35	0.35	0.05
Habitat for aquatic fauna	0.85	0.88	0.20
Mean score	**0.60**	**0.62**	**0.13**
Biodiversity provision			
Riparian vegetation intact	0.44	0.52	0.00
Mean score	**0.44**	0.52	0.00
SEV value	**0.77**	**0.83**	**0.14**

4.3 Fish

Stream reclamation works may result in direct injury or mortality of individual fish present at the time of construction due to dewatering, and other construction impacts. It is proposed that the risk of this be managed by appropriate construction methods which enable migration of fish downstream and away from the area of works. Further discussion on mitigation of the potential impacts on any fish present on site is provided in Section 5.3.

Loss of fish habitat is taken into consideration within the SEV impact assessment although the presence/absence of fish was not. It is noted that Electro fishing undertaken by Cardno (August 2017) yielded no specimens other than a single Eel and a number of Koura..

4.4 Downstream Impacts

Potential impacts of the ultimate subdivision on downstream receiving environments could potentially include changes in hydrology and discharge of contaminants including suspended solids, heavy metals, nutrients, hydrocarbons, and thermally enriched runoff from impervious surfaces. These impacts must be managed through the design of the development to minimise adverse impacts following development. Measures to achieve this are not presented further in this assessment but will be developed as part of the subdivision design. This could include hydrological control through catchment manipulation, rainwater tanks and reuse for non-potable demands as well as water quality treatment through bioretention systems integrated into the future development. These measures will ensure that adverse impacts to downstream waterways (Speedys Stream) are avoided in addition to the direct mitigation for impacts on waterways within the site itself.

5.0 Freshwater Impact Management

5.1 Environmental Compensation Ratio

The proposed activity will have an adverse effect on the ecological function of the streams within the subject site through stream reclamation (demonstrated by the reduction in SEV scores). These effects must be avoided, remedied or mitigated.

Where adverse effects to onsite waterways cannot be avoided, mitigation should be carried out onsite where appropriate. When onsite mitigation is not possible or appropriate, off-site environmental offsetting is required. The overall aim of environmental offsetting is to provide like-for-like restoration with no net loss of biodiversity with preference for offsetting to be conducted in close proximity to the impact site. Where such offsetting is not achievable, alternative compensation options may be considered.

The potential for onsite mitigation is limited by the open watercourse to be retained (in the northern corner of the subject site) already having a high SEV score (0.76). Therefore, it is considered that offsetting this impact through offsite stream restoration will result in a greater net benefit to freshwater values within the catchment. The amount of stream to be restored relative to the amount of stream degraded to achieve this offset is determined by an Environmental Compensation Ratio (ECR).

Derivation of the ECR requires estimating potential (i.e. following hypothetical remediation) and impacted (i.e. following proposed piping and development) SEV values for the impacted streams following the method of Storey *et al.* (2011). The estimated potential and impacted ecological function values for the three reaches are summarised in Table 6.

Table 6: Summary of SEV scores used to calculate ECR values

Site	iC	iP	iI
Southern Short	0.87	0.90	0.14
Southern Long	0.86	0.90	0.14
Northern Long	0.77	0.83	0.14

5.2 Offset Site

The ECR depends on the current and potential SEV scores of the stream selected for enhancement as well as the value of the impacted stream. It is proposed that offset stream enhancement works are undertaken on Belmont Stream within the Belmont Regional Park. The proposed site is along the main stem of the upper Belmont Stream and captures a number of lateral minor tributaries, including intermittent and ephemeral watercourses. These are currently within the area of Belmont Regional Park actively farmed by GWRC with uncontrolled stock access and resultant loss of any riparian vegetation. This area has been proposed to be permanently retired and fenced to support restoration of this section of stream (see Figure 6 for a map of the proposed site).

A current SEV score of 0.53 was estimated for the offset site (mC) (Table 7). The current score is based on the parameter values recorded for the Southern Long reach with changes made to specific variables to reflect the lack of riparian vegetation (including modifications to V_{chann}, V_{rough}, $V_{chanshape}$, V_{shade}, V_{ripar}, V_{macro}, V_{retain}, $V_{ripfilt}$, $V_{physhab}$, $V_{watqual}$ and $V_{ripcond}$).

The potential SEV score of the offset site (mP) (Table 7) was predicated on riparian planting being undertaken within the 20 m riparian zone (either side of the stream) as this remediation option would

have the greatest immediate benefit in terms of water temperature control, input of organic material and habitat provision.

Table 7: Current, potential SEV scores for the proposed offset site

Ecological functions	SEV values	
	mC	mP
Hydraulic		
Natural flow regime	0.86	0.86
Floodplain effectiveness	0.24	1.00
Connectivity for natural species migrations	1.00	1.00
Natural connectivity to groundwater	0.80	0.80
Mean score	**0.73**	**0.92**
Biogeochemical		
Water temperature control	0.10	0.96
Dissolved oxygen levels	1.00	1.00
Organic matter input	0.10	0.80
In-stream particle retention	0.60	0.60
Decontamination of pollutants	0.64	0.96
Mean score	**0.49**	**0.86**
Habitat provision		
Fish spawning habitat	0.50	0.88
Habitat for aquatic fauna	0.44	0.79
Mean score	**0.47**	**0.84**
Biodiversity provision		
Riparian vegetation intact	0.12	0.80
Mean score	**0.12**	**0.80**
SEV value	**0.53**	**0.87**

5.2.1 Calculation of ECR Values

ECR values were calculated using the equation below which determines the amount that the area of impacted stream will have to be multiplied by to determine the area of stream that will be required to offset the stream impacts. The calculated values are reported separately for the main channel and tributaries of the mitigation reach in Table 8 and Table 9, respectively.

$$ECR = [(SEVi\text{-}P - SEVi\text{-}I) / (SEVm\text{-}P - SEVm\text{-}C)] \times 1.5$$

Where:

SEVi-P	Potential SEV value for the site to be impacted
SEVi-I	Predicted SEV value of the stream to be impacted, after impact
SEVm-P	Potential SEV value for the offset site
SEVm-C	Current SEV value for the offset site

Table 8: SEV scores used to calculate ECR values (main channel)					
Site	**iP**	**iI**	**mP**	**mC**	**ECR**
Southern Short	0.90	0.14	0.87	0.53	**3.37**
Southern Long	0.90	0.14	0.87	0.53	**3.36**
Northern Long	0.83	0.14	0.87	0.53	**3.06**

Table 9: SEV scores used to calculate ECR values (tributaries)					
Site	**iP**	**iI**	**mP**	**mC**	**ECR**
Southern Short	0.90	0.14	0.86	0.55	**3.66**
Southern Long	0.90	0.14	0.86	0.55	**3.65**
Northern Long	0.83	0.14	0.86	0.55	**3.33**

5.2.2 Calculation of Offset Area

The ECR is used to determine the area of offset required. The offsetting is to be applied to a length of mitigation stream that has been identified by GWRC as being suitable for restoration (Figure 6). The total offset area was calculated using the ECR scores of both the main channel (Table 10) and tributaries (Table 11) of the mitigation stream due to there being insufficient length of the main channel available to meet the offset obligation and the intent to also enhance intermittent tributaries to reflect habitat loss at the development site. A total mitigation length of 1,303 m was calculated using the main channel ECR scores. Because this exceeds the total length of available channel (1,194 m), it was necessary to supplement the offset area using the tributaries' ECR scores.

The full length of available channel represents 92% of the calculated mitigation length requirement. The offset calculation was therefore based on 92% of the impacted streams' lengths, yielding an offset area of 47,760 m^2 when a 20 m buffer is applied to each side of the channel. This area was then reduced by 20% to 38,208 m^2 to reflect the channel's proximity to the road (such that the full 20 m buffer area is not available for the entire channel length). This is consistent with the derivation of the V_{ripar} score for the mP reach.

The offset area for the remaining 8% of mitigation length was calculated using the tributaries' ECR, resulting in an additional offset length of 296 m and corresponding area of 11,830 m^2 (the mitigation length applied to the tributaries is disproportionately greater than for the main channel due to their narrower width).

These figures indicate a total length of approximately 1,490 m is required to offset the reclamation of the streams, when a 20 m planting width is assumed, and would result in approximately 50,038 m^2 of mitigation planting. Planting of the remaining areas within the wider mitigation site are expected to be undertaken by GWRC.

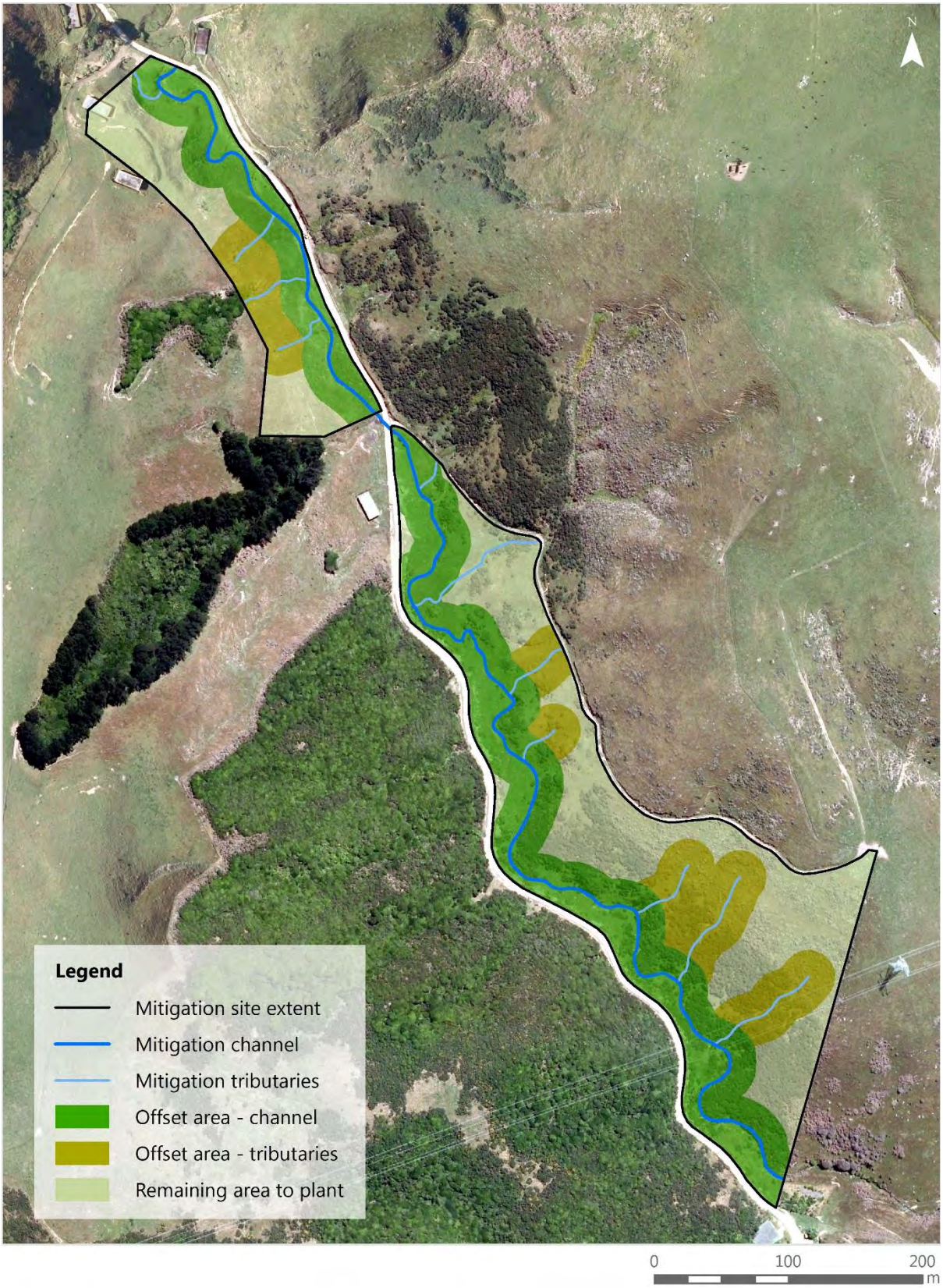

Figure 6. Offset areas of mitigation reach (Belmont Stream)

Table 10. Values used in the calculation of the length of offset required (main channel)

Site	ECR	Impact Stream width (m)	Length of impacted stream (m)*	Area of stream impacted (m^2)	Offset stream width (m)	Length of offset required (m)
Southern Short	3.37	0.65	197	432	1.25	346
Southern Long	3.36	0.68	297	678	1.25	543
Northern Long	3.06	0.74	169	382	1.25	306
Total length of stream offset (m)						**1,194**

*Length value represents 92% of impacted reach length

Table 11. Values used in the calculation of the length of offset required (tributaries)

Site	ECR	Impact Stream width (m)	Length of impacted stream (m)*	Area of stream impacted (m^2)	Offset stream width (m)	Length of offset required (m)
Southern Short	3.66	0.65	18	43	0.50	86
Southern Long	3.65	0.68	27	67	0.50	134
Northern Long	3.33	0.74	15	38	0.50	76
Total length of stream offset (m)						**296**

*Length value represents 8% of impacted reach length

5.2.3 Stream Offset Plan

The purpose of the proposed revegetation plantings is to offset the loss of ecological function of 724 m of watercourse. Positive outcomes expected include provision of habitat, water quality enhancement, and bank stability and erosion control. Protection of an upstream section of Belmont Stream will also reduce impacts on downstream habitats within the Key Native Ecosystem area by reducing stock access and sediment runoff and organic pollution.

A width of 20 m is to be planted on each side of the stream. The width of the riparian buffer strip should ensure that marginal weed infestations affect only a small proportion of the planting, further reducing the need for maintenance and enhance the succession of indigenous vegetation, maximising the likelihood that the planting will support self-sustaining indigenous vegetation (Parkyn *et al.* 2000). Due to the alignment of the existing road, it will not be feasible to achieve the full 20 m on each side in some locations. This has been factored into the calculation on the ECR through the proportion of riparian vegetation coverage (V_{ripar}).

A detailed planting plan has not been prepared at this time. This will be dependent on further engagement with GWRC and Friends of Belmont Regional Park to characterise planting zones based on exposure, topography, and the hydrology of the site. It is recommended that a detailed planting plan is developed as a condition of consent.

Planting plans are to be designed to achieve rapid canopy closure and include appropriate pioneer riparian species.

- All plants should be eco-sourced from the Wellington Ecological District to preserve the integrity of vegetation in the area. Eco-sourced plants are more likely to survive as they are suited to local conditions.
- PB3 grade plants are recommended to maximise the survival of the planting.
- Plant material must be handled and transported in a way that prevents any damage to plants. Care must be taken to retain as much soil on bare root plants as possible.
- Each plant must be held in position while backfill is placed around the root ball and the backfill must be firmed gently to expel air pockets, but not limit root growth and water penetration. Plants must be flush with (or slightly above) existing soil levels (i.e. water should not be able to pool around the root ball) and that the plants must be vertical. No fertiliser is to be used.
- Species selected for floodplain planting are required to be able to cope with periodic inundation during flood events, have tap roots to improve bank stability, and have smaller growth forms to minimise conveyance issues during flooding. A planting density of $2/m^2$ is recommended.
- General riparian planting is to include species tolerant of periodic inundation and damp soils.
- Upper slopes may be planted with enrichment species such as rewarewa in accordance with the 'mixed broadleaf' vegetation community type described in Section 6.2.

5.3 Fish Relocation Plan

A fish relocation plan is being developed to ensure no mortality of any specimens present in the reaches to be piped as part of these works. Thorough fish capture and relocation (downstream of the site within the same tributaries) will be undertaken prior to stream works as well as having a freshwater ecologist present on site during works to capture any missed fish.

Authorisation is being sought to undertake any trapping and transferring from the Ministry for Primary Industries.

Any fish that are captured will be recorded including size and species and any exotic pest fish captured will be humanely euthanised and disposed of. All trapping will be undertaken the day prior to the reaches being drained. All fish captured will need to be relocated as soon as possible downstream of the subject site to Speedys Stream.

6.0 Terrestrial Ecological Values

6.1 Site Description

The subject site is currently zoned as Hill Residential and is not listed as a Significant Natural Resource (SNR) in Appendix 1 of the Hutt City District Plan. Several SNR's are nearby or have ecological connection to the subject site (Table 12).

The subject site is adjacent to the Belmont-Speedys Key Native Ecosystem (KNE) area which forms part of the Western Hutt Biodiversity Corridor extending between the Tararua Range to Wellington City and to Porirua Harbour Basin. This land is owned by HCC but managed by WRC as part of Belmont Regional Park. Ecological weed control, and pest animal control is carried out within the KNE.

The property is within the Sounds-Wellington Ecological Region and the Wellington Ecological District. Pre-human disturbance, the area would have comprised kohekohe-tawa forest, and kamahi-podocarp forest types (Singers and Rogers, 2014).

Table 12: Nearby Significant Natural Resources (Hutt City District Plan Appendix 1)

Number	Site	Significant Values
1	Belmont Bush	Lowland forest vegetation, NZ pigeon
2	Belmont Road and Saddle Bush	Lowland forest vegetation
3	Boulder Hill Bush	Lowland forest vegetation, NZ pigeon
23	Kelson Bush	Regionally representative example of relatively unmodified lowland mahoe forest, large numbers of bird species, including NZ pigeon.
47	Round Knob and Belmont Road Trig	Flat topped or gently rounded summits on the Western Hills, representing peneplain remnants.
49	Speedys Reserve	Lowland forest on hill country, with diverse canopy species. Tawa forest with large specimens. Large numbers of bird species. Spur/ridge truncated by movement along a fault.

6.2 Existing Vegetation Community Types

Seven characteristic vegetation types were mapped by Boffa Miskell in 2006 based on a site walkover and supported by 11 standard RECCE plots. These results are summarised in Table 13 with some amendments based on a subsequent review by Blaschke (2007), and other observations based on site walkovers conducted in July 2015 and September 2017 by Morphum Environmental.

The northern gully site previously contained some larger trees that were cleared in 2006. These included mahoe (*Melicytus ramiflorus*), pigeonwood (*Hedycarya arborea*), rewarewa (*Knightia excela*), kahikatea (*Dacrycarpus dacrydioides*), and the only kaikomako *(Pennantia corymbosa*) that was on the site (Campbell, 2006). These were the largest trees present on site.

Table 13: Main vegetation community types (from Boffa Miskell, 2006, Blaschke, 2007, Morphum, 2015)

Vegetation Type	Description
Mahoe-mixed broad leaf forest	Mahoe dominated canopy with putaputaweta (*Carpodetus serratus*), mamaku (*Cyathea medullaris*), pigeonwood, and wineberry (*Aristotelia serrata*) with a number of large emergent rewarewa and kahikatea. This represents the most mature vegetation on the site. The understorey and ground floor include a diverse range of ferns and seedlings. The area is largely free of exotic weeds.
Mahoe forest	Uniform mahoe forest canopy between 3-5 m high, up to 12 m high in the gullies with a few mamaku kanono (*Coprosma grandifolia*), and five finger (*Pseudopanax arboreus*) . The understorey and ground cover is sparse with a few fern species. Mahoe stem diameter ranged from 80-120 mm.
Mahoe tree fern land	Mamaku dominates the canopy on south facing slopes with some mahoe and coprosma. The understorey includes five finger, kawakawa and other broadleafed shrubs.
Mahoe-gorse-karamu scrub	Similar to mahoe forest but younger with stem diameters ranging from 60-100 mm. Mamaku increases in abundance on the southern slopes whilst kanuka increases in abundance on the northern slopes. Gorse is more abundant in this scrub than in mahoe forest.
Gorse shrub grassland	In 2006, approximately 40% of the scrub on site had been cleared with gorse scrub growing up in these cleared areas. This vegetation has matured over the past 10 years and is now almost entirely scrub rather than grassland. The composition of the vegetation is predominantly exotic, dominated by gorse with blackberry with increasing native broadleaf shrubs establishing including rangiora, kanono (*Coprosma grandifolia)*, hange, five finger (*Pseudopanax arboreus*) and some red matipo. If unmodified, natural succession will result in native tree species replacing gorse within 30-40 years (Sullivan *et al.* 2007).
Weedland	Dense areas of exotic weeds occur adjacent to existing residential properties and at the head of the gully's infilled during track construction including *Convolvulus* sp., *Tradescantia flumenensis*, blackberry, pasture grasses etc.
Swampy basin	A wet basin has formed dominated by wandering buttercup and floating sweet grass. Other wetland vegetation includes *Carex virgata, Isolepis prolifer*, swamp coprosma, and kahikatea saplings.

Mahoe treefern land (SEV Southern Long)

Mahoe forest (SEV southern long)

Wetland grading to mahoe treefern land (SEV northern – wetland)

Figure 7. Vegetation community types (Morphum, 2015)

6.2.1 Wetland

The existing wetland on site is a sedge swamp approximately 307 m^2 in area that is located at the confluence of a minor tributary with the Northern Long tributary.

During periods of high flow, the Northern Long tributary is likely to overtop the channel and enter the wetland. Additional flow inputs to the wetland are likely to occur through overland flow and groundwater from the surrounding catchment. The wetland currently performs a natural flow attenuation role, protecting the lower reaches of the Northern Long tributary from high flows and associated impacts such as channel scour and sediment mobilisation. The wetland also provides biodiversity and habitat value and represents an ecosystem type which is increasingly rare in the region.

The wetland is currently dominated by exotic pasture species, especially buttercup (*Ranunculus* spp). However, the presence of native species such as kahikatea (*Dacrycarpus dacrydiodes*), swamp kiokio (*Blechnum minus*) and *Carex* spp, indicate vegetation assemblages likely to have been present at the site prior to vegetation clearance.

The wetland is buffered by the vegetation of the surrounding gully. The peripheral vegetation comprises a mixture of native and exotic shrub species, predominantly manuka (*Leptospermum scoparium*), mahoe (*Melicytus ramiflorus*), gorse, (*Ulex europaeus*) and Himalayan honeysuckle (*Leycesteria formosa*). The exotic species are unlikely to invade the wetland due to their intolerance of wetland conditions. The existing vegetation buffer, albeit of mixed scrub, adds value to the wetland area through filtration, shelter and preventing the establishment of more invasive weed species.

The wetland does not appear to have been modified in a hydrological sense and can be considered to have potential for improvement within a relatively short time frame (3-5 years) following appropriate restoration measures.

Wetlands are productive and valuable ecosystems providing a wide range of ecosystem services including:

- water filtration
- regulation of water flows
- retention of sediments and particulate contaminants
- denitrification
- carbon sequestration

6.3 Avifauna

Morphum have not conducted any comprehensive bird survey on the site as part of this assessment. A site walkover was conducted by Boffa Miskell in support of the 2009 consent which has been referred to for this assessment. All incidental bird observations were recorded as part of this without quantification of bird numbers. Additional birds were identified which were not observed by Boffa Miskell but considered likely to occur based on the site context. These results are reproduced in Table 14 below.

Table 14: Summary of avifauna observed or likely to occur on site (Boffa, 2006)

Species	New Zealand Status	Conservation Status
Tui (*Prosthemadera novaeseelandiae*)	Endemic	Not threatened
Grey Warbler (*Gergone igata*)	Endemic	Not threatened
Fantail (*Rhipidura fulginosa*)	Endemic	Not threatened

Kereru (*Hemiphaga novaeseelandiae)*	Endemic	Not threatened*
Harrier Hawk (*Circus approximans)*	Native	Not threatened
Silvereye (*Zosterops lateralis*)	Native	Not threatened
Welcome Swallow (*Hirundo neoxena*)	Native	Not threatened
Kingfisher (*Todiramphus sanctus*)	Native	Not threatened*
Morepork (*Nonox novaeseelandiae*)	Native	Not threatened*
Shining cuckoo (*Chrysococcyx lucidus*)	Native	Not threatened*
Blackbird (*Turdus merula merula*)	Introduced	Naturalised
Chaffinch (*Fringilla coelebs*)	Introduced	Naturalised
Goldfinch (*Carduelis carduelis*)	Introduced	Naturalised
Greenfinch (*Carduelis chloris*)	Introduced	Naturalised
Sparrow (*Passer domesticus*)	Introduced	Naturalised
Starling (*Sturnus vulgaris*)	Introduced	Naturalised
Thrush (*Turdus philomelos*)	Introduced	Naturalised
Yellowhammer (*Emberiza citronella*)	Introduced	Naturalised
Magpie (*Gymnorhina tibicen*)	Introduced	Naturalised
Rosella (*Playcercus eximus*)	Introduced	Naturalised

* Not observed but may occur on site

6.4 Herpetofauna

A lizard survey has not been conducted on site and the records summarised below may not capture the full extent of lizard distribution or abundance on site.

Table 15 outlines species that have been observed and recorded within the DOC Herpetofauna database, within a 10 km radius of the subject site.

Barking geckos, Raukawa geckos, Northern grass skink, copper skink and ornate skink should be expected to occur at the site as these are recorded frequently in the area and are widespread (EcoGecko, 2016). Numerous Ngahere geckos have been salvaged from the quarry site ~2 km from the Waipounamu development.

Pacific gecko and spotted skink are rare or sparse on the New Zealand mainland. There is a known population of Pacific gecko in Silverstream, Hutt Valley and it is possible that this species may be found on site. Spotted skinks are restricted to mainly rocky sites or on predator free offshore islands. It is unlikely that these species would be present on the subject site.

Terrestrial lizards are likely to be present in both exotic and indigenous vegetation including gorse and scrubland (EcoGecko, 2016). Arboreal lizards are likely to be recorded in both exotic and indigenous vegetation particularly where scrubland is contiguous with secondary forest habitats or where gorseland is in the process of converting into regenerating forest adjacent to established native vegetation (EcoGecko, 2016). This diversity of habitat provides spillover effects supporting lizard populations across habitats (EcoGecko, 2016).

A conservative approach is taken at this stage and it is assumed that these species are likely to occur on site either permanently or transiently as:

- A full lizard survey has not been conducted with a full Lizard Management Plan prepared based on an expectation of presence;

- Existing vegetation community types on site include suitable habitat types for both terrestrial and arboreal lizard species, and;
- Populations are likely to be supported by spillover from the adjacent Speedys Reserve and Belmont Regional Park areas.

Table 15: Native lizard observations within 10 km of Lot 1 DP 91313 (EcoGecko, 2016; Hitchmough, 2012)

Species	Common Name	Threat Status	Preferred Habitat Type
Dactylocnemis pacificus	Pacific gecko	At Risk – Relict	Forest
Mokopirirakau 'southern North Island'	Ngahere gecko	At Risk - Declining	Shrubland, forest
Naultinus punctatus	Barking gecko	At Risk - Declining	Shrubland, forest
Woodworthia maculata	Raukawa gecko	Not Threatened	Scree, scrubland, forest
Oligosoma aeneum	Copper skink	Not Threatened	Grasslands, shrubland, forest
Oligosoma lineoocellatum	Spotted skink	At Risk - Relict	Rocky screes, grassland
Oligosoma ornatum	Ornate skink	At Risk - Declining	Grasslands, shrubland, forest
Oligosoma polychroma (Clade 1a)	Northern grass skink	Not Threatened	Rocky screes, grassland, shrubland
Oligosoma zelandicum	Brown skink	Not Threatened	Grasslands, shrubland, forest

6.5 Pests

The presence of pest species is likely to have an adverse impact on indigenous biodiversity. Previous site visits have included observations of wild pig rooting on stream banks and gullies, and deer and possum browse.

A possum and control programme within the Belmont Speedys Key Native Ecosystem Area (KNE) also includes bait stations within the subject site. Feral pigs have been controlled in the past within the KNE however this has been discontinued. Recreational hunting is conducted under control of GWRC Parks to regulate pig numbers.

6.6 Ecological Valuation

The ecological value of terrestrial vegetation was assessed for the entire site on average in 2006 by Boffa Miskell. The evaluation was based on the values of representativeness, rarity, diversity, distinctiveness, continuity, restoration potential, and sustainability. Overall, the site was considered to have low ecological value with the exception of the small area of more mature vegetation on the northern margin of the site.

Blashke (2007) refuted this assessment and considered that generally, the vegetation values of Gully A (Northern tributary) and the downstream end of Gullies C (Southern Long) and D (Southern Short) were very high. Gully E was considered to be high value, and the upper parts of gullies C and D were considered to be moderate based on representatives, diversity, and distinctiveness of the vegetation (Blashke, 2007).

The Environmental Institute of Australia and New Zealand has subsequently developed guidelines for ecological impact assessment (EIANZ, 2015). Where a site is large and comprises multiple habitat units, it is generally preferred that ecological value is assessed for each habitat type within the site to avoid underestimating the potential impacts on individual components of the site.

Therefore, the ecological value of each of vegetation types and extents, as originally described by Boffa Miskell (2006), are re-evaluated here for both botanical values, habitat, and other ecosystem values.

6.6.1 Matters for Consideration

Terrestrial vegetation and habitat values are considered to be very high where an area is considered to have high value for several matters of ecological significance including representativeness, rarity, diversity, and ecological context; if nationally threatened species are present; or if the site meets one of the National Priorities for Biodiversity Protection (EIANZ, 2015).

Vegetation and habitats that support one of the national priorities for protecting rare and threatened native biodiversity identified by the Ministry for the Environment may be considered to have high ecological values (MfE, 2007; EIANZ, 2015). These national priorities are:

1. To protect indigenous vegetation associated with land environments (defined by Land Environments of New Zealand at Level IV that have 20 percent or less remaining in indigenous cover).
2. To protect indigenous vegetation associated with sand dunes and wetlands; ecosystem types that have become uncommon due to human activity.
3. To protect indigenous vegetation associated with 'originally rare' terrestrial ecosystem types not already covered by priorities 1 and 2.
4. To protect habitats of acutely and chronically threatened indigenous species.

Overall, a site that is of very high ecological value is likely to be nationally important, a high value site is likely to be regionally important, and a moderate value site is likely to be important at the level of the ecological district (EIANZ, 2015).

6.6.2 Summary of Terrestrial Ecological Values

Terrestrial ecological values within the site are summarised in Table 16. It is likely that the chronically threatened (At Risk – Declining) Barking gecko and Ornate skink occur on site and are likely to occur, either permanently or occasionally, in all scrub and forest vegetation community types on site, particularly where these are buffered by the adjacent regenerating forest on the western boundary of the site.

Therefore, the majority of the site may be considered to have high ecological value under the fourth national priority for the protection of biodiversity. The relative value of areas on site may be further refined by undertaking a detailed lizard survey.

The wetland area within the northern gully also has value as uncommon ecosystem type in accordance with the second national priority objective and through the provision of ecosystem services.

The site does not meet the other priority objectives. The majority of the vegetation communities on the site are nationally and locally common with low diversity due to the early successional stage, with the exception of the mahoe-mixed broadleaf forest. The site is not known to provide habitat for any threatened bird species.

The northern gully mahoe-mixed broad leaf vegetation community would have been described as kahikatea-rewarewa/mahoe-shrub hardwood forest prior to illegal clearance (Blashcke and Rutherford, 2006). The remaining mixed broad-leafed forest community is valued for the remnants of this vegetation community type and its potential to approximate an original ecosystem type over time. Emergent trees such as rewarewa and kahikatea are uncommon in this catchment.

Table 16: Summary of terrestrial ecological values

Vegetation Type	Area (m^2)	Botanical Value	Bird Habitat Value	Lizard Habitat Value*	Other Ecosystem Services
Mahoe-mixed broad leaf forest	3,928	High	Moderate	High	Low
Mahoe forest	36,200	Low	Low	High	Low
Mahoe tree fern land	7,611	Low	Low	High	Low
Mahoe-gorse-karamu scrub	34,630	Low	Low	High	Low
Gorse shrub grassland	52,337	Low	Low	High	Low
Weedland	4,671	Very Low	Low	Low	Very Low
Wetland	440	Low/Moderate	Low	Low	High

* A lizard survey has not been conducted on site and a conservative estimate of habitat value has been applied based on habitat preferences of potential lizard populations on site.

7.0 Terrestrial Ecological Impact Assessment

7.1 Vegetation Clearance

The total area of vegetation clearance proposed under the Stage 1 earthworks is 92,316 m^2, accounting for 66% of the total site area.

This includes:

- 10% of the mixed broadleaf vegetation in the northern gully
- 51% of the mahoe vegetation (primarily within the northern and southern gullies)
- 62% of the mahoe treefern community
- 73% of the mahoe-gorse scrub
- 77% of the gorse scrub
- 68% of weedland

The magnitude of effect of this vegetation clearance will have a minor effect on the wider Speedys Reserve-Belmont Regional Park area as the majority of vegetation community types are common within this catchment. The proposed clearance represents approximately 9% of all vegetation within the component of the Speedys Stream catchment that is within Belmont Regional Park. This proportion will reduce further as retirement and revegetation within the park continues. Within the site, however, the extent of clearance amounts to a major alteration of the existing baseline condition. Consequently, the overall magnitude of impact of the loss of all indigenous vegetation types is considered to be 'moderate' on balance of the within-site and landscape-level impacts of the other community types.

The mixed broadleaf community is relatively uncommon within this catchment. However, the magnitude of effect on this type is minor as only 380 m^2 of this vegetation type will be lost at the head of the gully.

7.1.1 Fragmentation and Edge Effects

In addition to the direct loss of vegetation, the vegetation removal will create more edge area along the western boundary of the construction footprint adjacent to Belmont Regional Park (371 m long) and along the northern tributary and wetland.

Edge areas are subject to a range of ecological impacts including:

- Changes in microclimate which affect species composition
- A general reluctance of many mobile species to cross edges reducing dispersal and colonisation of patches
- Higher levels of disturbance including light, noise, and movement reducing the usability of edge habitats
- Weed invasion which can further alter the structure, composition, and habitat values of the edge area (Overdyke and Clarkson, 2012)

Generally, the depth of edge influence, or the distance from the edge that is affected by edge effects can extend up to 50 m for plant responses; up to 100 m for invertebrate responses; and 50-200 m for bird responses (Reis *et al.* 2004, Ewers and Didham, 2006). Overall, the majority of edge effects occur over a scale of <100 m (Reis *et al.* 2004, Ewers and Didham, 2006).

The edge effects shall be reduced by planting of lower batters with fast growing indigenous species to create a defined edge and transition from the urbanised portion of the site into the retained vegetation. It is noted that considerable illegal waste dumping currently occurs at the end of Waipounamu Drive which will be stopped as a result of development.

7.2 Avifauna

Vegetation clearance will displace any resident fauna which may result in increased competition for food and roosting sites. The proximity of anthropogenic disturbance (movement, noise, light etc.) may reduce the quality of retained vegetation as feeding or nesting habitat.

Vegetation clearance would also result in direct mortality of eggs and juveniles of resident avifauna if vegetation clearance is conducted within the main breeding season. Due to the highly mobile nature of adult birds, it is unlikely that vegetation clearance would result in any direct mortality of adult indigenous avifauna.

7.3 Herpetofauna

Clearance of thick vegetation, grassland, rock piles, fallen logs, rotting wood, lead litter, and ground cover debris result in a loss of habitat and will displace any resident fauna and may result in direct injury or mortality of individual lizards from either vegetation clearance or earthworks stages.

Lizards may enter or re-enter the site following initial clearance activities, particularly if cut vegetation is left on site to provide refugia. All native lizards are protected under the Wildlife Act (1953); consequently, mitigation of this potential harm is required.

The loss of vegetation and associated habitat features on site also represents a loss of up to 89,165 m^2 of potential habitat (scrub and forest vegetation types) for threatened lizard species (66% of potential habitat on site). However, as noted in Section 7.1 these habitat types are common within the catchment and the overall magnitude of the loss of this area is considered to have a low to moderate effect on the range of this habitat type. This effect can be mitigated through following the recommendations of the lizard management plan.

8.0 Terrestrial Impact Management

The hierarchy of impact management should be adhered to, whereby impacts are to be avoided where practicable; remedied or mitigated on site if adverse effects cannot be avoided; any residual adverse impacts following appropriate mitigation should be offset with an aim of achieving no net loss of biodiversity with respect to species composition, habitat structure, and ecosystem function.

Impacts on the terrestrial habitats with the highest ecological value including the wetland and mahoe/broadleaf vegetation type are avoided by retaining the majority of the northern gully.

Other onsite remediation or mitigation is required to address moderate to high adverse ecological impacts identified include:

- Direct mortality or injury of native lizards
- Loss of lizard habitat

As the ecological value of the majority of vegetation communities on site is considered to be low and the magnitude of impact on these common community types is considered to be moderate, the overall level of impact is considered to be very low.

Recommendations to mitigate adverse impacts are outlined below.

8.1 Herpetofauna Management

A lizard management plan has been prepared by a qualified herpetologist in consultation with the Department of Conservation to support a project specific Wildlife Act Authority application (lodged).

Provision has been made to enable methods to be employed to capture lizards prior to vegetation clearance or earthworks activities being undertaken. These works are planned to be undertaken as soon as approval is granted by Department of Conservation.

8.2 Wetland Restoration

The existing wetland will be restored through targeted weed control and planting with appropriate species to improve the habitat and support biodiversity.

A detailed planting plan has not been prepared at this time. It is recommended that a detailed planting and weed management plan is developed as a condition of consent.

8.3 Other Site Management

8.3.1 Batter Stabilisation

Batters will be hydro-seeded with browntop grass with an added mixture of seeds of indigenous trees and shrubs to facilitate the stabilisation of these earthworks. The steep, exposed slopes are likely to be prone to gorse establishment and low survivability of indigenous species and will not replace lost indigenous diversity or habitat value for several years and consequently this planting is not considered to provide remediation or mitigation for the loss of vegetation or habitat values on site except where this may provide some mitigation of edge effects on retained vegetation.

A weed management plan will be prepared as part of the detailed mitigation and enhancement plans (which are suggested to be prepared as a condition of consent).

9.0 Summary of Terrestrial Impact Assessment

The overall level of impact of the proposed earthworks has been assessed. This impact was assessed assuming works are carried out in accordance with standard practice with no additional ecological management. This level of effect is reassessed based on a potential reduction in the magnitude of impact in accordance with recommended mitigation measures described in Section 8.0. Refer to Appendix 1 for a summary of key values and criteria used to describe the level of effects based on the EIANZ Ecological Impact Assessment Guidelines 2015.

Note that if the recommended mitigation measures are not implemented, the impact is considered the 'without mitigation' level.

Table 17: Summary of Terrestrial Impacts and Mitigation

Impact Area	Impact Details	Ecological Value	Magnitude of Impact	Level of Effect (without mitigation)	Recommended mitigation measures	Level of Effect (with mitigation)
Mahoe-mixed broad leaf forest	Removal of 379 m^2 (10% of type)	High	Low	Low	None	Low
Mahoe forest	Removal of 18,282 m^2 (51% of type)	Low	Moderate	Very Low	None	Very Low
Mahoe treefern land	Removal of 4,693 m^2 (62% of type)	Low	Moderate	Very Low	None	Very Low
Mahoe-gorse-karamu scrub	Removal of 25,318 m^2 (73% of type)	Low	Moderate	Very Low	None	Very Low
Gorse shrub grassland	Removal of 40,493 m^2 (77% of type)	Low	Moderate	Very Low	None	Very Low
Weedland	Removal of 3,151 m^2 (68% of type)	Very Low	Low	Very Low	Removal of weeds will have a net positive impact by reducing weed spread.	Very Low

Wetland	Sedimentation, changes to hydrological processes	High	Moderate	High	Stormwater management on site will be manipulated to closely mimic natural hydrological processes. Sediment and erosion control measures to minimise impacts of sedimentation during construction.	Low
North eastern border of site (~370,000 m^2)	Increased edge effects to Speedys Reserve / Belmont Regional Park (371 m long)	Moderate	Low	Low	None	Low
Total site	Loss of ecosystem services	Low	Low	Low	None	Low
Total site	Direct mortality of eggs and juvenile birds if vegetation is cleared during breeding season	Low	Low	Very Low	Avoid vegetation clearance September to December. All native birds are protected by the Wildlife Act.	Very Low
Total site	Direct mortality of skinks/gecko during vegetation clearance and construction	High	Moderate	High	All native lizards are protected by the Wildlife Act. Relocation of lizards on site during construction in accordance with a Lizard Management Plan. Avoid vegetation clearance May to September	Low
All Mahoe / Gorse Vegetation Types	Loss of potential lizard habitat (89,165 m^2)	High	Low/Moderate	Moderate	Lizard Management Plan to identify release site management required	Low

10.0 Adaptive Management and Monitoring

In the event that adverse effects on ecological values are greater than predicted or mitigation offsets do not achieve the mitigation outcomes an adaptive management approach is recommended.

It is recommended that all planting sites are maintained for at least three years. Maintenance includes releasing of plants from any colonising exotic species and replacement of dead plants.

A bi-annual survey of the vegetation clearance footprint should be conducted within a year following completion of construction to assess the extent, if any, of:

- Additional die back of indigenous vegetation beyond the clearance footprint from edge disturbances;
- An increase in weeds (abundance or diversity) in the retained area; and,
- The survival rate of buffer enhancement planting.

It is recommended that the following information should be recorded annually and supplied to Greater Wellington Regional Council if requested:

- All maintenance activities including spraying (including chemicals used, amounts used and species targeted)
- Details of animal pest monitoring
- Details of any animal pest control undertaken
- Record of plant losses
- Record of any replacement planting undertaken
- Plant growth and canopy closure

11.0 Conclusions

The proposed earthworks within Lot 1 DP 91313 cover approximately 9.2 ha between Belmont Regional Park to the west and Major Drive to the east in Kelson, Lower Hutt. The earthworks are required to facilitate future development of the site.

A resource consent has previously been granted (RM20-W11-64/6; 2009) for the Waipounamu development to create 142 residential allotments and 2.86 ha of reserves and to undertake associated earthworks and works in streams to develop the roads, infrastructure, and building platforms.

The length of stream to be lost under the previously granted consent was calculated as approximately 566 m. It was argued that the required compensation, based on the 'stream ecological valuation' method was approximately 1:2 resulting in a length of 1,132 m to be restored. This suggestion was rejected in favour of an alternative offer of the sum of $40,000 to contribute to the costs of fencing riparian margins in Belmont Regional Park.

The length of stream to be lost under the current plan is calculated at 724 m which includes the 566 m previously consented, with the addition of the lower reaches of the southern gully. The required offset based on the SEV method is a ratio of 3.06 to 3.66 which results in a length of 1,490 m, with a riparian corridor of up to 40 m, to be restored. This equates to 50,038 m^2 of offset planting, comprising both the main stem and tributaries of the mitigation channel. The proposed offset site is an upper reach of Belmont Stream located to the north east of the proposed subdivision within Belmont Regional Park.

The area of vegetation to be cleared to support the Stage 1 earthworks is 92,316 m^2. As the site is considered likely to be habitat for several arboreal and terrestrial lizard species, including chronically threatened ('At Risk - Declining') species; a robust lizard survey, lizard management plan, and Wildlife Act Authority including identification of suitable release sites and release site management is required to avoid/mitigate harm to indigenous lizard populations.

12.0 References

Beca (2011) Transmission Gully Project: Assessment of Environmental Effects Report. Prepared by Beca in association with Incite and SKM for the NZ Transport Agency and Porirua City Council.

Blaschke, P. (2007). Proposed residential subdivision at Waipounamu Drive, Kelson: summary of ecological values. Report for Hutt City Council.

Blaschke and Rutherford (2006). Ecological Report: Vegetation clearance at 64 Waipounamu Drive, Kelson. Prepared by Blaschke and Rutherford for Hutt City Council.

Boffa Miskell (2006). Biological Survey and report of significance, Proposed Kelson Heights Subdivision, Lower Hutt. Prepared for Kelson Heights Ltd.

Campbell, D. J. (2006) Ecological Assessment of Proposed subdivision: Lot 1 DP 91313, 64 Waipounamu Drive, Kelson. Prepared for Kelson Heights Ltd.

Campbell, D.J. (2008). Environmental Impact Assessment of a proposed residential subdivision at Kaitangata Crescent & 77 Waipounamu Drive, Kelson. Report prepared for Kelson Heights Ltd.

Cardno (2006). Draft Mitigation Plan: Proposed 1433 Lot Residential Subdivision, 64 Waipounamu Drive, Kelson, Lower Hutt. Prepared for Kelson Heights Ltd.

Conditions Applying to Subdivision and Land Use Consent No. RM20-W11-64/6 (Kelson Heights Ltd).

Cook Costello (2017). Proposed Erosion & Sediment Control Methodology for the subdivision of Lot 1 DP 91313 Waipounamu Drive, Kelson, Lower Hutt. 14 March, 2017.

EcoGecko (2016). Herpetofauna Database Search Results for Keslon Heights, Wellington (Ref: Lot 1 DP 91313). Prepared by EcoGecko Consultants for Morphum Environmental Ltd.

Environment Institute of Australia and New Zealand Inc. (EIANZ) (2015) *Ecological Impact Assessment (EcIA): EIANZ guidelines for use in New Zealand terrestrial and freshwater ecosystems.* EIANZ, Melbourne, Australia.

Ewers R.M. Didham, R.K. (2006) The effect of fragment shape and species sensitivity to habitat edges on animal population size. *Conservation Biology* 21(4): 926-936.

Hitchmough, R. Anderson, P., Barr, B., Monks, J., Lettink, M., Reardon, J., Tocher, M., Whitaker,T. (2013) Conservation status of New Zealand reptiles, 2012 *New Zealand Threat Classification Series 2.* Department of Conservation.

Hutt City Council and Wellington regional Council Decision of Joint Hearing Panel (2009) Kelson Heights Limited Subdivsion (64 Waipounamu Drive, Kelson).

Leathwick, J.R., Wilson, G., Rutledge, D., Wardle, P., Morgan, F., Johnston, K., McLeod, M., Kirkpatrick, R. (2003). Land Environments of New Zealand. David Bateman, Auckland, New Zealand. 183p.

MfE, (2007). Protecting our Places – Information about the national priorities for protecting rare and threatened native biodiversity on private land. Ministry for the Environment and Department of Conservation. ME 805.Overdyck, E., Clarkson B.D. (2012). Seed rain and soil seed banks limit native regeneration within urban forest restoration plantings in Hamilton City, New Zealand *New Zealand Journal of Ecology* 36(2): 177-190.

Parkyn, S., Shaw, W., Eades, P. (2000). Review of information on riparian buffer widths necessary to support sustainable vegetation and meet aquatic functions. Prepared by NIWA for Auckland Regional Council. Auckland Regional Council Technical Publication No. 350.

Patterson, M.G., Cole, A.O. (2013). 'Total Economic Value' of New Zealand's Land-Based Ecosystems and Their Services. *In* Dymond JR ed. *Ecosystem services in New Zealand – Conditions and Trends.* Manaaki Whenua Press, Lincoln, New Zealand.

Ries, L., Fletcher, R.J., Battin, J., Sisk, T.D. (2004). Ecological Responses to Habitat Edges: Mechanisms, Models, and Variability Explained. *Annual Review of Ecology, Evolution and Systematics.* 35: 491-522.

Singers, N.J.D., Rogers, G.M (2014). A classification of New Zealand's terrestrial ecosystems. *Science for Conservation 325* New Zealand Department of Conservation.

Storey, R.G., Neale, M.W., Rowe, D.K., Collier, K.J., Hatton, C., Joy, M.K., Maxted, J.R., Moore, S., Parkyn, S.M., Phillips, N. and Quinn, J.M. (2011). Stream Ecological Valuation (SEV): a method for assessing the ecological function of Auckland streams. Auckland Council Technical Report 2011/009.

Sullivan, J.J., Williams, P.A., Timmins, S.M. (2007). Secondary forest succession differs through naturalised gorse and native kanuka near Wellington and Nelson *New Zealand Journal of Ecology 21*(1): 22-38.

Young, A., Mitchell, N. (1994). Microclimate and Vegetation Edge Effects in a Fragmented Podocarp-Broadleaf Forest in New Zealand. *Biological Conservation* 67: 63-72.

Appendix 1 Assessment of Effects – Methodology

Table 18: Assigning value to species, vegetation, and habitats (summarised from EIANZ, 2015)

Value	Species Values	Vegetation/Habitat Values
Very High	Nationally threatened – critical or vulnerable	Supporting more than one national priority type. Nationally threatened species found or likely to occur there, either permanently or occasionally.
High	Nationally at risk – declining	Supporting one national priority type or naturally uncommon ecosystem. At risk, declining species found or likely to occur there, either permanently or occasionally.
Moderate - High	Nationally at risk – recovering, relict, or naturally uncommon	Other at risk species found or likely to occur there, either permanently or occasionally.
Moderate	Locally uncommon. rare, not nationally threatened or at risk	Locally rare or threatened, supporting no threatened or at risk species
Low	Not threatened nationally, common locally	Nationally and locally common, supporting no threatened or at risk species

Table 19: Criteria for describing magnitude of effect (summarised from EIANZ, 2015)

Magnitude	Description
Very High	Total loss of or major alteration to key features of the baseline condition causing a fundamental change or complete loss of the character, composition, or attributes of the site.
High	Major loss or major alteration to key features of the baseline condition causing a fundamental change of the character, composition, or attributes of the site.
Moderate	Loss or alteration of one or more key features of the baseline condition causing a partial change to the character, composition, or attributes of the site.
Low	Minor shift away from baseline conditions. Change may be discernible but underling character, composition, or attributes of the site will be similar to pre-development.
Negligible	Very slight change from existing baseline condition. Change barely distinguishable.

Table 20: Criteria for describing level of effects (from EIANZ, 2015)

Ecological Value / Magnitude	Very High	High	Moderate	Low
Very High	Very High	Very High	High	Moderate
High	Very High	Very High	Moderate	Low
Moderate	Very High	High	Low	Very Low
Low	Moderate	Low	Low	Very Low
Negligible	Low	Very Low	Very Low	Very Low

Table 21: Interpretation of effects against standard terms (modified from EIANZ, 2015)

Level of effect	Interpretation	
Very High	Unacceptable adverse effects	Extensive adverse effects that cannot be avoided, remedied, or mitigated
High	Significant adverse effects	An effect that is noticeable and will have a serious adverse impact on the environment but could potentially be mitigated or remedied
Moderate	More than minor	Adverse effects that are noticeable and may cause an adverse impact but could be potentially mitigated or remedied
Low	Minor adverse effects	Adverse effects that are noticeable but that will not cause any significant adverse impacts
Very Low	Not more than minor adverse effects	Adverse effects that are discernible day to day effects but too small to adversely affect the environment or other persons
Nil	Nil effects	No effects at all

Appendix 2; Fish management plan

A fish management plan is required for the capture and relocation of fish within any sections of the existing streams to be infilled or disturbed through works.

A draft plan is outlined below, however, it is recommended that this is updated (if necessary) on confirmation of detailed design and construction methodology.

12.1 Permit Requirements

Fish translocation will be undertaken by a suitably qualified ecologist in accordance with the approved fish management plan and appropriate permits.

Section 26ZM of the Conservation Act 1987 outlines the requirements for the transfer or release of live aquatic life.

Prior approval of the Minister of Fisheries is required for the movement of live aquatic life between sites where the species already exists.

12.2 General Habitat Values

The capture site is the existing tributaries which are within the proposed development footprint. This is a natural watercourse with good instream habitat and full canopy cover. The tributaries transition from perennial to intermittent within the site with some historical infilling having occurred in the upper intermittent sections.

The proposed release site is immediately downstream of the capture site within perennial watercourses of similar character and immediately upstream of the boundary of Belmont Regional Park and the confluence with Speedys Stream. Fish in the northern tributary will be released within the section of watercourse which is to be retained within the development as public reserve. This includes the perched wetland which is currently at the confluence of the two tributaries.

12.3 Fish species likely to be present

Electrofishing was undertaken by Ecologists from Cardno over two 200 m reaches of the tributaries in September 2017. This found only a single short fin Eel (downstream of proposed development site). No other native or exotic fish were located. Electrofishing also located 56 *Paranephrops planifrons* (Koura) within the tributaries. Based on the habitat type and downstream connectivity there is a chance of further fish being located during works. It is noted that the presence of a large (4m) waterfall in the southern tributary and extensive sections of cascade/drops in the northern tributary would exclude all species other than climbers.

Table 1 summarises fish species which may be present and methods to undertake capture for relocation.

Table 1: Native freshwater fish likely to occur on site

Species	Common name	Preferred/known habitats (NIWA, Fish Atlas)	Suitable Fishing Methods (DoC, 2013)
Anguilla australis	Shortfin Eel	Numerous in lowland lakes, wetlands, and streams. Tolerant of higher water temperatures and low dissolved oxygen concentrations.	Fyke nets, Electrofishing, Minnow traps.

Anguilla dieffenbachii	Longfin Eel	Wide range of rivers, streams, lakes, ponds, and wetlands.	Fyke nets, Electrofishing, Minnow traps.
Galaxius fasciatus	Banded kokopu	Pools of small tributaries with high overhead shading and instream cover.	Electrofishing, Fyke nets, Minnow traps.
Galaxius brevipinnis	Koaro	Pools of small tributaries with high overhead shading and instream cover. Prefer rocky, tumbling streams	Electrofishing, Fyke nets, Minnow traps.
Galaxius postvectis	Shortjaw kokopu	Pools of small tributaries with high overhead shading and instream cover. Prefer rocky, tumbling streams	Electrofishing, Fyke nets, Minnow traps.

12.4 Methodology

The methodology for the capture, management and relocation of fish should:

- Brief all personnel on the best practice guidelines outlined in this management plan.
- Not use any explosive, toxic gas, poisonous, or narcotic substances to collect fish.
- A list of equipment that may be required in provided in 2. This list is not exhaustive.

Table 2: Equipment list

Equipment	Notes
Project check list and reporting form	Section One and Two are to be used in planning such works prior to any trapping or physical works. Section Three is to be used following the completion of any such works.
Electrofishing certificate	
Dissolved oxygen and temperature measuring devices	For ensuring dissolved oxygen and temperature requirements are maintained.
Stop nets	Approximately 5 mm mesh
Fyke nets	Different sized mesh sizes may be required.
Gee minnow traps	
Electrofishing unit	
10 L Bucket	Securely-lidded container for immediate holding of captured fish during electrofishing.
Hand nets	
Fish transport containers	Securely-lidded containers of at least 20 L in volume.
Pest fish disposal device	Lidded bucket, clove oil
Equipment disinfectant	All nets will require disinfection both before and after fieldwork to reduce the risk of spreading aquatic pest species. This can be done by immersion in a concentrated saltwater solution for at least two hours, or by being dipped/sprayed in a 2% bleach solution, or 5% detergent solution.
Submersible aquarium pump / aerator	In order to maintain dissolved oxygen levels during transport

12.4.1 Site preparation and notifications

The steps for site preparation and required notifications are outlined below:

5. Stop nets are to be installed at the upstream and downstream extents of the target reach, extending beyond the wetted width, at least 48 hours before capture activities are to commence. These nets are to remain in place until capture and relocation activities are concluded and the channel is fully dewatered.
6. An exclusion area is to be set up around any dewatering equipment to prevent fish from becoming trapped within the equipment. The exclusion structure is to be inspected by the project ecologist prior to and during dewatering to ensure the structure is appropriate.
7. All unattended equipment (including nets set overnight) are to be labelled with the owner's name.
8. It is recommended that the weather forecast is checked for the following 72 hours and that fish translocation works are scheduled to avoid heavy rain events. If any event disrupts an exclusion barrier, the ecologist will identify if re-fishing is required.

12.4.2 Capture prior to dewatering

The procedures and methods to capture fish prior to dewatering are outlined below:

1. A mixture of fyke nets and Gee minnow traps (GMTs) are to be used to fish the channel prior to dewatering. This will serve to reduce the number of fish that will subsequently need to be removed by electrofishing.
2. Fyke nets and GMTs are to be set overnight for at least two consecutive nights.
    i. At least six fyke nets and twelve GMTs should be set for each 150 m of channel length. A higher density of nets and traps is preferable to maximise the number of fish caught.
    ii. Fyke nets and GMTs are to be set as late as possible in the afternoon and retrieved as early as possible in the morning in order to reduce predation inside the traps and potential hypoxic conditions.
    iii. The mouth of the net must be fully submerged to allow fish to enter the net and minimise the risk of capturing water birds. An air gap is to be left at the top of each chamber to avoid trapping fish in potentially hypoxic conditions.
    iv. It is preferable for the net locations are to be changed on each occasion to cover the largest area possible.
3. Electric fishing is to be undertaken with adherence to standard protocols in David and Hamer (2010). All operators are required to be licenced.
    i. The channel to be fished will be divided into 25-metre-long sections using upstream and downstream stop-nets, in order to enable resident fish to be captured and removed as efficiently as possible.
    ii. Each section will be electro fished sequentially, from downstream to upstream, in at least three passes. After each pass the number of fish captured will be counted. If the number of fish caught between each of the three passes decreases by at least 50% then that section will be deemed 'clear', the downstream stop-net can be removed and installed 25 metres upstream of the upper stop-net, and the process will be repeated in the next section. If the number of fish caught between each of the three electrofishing passes is less than a 50% decrease then further passes will be undertaken until either the decrease is greater than 50% or less than 10 individuals are captured.

iii. All fish captured will be counted and identified to species, where possible. The total length of the first 50 individuals of each species captured will be recorded and all data submitted for inclusion in the NZ Freshwater Fish Database.

12.4.3 Holding and transfer

The procedures and methods to hold and transfer fish are outlined below:

4. All native fish are to be retrieved and relocated on the same day. Any mortality of native fish species during holding and relocation will be recorded. Fish should only be handled with wet hands (Joy *et al.* 2013).
5. Transfer is to be undertaken as quickly and efficiently as possible with efforts to relocate fish during the cooler times of the day. Total transfer time should be <1 hour to reduce stress and adverse impacts on fish welfare.
6. Fish will be held for transfer in securely-lidded containers of at least 20 L in volume, such as plastic fish bins or polyethylene drums.
7. The container is to be filled with water taken from the channel. Water temperature is to be maintained ±3°C of the temperature of the capture location.
8. Continuous water current and movement will be provided via submersible aquarium pump / aerator. Dissolved oxygen levels are to be maintained at >90% saturation with use of a fine bubble aerator if required.
9. Large eels >500 mm must be isolated from other captured fish to minimise the risk of predation while being held prior to release (Joy et al. 2013).

12.4.4 General biosecurity considerations

The procedures and methods to address biosecurity requirements are outlined below:

10. No aquatic plant, noxious fish, or unwanted organisms including eggs and larvae of noxious fish or unwanted organisms are to be introduced to other waterways.
11. All equipment used in the collection and removal of fish must be thoroughly checked, cleaned, and dried, before and after fishing.
12. Nets and boots/waders are to be soaked in a concentrated saltwater solution for at least two hours, or dipped/sprayed in a 2% bleach solution, or 5% detergent solution (David and Hamer, 2010).
13. Fish are to be visually inspected prior to release. Any fish with lesions or signs of disease shall be disposed of humanely.
14. Any pest fish captured shall also be disposed of humanely.

12.5 Reporting

A fish relocation report will be prepared that will record the methodology, fishing effort, number and size of fish captured (per species), and release site. This will be submitted to the relevant authorities within 10 working days of completion of the fish salvage operation.

Appendix 6 Landscape and Visual Assessment – Drakeford Williams Ltd

64 Waipounamu Drive
Proposed Plan Change

LANDSCAPE & VISUAL ASSESSMENT

Prepared for Kelson Heights Ltd by
DRAKEFORD WILLIAMS LTD
September 2017

1.0 Background

Drakeford Williams Ltd has been engaged by Kelson Heights Ltd to prepare a landscape and visual effects assessment for the proposed 64 Waipounamu Drive plan change from Hill Residential to Residential.

The plan change proposal is subsequent to the proposal lodged in June 2017 for the Stage 1 bulk earthworks for 64 Waipounamu Drive. A separate landscape and visual effects assessment was prepared by Drakeford Williams for Stage 1. An initial site survey was undertaken on 31 July 2016 and further field work for the visual assessment on 3 September 2016.

1.1 Documentation referred to includes:

- Cook Costello Plans 12652-002 EW-01_RC dated June 2017:
  - Sheet 1: Bulk earthworks plan
  - Sheet 2 & 3: Sections through site
- Cuttriss Plans 28923SK6 dated 17-07-17
  - Sheet 1: Indicative Residential Development Layout
- Hutt City website: http://gisweb.huttcity.govt.nz/historicaerials/historicaerials.html
- Hutt Landscape Study: Landscape Character Description. April 2012. Produced by Boffa Miskell for Greater Wellington Regional Council

1.2 *Terminology*

The New Zealand Institute of Landscape Architects (NZILA) best practise recommends using a robust and consistent rating scale for assessing the magnitude and importance of conditions, change or effects, such as the following seven point scale: extreme/ very high/ high/ moderate/ low/ very low/ negligible.

extreme	very high	high	moderate	low	very low	negligible

This scale has been used for the following assessment, with 'low' considered to be equivalent to 'minor' effects in RMA terminology.

2.0 The site

The 64 Waipounamu Drive site is a 14.1334ha parcel of land in Kelson on the Western Hutt hills. It is located towards the top end of Major Drive, on moderately steep hill slopes below Belmont Regional Park and immediately east of Speedy's Stream and Speedy's Reserve (owned by Greater Wellington and managed as part of Belmont Regional Park)[1]. The site borders existing properties on Kaitangata Crescent to the north, Major Drive to the east and Waipounamu Drive, Otira Drive and Christchurch Crescent to the south.

[1] Speedys Reserve is shown as part of Belmont Regional Park in the webmap on the GW site.

2.1 *Site history*

In the 1970s the land formed the final stages of a Fletchers medium density subdivision extending east and west of Major Drive. Stages 10 and 11 did not proceed and this site remained undeveloped.

In 1994 the site zoning was changed from Residential to the Hill Residential in the draft District Plan. The outcome is that the site now is bounded by General Residential zoned development on 3 sides, with lower density/larger lot Hill Residential and Rural Residential zoned development to the north.

In 2009 Kelson Heights Ltd lodged plans for a 142 lot subdivision including earthworks for roading and building platforms, to be undertaken in 10 stages. A joint HCC and WRC hearings panel granted Kelson Heights Ltd consent. The subdivision did not proceed although the resource consent decision will remain valid until 2019.

2.2 *Site landscape values*

The site is located on the lower slopes of the Belmont Hills. The landscape is described in the Hutt Landscape Study:

> *The Belmont Hills character area includes the rounded hilltops and slopes above the Wellington Fault escarpment, adjacent to the lower reaches of Te Awa Kairangi/Hutt River. The hills with their distinctive flat tops form part of a central plateau separating Wellington Harbour and the Hutt Valley from Porirua Harbour.*
>
> *Much of this character area is part of the Belmont Regional Park, the first park in New Zealand to combine land for recreation, conservation and farming purposes. In pre-European times this would have been covered in podocarp forest. However, the elevated and open hilltops are now in pasture and grazed primarily by sheep. In the lower and more sheltered slopes and gullies, broadleaf indigenous hardwoods are present, although there are also large sections of gorse and broom and some pine plantations, particularly in the area to the east of Haywards Hill Road (SH58).*[2]

2.3 *Site landform and vegetation*

64 Waipounamu Drive is located on a northwest facing hillside that extends from a spur sitting parallel to (and west of) Major Drive down into Speedy's Stream (also known as Kahikatea Stream) in a larger valley to the west in Speedy's Reserve. The landform is folded into rolling to moderately steep spur and ridgetop slopes intersected by steep to very steep slopes. The site includes the spur ridgeline to the east and five gully and stream systems but stops short of Speedy's Stream to the west. Two of the streams are considered to be ephemeral and basically three main tributaries drain the site. Collectively they form wetted areas along the western boundary and a small wetland area at the base of the northern-most gully.

Historic aerial photography shows the progressive revegetation of the site from pasture through gorse cover to the regeneration of native bush. It also shows there was vegetation clearance along the ridgeline west of Major Drive in the 1980s and some re-cutting/clearing of old farm tracks in the period between 2008 and 2013. The land today has a cover of gorse and early regenerating bush on the higher and more exposed west facing slopes and established native forest in the sheltered bottom gullies. Revegetation on the east facing slopes above Major Drive is generally more advanced due to the protection from the prevailing wind.

2.3 *Site Visibility and Views*

The site landform forms a small amphitheatre orientated to the west towards the Belmont Hills. Due to its location, and the local topography, the most visible elements of the site are the ridgeline and upper slopes. The remainder of the site, the mid and

[2] Hutt Landscape Study. Boffa Miskell April 2012.

lower slopes, is screened by landform, intervening vegetation and built development along the site boundaries. It can only be seen in immediate views from adjoining properties and in more distant views from tracks in Belmont Regional Park and lifestyle properties accessed from Kaitangata Crescent.

The site is screened in views from the floor of Hutt Valley by intervening landform, namely the Outram /Mossburn Grove ridge to the east of Major Drive.

2.4 *Residential character and amenity*

Residential development along the top end of Major Drive and on the associated side streets is typical of 1970s medium density subdivision where vegetation was removed across the site and bulk earthworks undertaken to form viable building platforms. Lots were configured to maintain a consistent property size of 500-600sqm. This means that subdivision on less steep landform or ridges or valley floors such as along Major Drive and lower Kaitangata Crescent allowed for the creation of consistent rectangular lots, with similar dimensions. Subdivision on roads cutting across the landform such as along Christchurch Crescent and Otira Grove is less regular. Lot frontages vary, and there numbers of rear lots and shared driveways.

Built development is mostly single storey houses somewhere between 100-140sqm with the occasional 2-storey house and split level houses on steeper sites. Houses are set back from the street and there are generous berms and footpaths.

Overall the residential landscape is characterised by what today are regarded as modest houses on relatively large lots, set in an open streetscape but contained within the wider Belmont hill landscape. While not evident in aerial photographs, viewed from the road the topography increases the visual impact of the small bands of regenerating bush on the steeper slopes and ridgelines either side of Major Drive, both on private land and within reserves, and in Speedy's Reserve. This backdrop vegetation creates the perception of a framework of green vegetation separating areas of residential development.

Kelson residents also derive amenity from the wider landscape context including the Belmont Hills, which provide a panoramic backdrop in views to the west, and Belmont Regional Park and its recreational facilities.

Statutory Context

The site is zoned Hill Residential in the Hutt City District Plan.

3.0 Outstanding and Special Amenity landscape values

Policies 25 and 27 in the Greater Wellington RPS require that the region's outstanding natural features and landscapes (ONFs and ONLs), and special amenity landscapes (SALs) be identified in district and regional plans.

Hutt City currently does not identify ONFs, ONLs, or SALs in its district plan although a landscape inventory for Hutt City, the *Hutt Landscape Study, was* completed in 2012.

It provides the basis for identifying outstanding natural features and landscapes, and significant amenity landscapes. The subsequent evaluation of ONFs, ONLs and SALs has been undertaken but is not yet available to the public. However HCC has confirmed for Cuttriss that the site has not been identified as an ONL, an ONF or a SAL.

Given the lack of District Plan direction, the site has been assessed against the criteria set out in Policies 25 and 27 of the RPS. Refer Appendix 1 for the detailed assessment.

In summary, the site is considered too small to be a landscape. It does form part of a larger ridgeline, although the natural values of the landform have already been compromised by earthworks and residential development along Major Drive and the associated side streets.

The site has no significant geological, ecological, topographical and natural process components. Other than the fact that it is undeveloped, and provides a green, vegetated backdrop to the surrounding Kelson residential properties, it has no outstanding, significant or special aesthetic values.

The site does not have special shared values, historical associations or specific tangata whenua values. The land has not been considered to be significant enough for it to be incorporated into the wider Belmont Regional Park or Speedy's Reserve sites. Instead the land is zoned for residential use and has a standing consent for a 142 lot subdivision including earthworks for roading and building platforms.

Based on these criteria, it is my opinion that 64 Waipounamu Drive is not an outstanding landscape, an outstanding feature or a special amenity landscape.

4.0 Hill Residential Activity Area Zone

4.1 Intent

Hill Residential zoning anticipates residential development on sites with difficult topography, limited access and/or established bush cover so long as the activity maintains the character and visual amenity of the wider landscape. and avoids adverse effects on visual amenity values.

The policies in particular focus on maintaining citywide amenity values by reducing the density of built development on the higher and more visible hill slopes that form an undeveloped skyline and a green hill backdrop to local residential development in views from the floor of the Hutt Valley. They also aim to limit bulk earthworks on the more highly visible hill slopes and to ensure that earthworks reflect natural landforms and are sympathetic to the natural topography.

4.2 The development form that could result under existing Hill Residential zoning

Over and above the usual General Residential rules and conditions, the District Plan achieves the objectives and policies of the Hill Residential zoning through a minimum net site area, controls on the location of accessory buildings and criteria for assessing

the effects of site earthworks on visual amenity and landscape values. The objective is to create low density development that is characterised by more the predominance of established vegetation and site landform than by the prominence of the built development and associated earthworks.

The development form could include:

- large lots over 1000sqm with boundaries that respond to the landform. This would potentially include lots with an irregular form and layout;
- bulk earthworks for roading;
- small scale earthworks to form building platforms for individual dwellings or possibly for clusters of lots;
- cut and fill batters graded to replicate existing landform, at gradients that can be topsoiled and replanted;
- and retention of site vegetation on areas that have not been earthworked including established forest, mahoe gorse scrub or gorse shrub grassland. This vegetation possibly could be incorporated into residential lots with the potential to protect it through conditions.

Notwithstanding the Hill Residential objectives and policies, the Kelson Heights subdivision consented in 2009 provides an illustration of a potential development form that could occur under the existing Hill Residential Activity Area Zone.

- The subdivision included 142 residential lots, the associated roading and two reserve sites totalling 2.86ha. Lots ranged in size from 400sqm to over 1000sqm, with only 9 lots over 1000sqm. Site development to accommodate this number of allotments included vegetation clearance, bulk earthworks and the loss of streams.

- Bulk earthworks were based on a cut to fill balance and were undertaken across 9.3ha or 66% of the site. They were generally restricted to the upper slopes and ridgeline, avoiding the more significant vegetation and wetland areas adjoining Speedy's Reserve. Earthworks included lowering the ridgeline by up to 9m and removing the tops of the small east-west running spurs to fill gullies and form 4 broad building platforms across the site.

- Nearly 30,000sqm of existing site vegetation was retained including the most valued wetlands and mixed broadleaf vegetation in the reserves, and a band of protected vegetation below the lowered ridgeline and adjoining residential properties on Major Drive, Christchurch Crescent and Waipounamu Drive.

In summary, the 2009 subdivision allowed development that did not meet the minimum net site area or the earthworks and vegetation removal restrictions. The subdivision pattern along the ridgeline road in particular had the potential to create higher density development than occurs in the surrounding 1970's residential properties, with the narrow lots and stepped building platforms encouraging split level development along the ridgeline.

5.0 General Residential and General Recreational Activity Areas

5.1 Intent

The General Recreation zoning promotes residential development that maintains and enhances the amenity values and residential character of Hutt City. It allows for the development of single dwellings across a range of housing styles including some higher density cross-lease, semi-detached and some multi-unit development.

The intent of the objectives and policies is to ensure residential development that is compatible with the surrounding development and does not diminish the existing sense of place and amenity values.

There are fewer restrictions on earthworks in the General Residential zone than in the Hill Residential zone, although 14I 1.1 notes:

> *Where any earthworks proposed exceed specific requirements, consideration will be given to the maintenance and enhancement of visual amenity values, and any historical or cultural significance of the site concerned. Consideration will also be given to any rehabilitation measures which can be undertaken to mitigate adverse effects upon the environment.*

General Residential objectives and policies allow development on hill slopes providing that the earthworks are shaped and revegetated in a manner that avoids unnecessary scarring of the landscape and mitigates adverse effects on the character and amenity of both the existing and the proposed residential development.

5.2 The development form that could result under existing General Residential and General Recreation zoning

With regard to the recreational zoning, relevant Objectives and Policies 7A1.1.1 AND 7A 1.1.2 in the General Recreation Activity Area focus on the potential for adverse effects of recreation activities on landscape values and on adjoining residential amenity values.

The landform at 64 Waipounamu Drive is folded into rolling to moderately steep spur and ridgetop slopes. Nearby Speedy's Reserve and the Belmont Regional Park provide opportunities for active and passive recreation. An existing playground on Major Drive backs onto the site with potential for a direct pedestrian walkway link.

There is limited potential to create a small scale reserve for active play within the undeveloped site. Given the rolling to moderately steep spur and gully landform, a functional active recreation area would need to be located on one of the building platforms, with potential for adverse effects on the amenity of adjoining properties and residents. The most appropriate area for reserve land is the lower slopes in the northwest corner of the site. The land has high landscape values, with vegetation and wetland areas that make it inappropriate for any activity other than passive

recreation. A reserve in this location would be contiguous with and provide additional landscape value to Speedy's Reserve and Belmont Regional Park.

The development form that could result under the proposed General Residential and General Recreational zoning could include:

- residential development with the majority of lots 400m² and above;
- minimum front and side yards and recession planes apply;
- bulk earthworks for roading and infrastructure;
- vegetation removal across most of the site;
- roading through the site to provide appropriate connectivity for the dwellings;
- large scale earthworks across the remainder of the site for built development;
- more geometric landform with large building platforms, separated by cut or fill batters;
- cut and batters at gradients up to 1:1;
- exposed earthworks hydroseeded;
- retention of vegetation and landform on less accessible areas of the site on the eastern boundary adjacent to Speedy's Reserve, possibly incorporated into extended/larger residential lots but with the potential to protect it through conditions such as no build or protected zones; and
- potential for retention of vegetation and/or landform at the rear of lots above Major Drive and Christchurch Crescent. Effects on the residential amenity of neighbouring property are avoided through General Residential rules for minimum yard requirements, recession planes and maximum building heights.

6.0 Landscape and visual effects resulting from the two potential development forms

Based on the relevant objectives and policies, residential development in the Hill Residential zoning could provide for a subdivision where:

- Biophysical effects are minimised by controls on earthworks and the removal of significant vegetation, and the requirement for earthworks that are low visual impact and/or can be revegetated to look more natural;
- Large lot sizes and site coverage controls encourage the retention of site vegetation, and provide opportunities for further large scale planting within the lots:
- Low density development reduces the visual impact of the overall built development including the houses, accessory buildings and driveways, when seen in distant views into the site.
- Retained vegetation on site boundaries screens built development and minimises effects on the visual amenity of neighbouring properties.
- Effects on the character and amenity of the surrounding residential area are mitigated by controls on the height, scale and density of built development, which in turn ensures that established vegetation and site landform has visual prominence over the built development and earthworks.

- Effects on the amenity of adjoining properties in particular are mitigated by policies that manage the siting of built development and the clearance of vegetation along the residential boundary.

Based on the relevant objectives and policies, residential development in the General Residential and Recreation zoning allows for a subdivision where:

- Biophysical effects are avoided, remedied or mitigated. This means, for example, that waterways and associated riparian vegetation will be retained where practicable but can be removed if the effects can be mitigated through sensitive stormwater systems and off-set planting outside the site;
- Minimum lot sizes of 400sqm and 35% site coverage allow for large scale removal of site vegetation
- Lot size and site coverage controls anticipate earthworks for roading and to establish building platforms, providing that the remaining unbuilt earthworked areas are rehabilitated or replanted to reduce their visual impact. The bulk earthworks can create a highly geometric landform of large scale building platforms separated by grass covered batters. Effects on landscape values have the potential to be high;
- Large cut or fill batters are high visual impact initially but will be partially screened by intervening buildings when seen in distant views from elevated properties. Visual effects are mitigated by the establishment of 'green' grass cover on the exposed batter faces, with batters left to naturally revegetate over time;
- Rules for residential density and controls on recession planes, yards and building dimensions limit potential effects on the visual amenity of adjoining residential properties, although provide no guarantees on maintaining the degree of visual separation providing by the existing landform and vegetation. Consequently the development is characterised by the dominance of built development over natural landscape elements;
- Active recreation areas are allowed for but are required to be small scale or removed from existing and proposed properties to avoid adverse effects on residential amenity.

I note that the above comparison is theoretical. The reality is that the landscape and visual effects of the 2009 consented development within the Hill Residential zoned site are only slightly lower than the effects that can be anticipated from a development under the proposed General Residential and Recreational zoning. The bulk earthworks and residential densities are relatively similar. The difference in effects arises from the additional mitigation provided by the retention and protection of valued landform and vegetation along the western boundary and around the ridgeline along the adjoining residential boundary in the 2009 consented development.

7.0 Proposed Plan Change alignment with the local and wider environment

The development form associated with the General Residential Activity Area is in keeping with the local and wider environment for the following reasons:

Site location within a residential landscape context
The 64 Waipounamu Drive site is located in Kelson, adjacent to Major Drive. It is bounded by Residential zoned development on 3 sides and with General Recreation zoned land on the western boundary. In other words, the site sits within a suburban landscape and access to the site is through local streets lined with residential development.

The site is bounded by Speedy's Reserve valley to the west and a smaller gully to the north that together form a natural boundary between the Residential development to the south and the lower density Hill Residential development to the north.

Location of recreation zones
The development form allows for a General Recreation zone adjoining an existing reserve and adjacent to Belmont Regional Park. The formation of a zone with contiguous vegetation and vegetation values is appropriate in this location.

Site landform and topography
The site is characteristic of the Kelson landscape with the landform folded into rolling to moderately steep spur and ridgetop slopes. As illustrated in the Kelson Heights indicative layout, the large scale earthworks for roading and building platforms anticipated in the development form are not dissimilar to the earthworks undertaken in the 1970's subdivision, which filled in gully systems and removed existing streams and associated vegetation.

The topography and development form allow for undeveloped land on the periphery of the site, generally in the form of steeper backyards below the building platform. These are likely to be left to revegetate over time and are comparable to the small bands of regenerating bush that have established on the steeper slopes of rear yards of properties in Major Drive, Christchurch Crescent and Waipounamu Drive adjoining the site in the 40+ years since earthworks were completed.

Similarly the steep batters between building platforms within the site have the potential to revegetate. Even on these engineered slopes, the grass will be overtaken by scrub cover over time to create the perception of a framework of green vegetation separating areas of residential development.

Pattern of development
The topography also influences the lot layouts, which are dictated largely by the location of the main access roads. This means for example that subdivision along the ridgeline road allows for the creation of consistent rectangular lots, while lots on smaller cul de sacs and ROWs are less regular and have variable frontages. This replicates the existing pattern of development across Kelson. In addition, the

At a wider scale, the General Residential rules anticipate built development in terms of front yards, building height and maximum site coverage that is comparable to existing Kelson development. The outcome is a similar pattern of residential development, albeit at a slightly denser scale with smaller lots and potentially larger houses, given current day expectations for internal garages.

Connectivity
The General Residential development form allows for and encourages roading links to existing residential development to the south and northeast of the site, and extending through the site. This was foreseen in the 1970s development layout and design of Waipounamu Drive and connection to Kaitangata Crescent.

8.0 Conclusion

There are negligible effects on the wider Belmont and Hutt environment. While it is backdropped by the Belmont Hills, the larger part of the site faces west, away from the city. Kelson residents will continue to derive amenity from the wider landscape context including the Belmont Hills, which provide a panoramic backdrop in views to the west, and Belmont Regional Park and its recreational facilities. At a local scale, the site landform is visually contained, which reduces the potential for adverse effects on the visual amenity values of the hillside environment and on existing residential character and amenity.

The proposed General Recreation zoning provides an opportunity to maintain landscape values of the most valued areas of wetland and vegetation along the lower slopes of the site and adjoining Speedy's Reserve.

While the development form is characterised by the dominance of built development over natural landscape elements, the residential zone rules limit potential effects on the visual amenity of adjoining residential properties. The landscape and visual effects of the development will be mitigated over time as the steeper, undeveloped areas within the lots and in the recreational zone naturally revegetate over time to divide and separate areas of residential development.

Viewed from within Kelson, the development will be perceived as an extension of the existing suburban housing area.

From a landscape and visual perspective the General Residential Activity Area zoning is appropriate for this site.

Additional mitigation
Based on observations of the existing vegetation patterns in Kelson residential development, it is anticipated that property development will occur around the immediate house and curtilage. Existing vegetation (of any form) remains untouched. Steeper and less usable areas of the site are planted or left to revegetate. Over a

period of time, the landscape and visual impact of new development on the residential landscape will reduce through the process of natural regeneration.

It is my opinion that no site specific rules are required to address the resulting effects from the plan change.

Julia Williams
Drakeford Williams Ltd
7 September 2017

APPENDIX 1

Outstanding Natural Features and Landscapes
Special Amenity Landscapes

The 2013 Regional Policy Statement for the Wellington Region provides the following direction for ONFLs and SALs.

Policy 25: Identifying outstanding natural features and landscapes – district and regional plans
District and regional plans shall identify outstanding natural features and landscapes having determined that the natural feature or landscape is:
(a) exceptional or out of the ordinary; and
(b) that its natural components dominate over the influence of human activity, after undertaking a landscape evaluation process, taking into account the factors listed below.

Policy 27: Identifying special amenity landscapes – district and regional plans

District and regional plans may identify special amenity landscapes which are distinctive, widely recognised and highly valued by the community for their contribution to the amenity and quality of the environment of the district, city or region. Any special amenity landscape evaluation process carried out to inform the identification of any such special amenity landscapes shall take into account the factors listed in policy 25.

For the purposes of clarification, special amenity landscapes when compared to outstanding natural landscapes will have, when assessed under the factors listed in Policy 25:
(a) highly valued, but not clearly exceptional landscape values, in an area where the **natural components** of landscape character dominate; or
(b) highly valued, including exceptional landscape values, in an area where the modification of landscape by **human activity** is a dominant influence on landscape character.

Natural science factors (a) Natural science values: these values relate to the geological, ecological, topographical and natural process components of the natural feature or landscape:	
(i) Representativeness: the combination of natural components that form the feature or landscape strongly typifies the character of an area.	The site is too small to be a landscape. It could be considered to be part of a larger Major Drive ridgeline, although the natural values of the ridge landform have already been compromised by earthworks and residential development along Major Drive and the associated side streets.
(ii) Research and education: all or parts of the feature or landscape are important for natural science research and education.	The site is not used for natural science research and education.
(iii) Rarity: the feature or landscape is unique or rare within the district or region, and few comparable examples exist.	The site sits on the lower slopes of the Belmont Hills. The peneplain hills and ridgeline landform is not unique but is characteristic of most Wellington hills and ranges.
(iv) Ecosystem functioning: the presence of healthy ecosystems is clearly evident in the feature or landscape.	The Morphum ecological report notes that while the streams and wetland have high ecological values, the majority of the vegetation communities on the site are nationally and locally common, with low diversity. The site is not known to provide habitat for any threatened bird species.

Sensory factors (b) Aesthetic values: these values relate to scenic perceptions of the feature or landscape:	
(i) Coherence: the patterns of land cover and land use are in harmony with the underlying natural pattern of landform and there are no significant discordant elements of land cover or land use.	The site is located within Kelson, with residential development along 3 sides of the property, so that natural patterns of landcover have been disrupted.
(ii) Vividness: the feature or landscape is visually striking and is widely recognised within the local and wider community for its memorable and sometimes iconic qualities.	The ridgeline and hillside are fragments of the wider landscape and have no features that elevate the landscape and make it special or iconic to the wider community, other than its unbuilt/undeveloped character
(iii) Naturalness: the feature or landscape appears largely unmodified by human activity and the patterns of landform and land cover appear to be largely the result of intact and healthy natural systems.	The majority of the vegetation communities on the site are nationally and locally common, with low diversity due to the early successional stage with the exception of the Mahoe-mixed broadleaf forest.
(c) Expressiveness (legibility): the feature or landscape clearly shows the formative processes that led to its existing character.	The site is fragment of the wider landscape, which limits its capabilities to display formative processes.
(d) Transient values: the consistent and noticeable occurrence of transient natural events, such as seasonal change in vegetation or in wildlife movement, contributes to the character of the feature or landscape.	There are no notable or even noticeable transient natural events, other than the seasonal change of gorse in flower.
Shared or recognised factors	
(e) Shared and recognised values: the feature or landscape is widely known and is highly valued for its contribution to local identity within the immediate and wider community.	The District Plan does not acknowledge the site as having special values. The land is not considered to be special or significant enough for it to be incorporated into the wider Belmont Regional Park or Speedy's Reserve sites. The land is zoned for residential use and has a standing consent for a 142 lot subdivision including earthworks for roading and building platforms.
(f) Tangata whenua values: Māori values inherent in the feature or landscape add to the feature or landscape being recognised as a special place.	No specific tangata whenua values have been noted for this site.
(g) Historical associations: knowledge of historic events that occurred in and around the feature or landscape is widely held and substantially influences and adds to the value the community attaches to the natural feature or landscape.	No specific historical associations have been noted for this site.

APPENDIX 2

4.3 Relevant Objectives and Policies

Objectives and Policies 4D 1.1.1
In 4D 1.1.1, the Objectives and Policies seek to manage and enhance the distinct characteristics and amenity values of the hillside residential areas.

An assessment of the 2009 proposal against 4D1.1.1 policies includes:
Policy

a) The site is visually contained which reduces adverse effects on the visual amenity values of the hillside environment;
b) The quantum of vegetation clearance is mitigated by the retention of the high value vegetation adjacent to Speedy's Reserve and the band of mahoe mixed broadleaf vegetation on the top of the east, south and part west ridgeline slopes. exposed cut and fill earthworks are revegetated;
c) Significant vegetation within the wetland areas is retained and protected in reserves;
d) Although there are earthworks along the ridge landform and the ridgeline is lowered by over 9m, the landform is screened in close views from adjoining properties due to the retention of intervening vegetation. The ridgeline is backdropped by the Belmont Hills in more distant views from elevated properties, and the natural appearance of the skyline is retained; and
e) The proposal has no effect on the wider landscape of the Belmont Hills and Belmont Regional Park, both of which provide amenity for the residents of Kelson. The site cannot be seen from the floor of the Hutt Valley.

Summary Assessment
The proposal has no effect on the amenity values of the wider Hutt City. Adverse effects on the distinct characteristics and amenity values of the Kelson hillside environment are managed largely through the location of the site on landform that is visually contained. Where the site can be seen in its wider hillside context, it is backdropped by the Belmont Hills to the west, and by existing residential development on the Mossman/Outram ridge to the east. Effects on residential amenity values and residential character are mitigated through the retention of a vegetative buffer along the Major Drive and Christchurch Crescent site boundaries, and across the top of the west facing slopes below the ridgeline. This recreates the existing pattern of development by forming a framework of green vegetation that separates areas of residential development.

Objectives and Policies 4D 1.2.2
An assessment of the 2009 proposal against 4D1.2.2 policies includes:

Policy

a) The bulk of the lots are over 500sqm, although there are 32 lots in the 400-500sqm range, and 22 lots that are over 800sqm. Only 9 lots comply with the

Permitted Activity minimum net site area of 1000sqm. Site coverage can be achieved through the Permitted Activity minimum yard requirements;

b) The sites allow for built development of a height and scale compatible with the surrounding residential development, although the built density has the potential to be greater;

c) Where lots are located above existing residential properties, building platforms are set back from the boundary behind a band of retained vegetation in order to maintain adequate daylight and sunlight for adjoining properties;

d) The finished development will be visible from a number of more distant properties, but the visual impact of the proposal is mitigated by the viewing distance and the wider panoramic backdrop that minimises detractions from the character and visual attractiveness of the surrounding residential activity area;

c) Minimum yard requirements apply. Where lots are located above existing residential properties, a band of retained vegetation along the residential boundary provides a buffer and partial screening between existing and proposed houses to mitigate visual and amenity effects; and

e) Effects resulting from scale and siting of garages and carports are contained within the bulk earthworks, rather than on a site by basis during building construction.

Summary Assessment

The proposal retains an area of established and regenerating native vegetation at the lower end of the site and contiguous with the adjacent reserve. While minimum net site areas do not comply with the Hill Residential rules, they are consistent with the General Residential rules in terms of net site area, site coverage and height. The form and density of the Kelson Heights subdivision is not what is necessarily anticipated under the Hill Residential zoning, but it is consistent with the character of residential development adjacent to the site, although a much denser form of development than the more distant Hill Residential and Rural Residential properties to the north. Adverse effects resulting from the impact of built development on the amenity values of adjacent residential properties and the residential character of the surrounding area were considered to be able to be mitigated through the retention and protection of vegetation below the residential development either side of the ridgeline road, on the more visible upper slopes of the site.

Appendix 7 Geotechnical Report – Cook Costello Consulting Engineers

Geotechnical Report

for subdivision of

Lot 1 DP 91313 64 Waipounamu Drive

Kelson

CCL project number: 12652-002

14 March 2017

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Cook Costello

Document Control Record

Client:	**Kelson Heights Residential Limited**
Project description:	Geotechnical report for subdivision
Document name:	160617-12652-002-geotech [final]
Client reference:	64 Waipounamu Drive, Kelson
Date of issue:	Tuesday, 14 March 2017
Status:	For Review
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1. INTRODUCTION

1.1. Overview

Kelson Heights Residential Limited has proposed to subdivide 64 Waipounamu Drive, Kelson into approximately 80 residential lots as part of Stage 1. This property is legally described as Lot 1 DP91313, and it is approximately 14.13 hectares in size. The subdivision of the land is proposed under the Hutt City Council jurisdiction. Cook Costello has been engaged to provide a report to examine the geotechnical suitability of the proposed subdivision in support a resource consent application. This report considers the following aspects of site development:

- Existing stability of the site
- Effects of the development on stability
- Suitability of proposed bulk earthworks

2. EXISTING SITE FEATURES

2.1. Site Description

The property is located at the end of Waipounamu Drive in Kelson, Wellington. The subdivision will be bordered by Major Drive to the east and Kaitangata Crescent to the north-east. Access into the subdivision will be via Kaitangata Crescent. The legal description of the site is Lot 1 DP 91313 and the total size of the lot is approximately 14.13ha.

The property has a ridgeline running parallel with Major drive that is intersected with four gulley's running in a southeast to northwest direction. The property is elevated from the surrounding land. There is a steep slope between the top of the ridgeline and the neighbouring properties along Major Drive; sloping down to the south-east at grades of up to 33°. The rest of the property generally slopes down to the north-west. There are four well defined natural gullies which run from the ridgeline downslope to the north-west.

The elevated areas of the property are vegetated with regenerating bush and shrub consisting mostly of gorse. The steeper areas, including the slope down to Major Drive to the south-east and gullies to the north-west, are vegetated with bush consisting mostly of ponga trees with other dense shrub and some isolated mature trees.

The proposed development is an 80 lot residential subdivision. The 80 lots will be situated along the ridgeline in the eastern half of the property, with access via a new road developed off Kaitangata Crescent to the north-east.

Figure 1: Site Location Plan

Earthworks of approximately 150,000m³ of cut to fill are proposed at the subdivision. The cut area will mostly be along the main ridgeline parallel to Major Drive and also along the secondary ridges elevated between the natural gullies. The cut material will be used to fill in the gullies to create a smooth profile sloping down to the west with some potential terraced retaining features.

Although the site was generally covered in bush and scrub at the time of the site visit, it appeared to be sound with no apparent local or global failure features visually identified. A subdivision plan showing the proposed earthworks and contours is attached in Appendix 1.

2.2. Geology

The geology of the site has been obtained from the 1:250,000 scale geological map of New Zealand (GNS Science Geological Map 1). This map indicates that the site is underlain by Triassic age undifferentiated Rakaia Terrane Sandstone and Mudstone; alternating sandstone and mudstone, poorly bedded sandstone with minor coloured mudstone, conglomerate, basalt and chert.

The site appears to be situated just south of an inactive fault line with no record of recent movement. However, the Wellington Fault lies approximately 1km south-east of the proposed development and runs along the Hutt River. The Wellington Fault is a Class 1 active fault and is also known as the collision zone between the two great tectonic plates (Australian and Pacific plate). GNS describes this as an oblique dextral strike-slip fault which essentially means that there is a possibility of movement in nearly all directions. Reports indicate there is a 10% possibility of a >M7 earthquake on the Wellington Fault within the next 100 years.

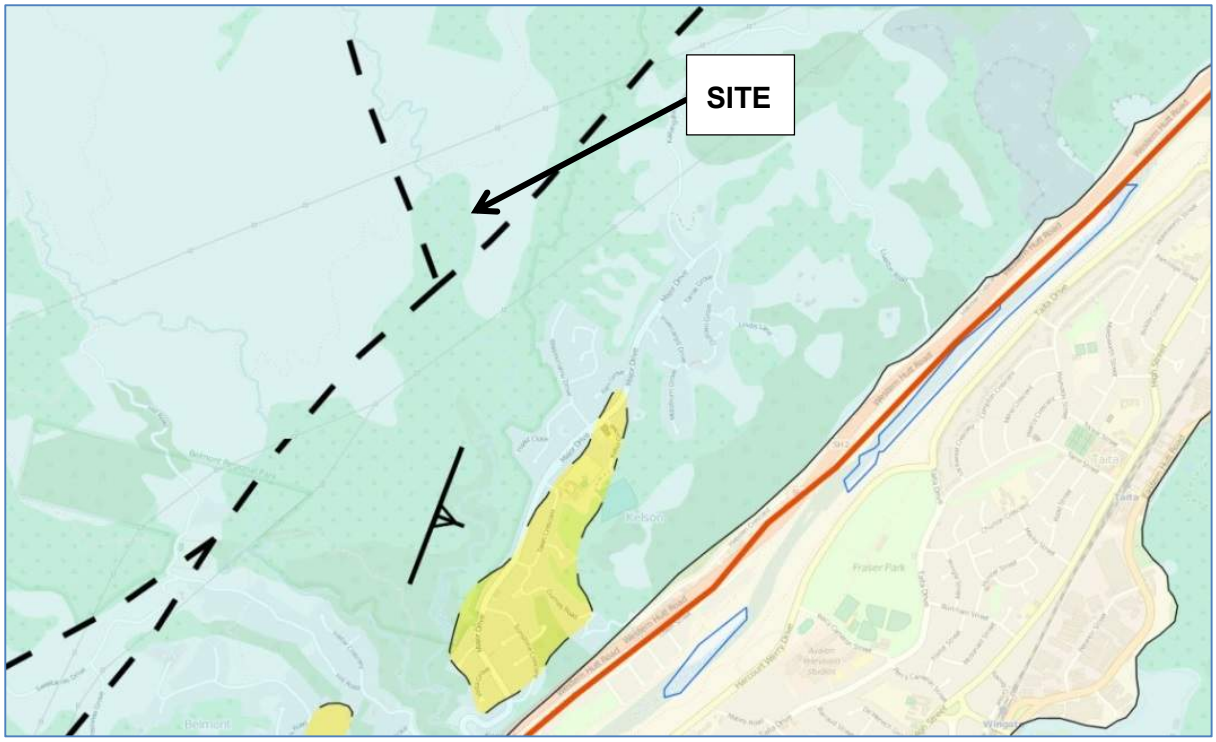


Figure 2. GNS Science Geological Map 1

Active Fault

Inactive Fault

3. GEOTECHNICAL SITE INVESTIGATIONS

A Geotechnical site investigation was carried out on the 14th and 17th of June, 2016. These investigations consisted of:

- Visual inspection and walkover
- 12 pits (TP) with shear vane measurements to identify subsurface soil properties
- 11 Scala penetrometer tests (SP) to identify bearing capacity and uniformity of the soil

The test locations are shown on the site investigation plan attached in Appendix 1. The test results have been attached in Appendix 2.

3.1. Subsoil

Subsoil observations during excavation of the test pits undertaken on site are summarised within Table 1 below. The test pits were evenly spaced across the proposed subdivision.

TP1, 2, 3, 4 and 5, are located within the southern half of the site, all identified very stiff clayey silt with traces of sand and cobbles of varying thickness overlying rock where the test pits were terminated. The depth to rock varies from approximately 1 – 3mbgl. Groundwater was encountered only during TP5 at approximately 1.2 – 1.5mbgl.

TP6 identified clayey silt, however was terminated at 1mbgl due to excavator slippage.

TP7, 8, 9, 10, 11 and 12, located in the northern half of the site, and were all excavated to the target depths of approximately 2 – 3mbgl. Clay and silt soils with traces of sand were identified however rock was not encountered at the base of the test pits. Groundwater was encountered during TP12 only at approximately 1.5mbgl.

Test ID	Location	Depth (mBGL)	GWL (mBGL)	(mBGL)	Soil type	Shear Strength (kPa)	Soil Sensitivity
TP1		1.2 (refusal)	N/A	0.00 – 0.10	(Topsoil) dark brown, moist	0.2m – 172/7	24.6
				0.10 – 1.20	(Clayey SILT) traces of coarse sand and cobbles; light brown, slightly plastic, slightly moist		
TP2		1.0 (refusal)	N/A	0.00 – 0.20	(Topsoil) dark brown, slightly moist, friable		
				0.20 – 1.00	(Weathered ROCK)		
TP3		2.0 (refusal)	N/A	0.00 – 0.30	(Topsoil) dark brown, slightly moist, friable	0.5m – 139/40	3.5
				0.30 – 2.00	(Clayey SILT) traces of coarse sand and cobbles; light brown, slightly plastic, slightly moist	1.0m – 159/15	10.6
TP4		1.80 (refusal)	N/A	0.00 – 0.20	(Topsoil) dark brown, slightly moist, friable	0.5m – 172/24	7.2
				0.20 – 1.80	(Clayey SILT) traces of coarse sand and cobbles; orange brown, slightly plastic, slightly moist, increasing cobbles with depth		
TP5		2.80 (refusal)	1.2 – 1.5	0.00 – 0.10	(Topsoil) dark brown, moist, friable		
				0.10 – 2.80	(Clayey SILT) traces of medium to coarse sand; orange brown with blue alluvial material from 1 – 1.5mbgl		
TP6		1.0	N/A	0.00 – 0.20	(Topsoil) dark brown, slightly moist, friable	0.3m – 175/9	19.4
				0.20 – 1.00	(Clayey SILT) traces of medium to coarse sand and cobbles; orange brown, slightly plastic, slightly moist	0.5m – 176/37	4.8
				1.0	TP6 terminated due to excavator slipping		
TP7		3.0 (target depth)	N/A	0.00 – 0.10	(Topsoil) dark brown, slightly moist, friable	0.2m – 139/7	19.9

Test ID	Location	Depth (mBGL)	GWL (mBGL)	(mBGL)	Soil type	Shear Strength (kPa)	Soil Sensitivity
				0.10 – 3.00	(Silty CLAY) orange brown, slightly moist, friable		
TP8		3.0 (target depth)	N/A	0.00 – 0.20	(Topsoil) medium brown, dry, friable	0.3m – 159/16	9.9
				0.20 – 3.00	(Clayey SILT) traces of medium to coarse sand; light brown, moist, plastic	1.1m – 95/16	5.9
TP9		2.0 (target depth)	N/A	0.00 – 0.50	(Fill)	1m - >185	
				0.50 – 2.00	(Silty CLAY) traces of medium to coarse sand, traces of cobbles and weathered rock; orange brown, slightly moist		
TP10		3.2 (target depth)	N/A	0.00 – 0.10	(Topsoil) dark brown, moist, friable		
				0.10 – 3.20	(Clayey SILT) orange mottled with blue, slightly plastic, traces of weathered/inferred rock from 2mbgl		
TP11		3.0 (target depth)		0.00 – 0.20	(Topsoil) medium brown, dry, friable	0.3m – 86/13	6.6
				0.20 – 3.00	(Silty CLAY) with traces of coarse sand; orange	0.9m – 126/15	8.4
						1.4m - >185	
TP12		2.0 (target depth)	1.5	0.00 – 0.20	(Topsoil) medium brown, slightly moist, friable	0.5m - 159	-
				0.20 – 2.00	(Clayey SILT) traces of medium to coarse sand; orange, slightly moist, friable	1.5m – 106/13	8.2

[1] mBGL: metre Below Ground Level [2] GWL: Ground Water Level

Table 1. Summary of test pit results

3.2. Bearing Capacity

A series of eleven Scala penetrometer tests (SP8 excluded) were conducted over the site. The results show that an ultimate bearing capacity (UBC) of 300kPa (100kPa allowable) can be achieved generally throughout the site with some exceptions:

1. SPT3, SPT5, SPT7, SPT10 and SP11 did not achieve UBC ≥300kPa within 0.5mBGL.

The exceptions mentioned above are considered to be minor given the overall scale of the development. In this case the Scala tests that did not achieve UBC ≥300kPa within 0.5mBGL are mostly located within areas of proposed cut (with the exception of TP11) and therefore any bearing capacity issues will likely be mitigated during the bulk earthworks construction phase.

Table 2: Summary of Scala penetrometer results

Test ID	Depth (mBGL) [1]	Scala Penetrometer (mm/Blow)	Inferred Ultimate Bearing Capacity (kPa)
SP1	0.11	<28mm/blow	>300
SP2	0.18	<28mm/blow	>300
SP3	0.36	<50mm/blow	>200
	0.70	≤28mm/blow	≥300
SP4	0.13	<28mm/blow	>300
SP5	0.25	<50mm/blow	>200
	1.03	<28mm/blow	>300
SP6	0.20	<28mm/blow	>300
SP7	0.06	<50mm/blow	>200
	0.57	<28mm/blow	>300
SP9	0.26	<28mm/blow	>300
SP10	0.15	<50mm/blow	>200
	0.92	<28mm/blow	>300
SP11	0.19	<50mm/blow	>200
	1.00	<28mm/blow	>300
SP12	0.35	<50mm/blow	>200
	0.56	<28mm/blow	>300

[1] mBGL: metre Below Ground Level

The uncorrected allowable bearing capacities as shown in the above Table are based on Scala penetrometer tests and have been estimated using the procedure presented by M.J. Stockwell in the paper 'Determination of allowable bearing pressure under small structures (June 1977)'.

3.3. Undrained Shear Strength and Soil Sensitivity

The undrained shear strength ratio of the soil material, were measured during several test pits at irregular intervals (TP1, 3, 4, 6, 7, 8, 9, 11, 12) using a hand-held shear vane as the test pit progressed. This determined the in-situ shear strength of the subsoil with respect to depth. The sensitivity of the soil was also estimated during the TP investigations.

Soil sensitivity is a measure of loss of strength that may occur when the soil is disturbed or remoulded, for example during cut to fill bulk earth works operations. This measurement of strength is expressed as a ratio. The shear vane results indicate that the soil material can be considered to be sensitive to extra sensitive and quick in some areas, in accordance with NZGS Soil and Rock Guidelines Table 2.10 (2006). This means there will be considerable loss in strength compared to the in-situ shear strength.

It can be concluded that material excavated from the soil mantle (silts and clays) overlying the weathered sandstone may not be suitable for re-use in filling operations due to loss in shear strength.

Table 3: Sensitivity of soil (NZGS Soil and Rock Guidelines (2006) Table 2.10)

Descriptive Term	Shear Strength Ratio (undisturbed/remoulded)
Insensitive/normal	< 2
Moderately sensitive	2 – 4
Sensitive	4 – 8
Extra sensitive	8 – 16
Quick	> 16

3.4. Groundwater

Groundwater was encountered during TP5 and TP12 at approximately 1.5m below the existing ground level. All other test pits did not identify groundwater.

Due to proposed cut of up to approximately 15m within some areas of the subdivision, there is the potential for groundwater to be encountered during the construction phase of the development. Further testing could be undertaken to confirm the depth to groundwater, or installation of subsoil drainage will be required during the bulk earthworks stage. This will be completed at the discretion of the engineer who is supervising the bulk earthworks operation.

3.5. General Interpretation of Geotechnical Investigations

In general, the test pits revealed a matrix of stiff to very stiff sedimentary soils being silts, sand and clay, overlying weathered sandstone rock over the entire site that is to be developed (approximately 14.13ha). The stiffness of the material is supplemented by Scala penetrometer tests which yield an allowable bearing capacity of 100kPa at approximately 0.5mBGL over approximately half of the site.

On this basis, it can generally be concluded that the soil material and its engineering properties encountered during the geotechnical site investigation are considered to be competent and suitable for residential development. The bulk earthworks can be completed in accordance with the following design standards and guidelines:

1. NZS 4431:1989 - Code of Practice for Earth Fill for Residential Development
2. NZS 4404:2010 - Land Development and Subdivision Infrastructure

4. SLOPE STABILITY HAZARDS

4.1. Seismic induced Site Stability

As indicated within Section 2.2, there are two known active faults within the vicinity of the proposed sub-division, these are:

- The Wellington Fault (active), approximately 1km to the east of the site. Reports indicate there is a 10% possibility of a >M7 earthquake on the Wellington Fault within the next 100 years
- The Otaki Forks Fault (active). 5Km northwest of the site. Dextral strike-slip, no other details have been published.

As noted within Figure 2, two other non-active faults have been mapped immediately adjacent to the site. Both of these faults have been listed as in-active by GNS science, therefore offer no threat to the proposed sub-division.

The combined earthquake hazard map for the Hutt Valley was also consulted for seismic slope failure potential. This map indicates that the earthquake combined hazard rating for the site is within a low to medium danger zone, however this is a regional scaled document and should not be relied upon for site specific stability acceptance. Site Stability

After a review of historic aerial photographs and a site walkover, we believe the following stability hazards may impact the site:

- Shallow surface creep & minor landslips. Shallow surface creep features are visible over the steep slopes of the site. After periods of prolonged rainfall extended areas of surface material may slip over the more dense weathered rock below. Due to the proposed mass earthworks and cut excavations expected at the site the risk of minor slips is thought to be greatly reduced. Where proposed Lot sites are to be close to slopes of original ground greater than 35˚ retaining structures or further site specific stability assessments may be needed.

Deep seated global stability and Rockall is not thought to be an issue at the site due to the shallow depth of competent weathered rock material and the highly vegetated rolling nature of the existing site slopes. Debris flows are not considered to be a major hazard due to the tributaries generally joining below the site and the position of the proposed development near the surrounding ridgelines.

4.2. Mitigation options

As noted above the majority of the shallow surface hazards such as minor slips and on-going surface creep will be removed during the creation of the sub-division due to the large scale excavation at the site forming the proposed Lots, however, were existing slopes of greater than 36˚ occur within 20m of any proposed Lots site specific stability assessments will need to be undertaken along with the possible use of engineer designed retaining structures.

As mentioned above Debris flows, global stability and rock fall are not expected to be an issue at the site due to the proposed sub-division location along ridgelines and the shallow depth to competent soil/rock material.

4.3. Slope stability

In many cases it is generally impractical to measure quantitatively the factor of safety against short term (construction phase) and long term (permanent) slope failure. However a practical approach can be undertaken to determine a suitable slope for cut and fill based on longstanding history of stability, groundwater conditions and good engineering judgement.

The risk of slope failure is quantified by means of a Factor of Safety (FOS) and is determined by the ratio of stabilising forces to destabilising forces. This is known as limit equilibrium slope stability analysis. An acceptable slope will generally have a factor safety of 1.2 to 1.5 with a normal FOS value of 1.5 for subdivisions or new housing development. The factors of safety adopted by engineers in geotechnical design have been developed to accommodate uncertainties in geometric accuracy, soil properties, analysis method, and the validity of assumptions made. The modelled FOS does not assure safety from instability or slope movement but reduces the risk of failure. The risk of failure for different levels of Factors of Safety is approximately:

Table 4: Slope stability likelihood of failure

Factor of safety	Likelihood of failure per annum
1.1	1:10
1.3	1:50
1.5	1:200
1.7	1:1000

The appropriate factor of safety is not governed by any national standard (such as the NZ building Code) for the slope stability analysis. It is selected on its own merits. Generally, high risk assets under consideration will necessitate higher FOS.

The risk of any slope failure is dependent on the ratio of forces causing and resisting movement. Factors causing movement include the slope gradient, weight of soil, ground water, surcharge, and the factors resisting movement include slope support, soil strength parameters. Groundwater plays a critical role in slope stability, as soil shear strength when wet may be reduced to less than half of the strength when dry.

The geotechnical investigations revealed a complex matrix of stiff to very stiff sedimentary soils being silts, sand, gravel and clay overlying moderately weathered greywacke and sandstone rock with no presence of groundwater. These soil configurations are more prone to translational slip or compound slip failures i.e, where the sedimentary soil is likely to fail along the plane of the hard stratum beneath (in this case, greywacke rock). Based on our initial site walk over, no visual evidence of deep-seated instability was observed.

For the construction phase (short term loading) it is our opinion that detailed numerical analysis is not warranted, given that the risk and its associated consequences of failure in this situation are considered to be low. The soil configuration on site can withstand near vertical slopes with adequate factor of safety. Table 5 below outlines the recommended slopes for the construction phase (short term).

Table 5: Earthworks batter slopes

Soil Type	Permanent slope
Engineered fill	1V:2H (26°)
Alluvium - Cohesive	1V:3H (18°)
Alluvium - Granular	1V:3H (18°)
Colluvium - Cohesive	1V:3H (18°)
Colluvium - Granular	1V:3H (18°)
Weathered Rock	1V:1H (45°)

Table 5 is based on the soil parameters as encountered during site investigations. A geotechnical engineer should be advised and further assessment may be required should the subsoil conditions appear to be significantly different.

Long term stability of the cut and fill batters is governed by the ultimate situation and the final configuration of the land, retaining walls, roads and dwellings. It is recommended that a detailed analysis is undertaken by a suitably qualified geotechnical engineer at the time of engineering approval for the subdivision to ensure that the proposed retaining walls and slopes can bear the design loads.

It is our opinion that as long as the recommendations supplied above are followed the proposed sub-division will provide safe and stable building platforms with adequate access.

5. EARTHWORKS

5.1. Proposed Earthworks

The proposed bulk earthworks volume is in a magnitude of approximately 145,000m. The cut area will mostly be the main ridgeline parallel to Major Drive and also secondary ridges elevated between the natural gullies. Cut material will be filled into the gullies to create a profile sloping down to the west. All earthworks shall be constructed in accordance with NZS4431:1989. Earthworks construction should ensure that safe batter slopes are formed for both short term and long term scenarios as recommended in Table 5.

5.2. Earthworks Methodology

A detailed Earthworks Management Plan (EMP) which will be detailed and submitted prior to construction. The EMP will detail the earthworks methodology in accordance with NZS4431:1989 and NZS4404:2010. In general it will address following items:

- Site enabling works and preparation
- Earthworks sequencing and placement
- Management of surface and sub-surface water.
- Compaction methods
- Testing and validation requirements

6. CONCLUSION AND RECOMMENDATIONS

Initial geotechnical investigation of the site has shown that no signs of deep seated slope instability were observed at the time of the site walkover. The site is underlain by fine grained clayey silt soils to a depth of approximately 1m to >3mbgl, overlying weathered sandstone rock. It is considered that the subsoil properties have adequate strength parameters necessary for the proposed residential development. Development will need to be carried out in accordance with proper engineering practice and the following guidelines:

- All earthworks should be undertaken and tested in accordance with NZS4431:1989. Earthworks construction should ensure that safe batter slopes are formed both in the short and long term.
- Detailed Earthworks Management Plan (EMP) will be prepared suitably qualified Chartered Professional Engineer and submitted to Council prior to construction.
- The land is suitable for future residential development

7. LIMITATIONS

This report has been prepared for the benefit of Kelson Heights Residential Limited as our client with respect to geotechnical feasibility and for Hutt City Council approval of the proposal as defined in the brief. It shall not be relied upon for any other purpose. The reliance by other parties on the information or opinions contained in this report shall, without our prior review and agreement in writing, be at such parties' sole risk.

Opinions and judgments expressed herein are based on our understanding and interpretation of current regulatory standards, and should not be construed as legal opinions. Where opinions or judgments are to be relied on they should be independently verified with appropriate legal advice. Any recommendations, opinions, or guidance provided by Cook Costello in this report are limited to technical engineering requirements and are not made under the Financial Advisers Act 2008.

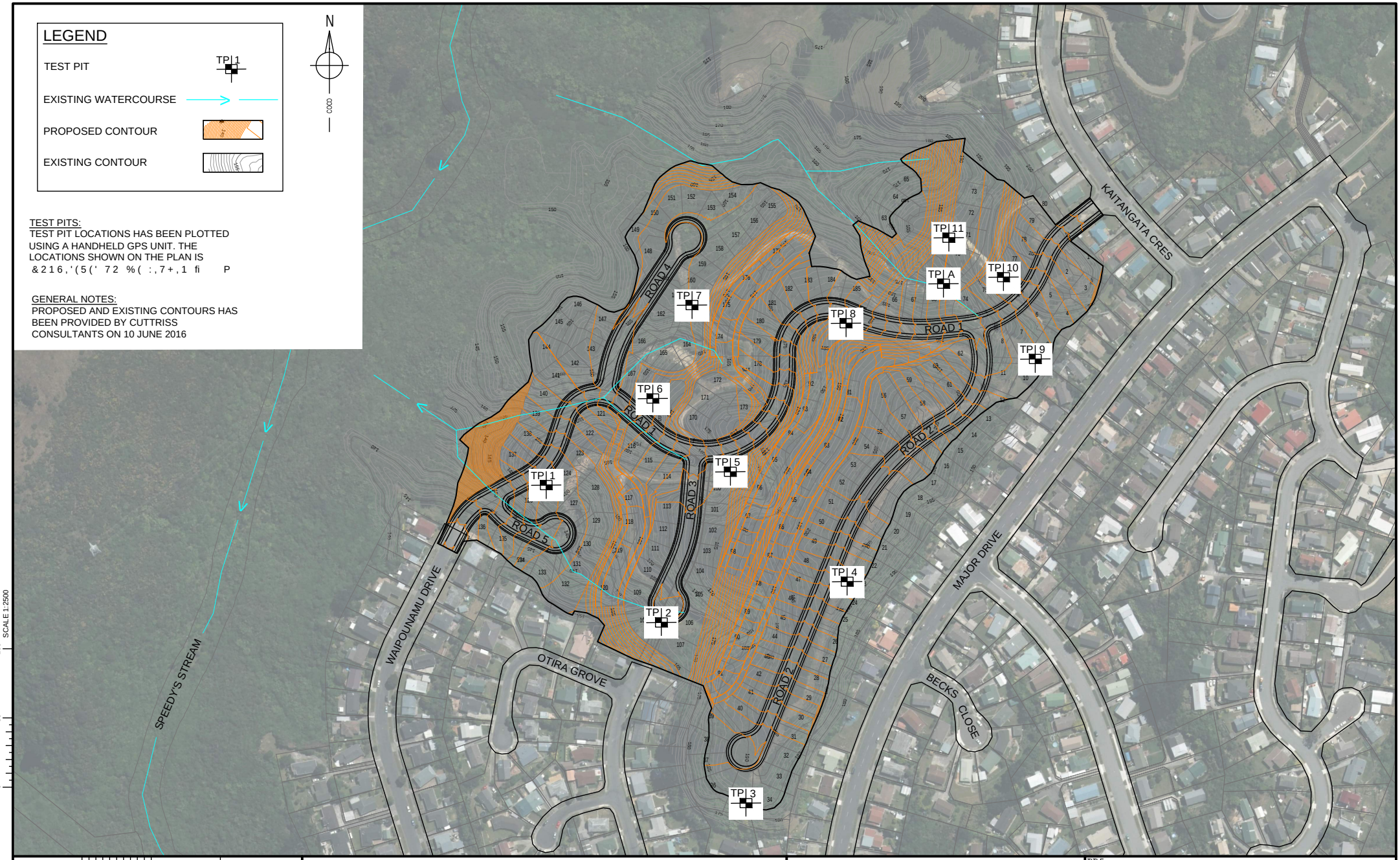
Recommendations and opinions in this report are based on data from hand augered boreholes with in situ shear vane testing and Scala penetrometer testing undertaken on site. The nature and continuity of subsoil conditions away from the boreholes and Scalas are inferred and it must be appreciated that actual conditions could vary considerably from the assumed model.

During excavation and construction the site should be examined by an Engineer or Engineering Geologist competent to judge whether the exposed subsoils are compatible with the inferred conditions on which the report has been based. It is possible that the nature of the exposed subsoils may require further investigation and the modification of the design based on this report. In any event it is essential that the firm is notified if there is any variation in subsoil conditions from those described in the report as it may affect the design parameters recommended in the report.

Cook Costello have performed the services for this project in accordance with the standard agreement for consulting services and current professional standards for environmental site assessment. No guarantees are either expressed or implied.

There is no investigation which is thorough enough to preclude the presence of materials at the site which presently, or in the future, may be considered hazardous. Because regulatory evaluation criteria are constantly changing, concentrations of contaminants present and considered to be acceptable now may in the future become subject to different regulatory standards which cause them to become unacceptable and require further remediation for this site to be suitable for the existing or proposed land use activities.

8. APPENDIX 1: SITE PLAN



REV.	REVISION DETAILS	DRAWN	DATE
C			
B			
A			
-	FOR REVIEW	JAM	09-03-17

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ACENZ

KELSON HEIGHTS LIMITED

PROPOSED SUBDIVISION

64 WAIPOUNAMU DRIVE, KELSON

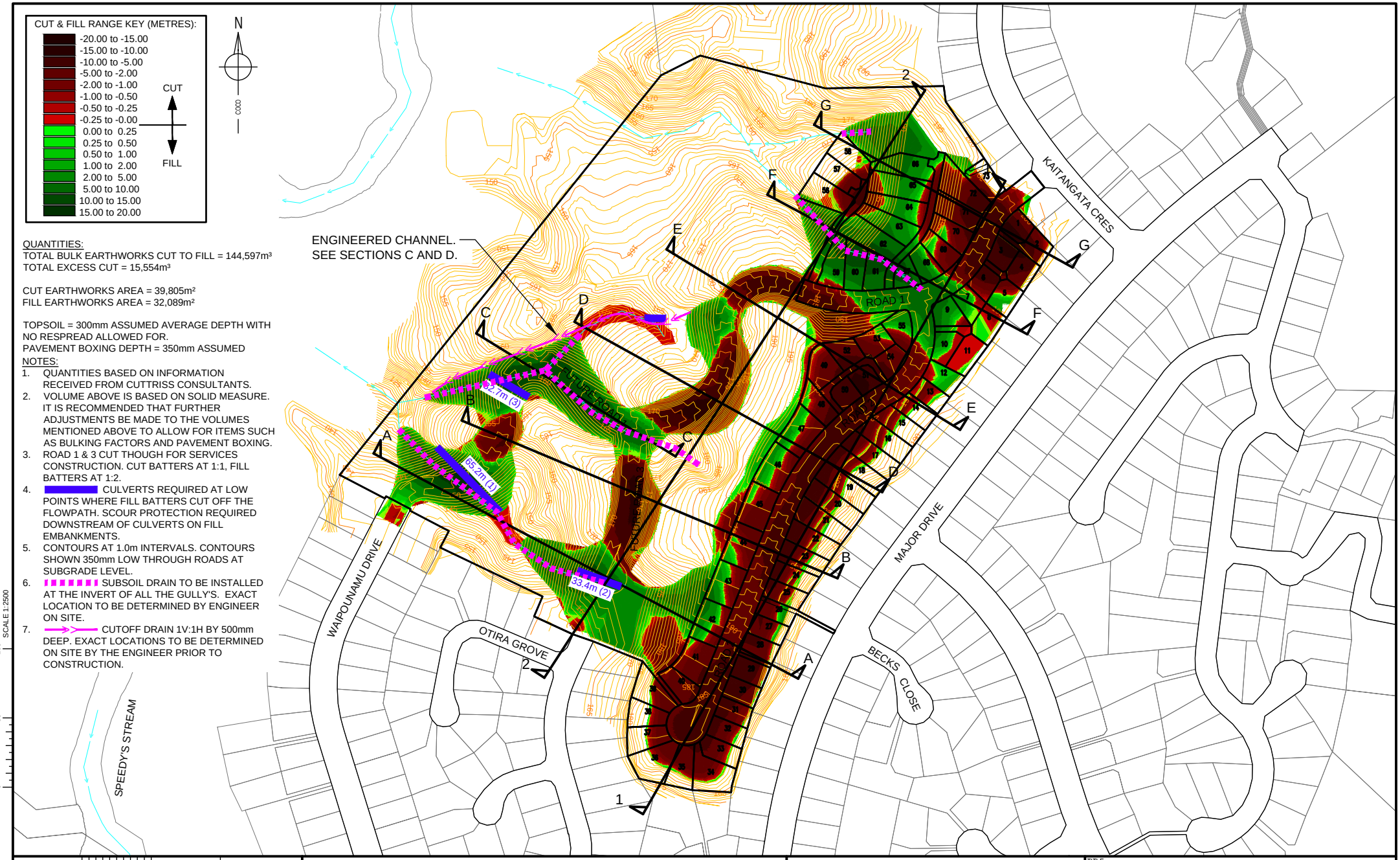
TITLE

TEST PIT LOCATION PLAN

DESIGNED JAM	CCL REF. No. 12652-002	DWG NAME & REV. T1-02
APPROVED TSN		
STATUS FOR REVIEW	SCALE 1:2500 @ A3	SHEET No. 01 OF 02

DATE PLOTTED: 9/03/2017 FILE PATH: Z:\12500-12999\12652\12652-002\CAD\12652-002 Geotech Site plan 160620.dwg

9. APPENDIX 2: BULK EARTHWORKS PLAN



QUANTITIES:
TOTAL BULK EARTHWORKS CUT TO FILL = 144,597m³
TOTAL EXCESS CUT = 15,554m³

CUT EARTHWORKS AREA = 39,805m²
FILL EARTHWORKS AREA = 32,089m²

TOPSOIL = 300mm ASSUMED AVERAGE DEPTH WITH NO RESPREAD ALLOWED FOR.
PAVEMENT BOXING DEPTH = 350mm ASSUMED

NOTES:

1. QUANTITIES BASED ON INFORMATION RECEIVED FROM CUTTRISS CONSULTANTS.
2. VOLUME ABOVE IS BASED ON SOLID MEASURE. IT IS RECOMMENDED THAT FURTHER ADJUSTMENTS BE MADE TO THE VOLUMES MENTIONED ABOVE TO ALLOW FOR ITEMS SUCH AS BULKING FACTORS AND PAVEMENT BOXING.
3. ROAD 1 & 3 CUT THOUGH FOR SERVICES CONSTRUCTION. CUT BATTERS AT 1:1, FILL BATTERS AT 1:2.
4. CULVERTS REQUIRED AT LOW POINTS WHERE FILL BATTERS CUT OFF THE FLOWPATH. SCOUR PROTECTION REQUIRED DOWNSTREAM OF CULVERTS ON FILL EMBANKMENTS.
5. CONTOURS AT 1.0m INTERVALS. CONTOURS SHOWN 350mm LOW THROUGH ROADS AT SUBGRADE LEVEL.
6. SUBSOIL DRAIN TO BE INSTALLED AT THE INVERT OF ALL THE GULLY'S. EXACT LOCATION TO BE DETERMINED BY ENGINEER ON SITE.
7. CUTOFF DRAIN 1V:1H BY 500mm DEEP. EXACT LOCATIONS TO BE DETERMINED ON SITE BY THE ENGINEER PRIOR TO CONSTRUCTION.

REV.	REVISION DETAILS	DRAWN	DATE
C			
B			
A	REVISED BULK EARTHWORKS	AP	02-03-17
-	FOR REVIEW	AP	23-12-16

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KELSON HEIGHTS LIMITED

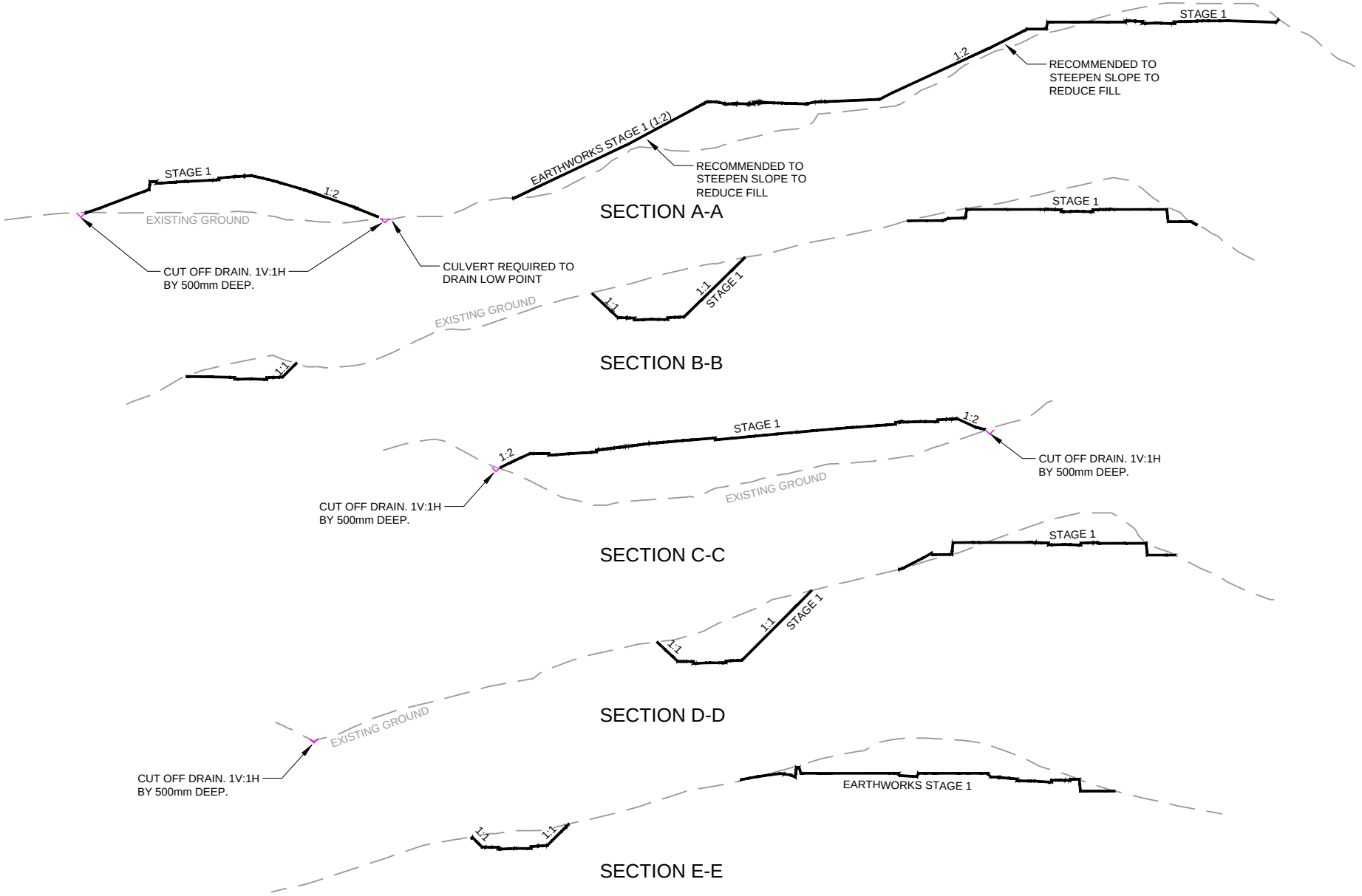
PROPOSED SUBDIVISION

64 WAIPOUNAMU DRIVE, KELSON

TITLE: BULK EARTHWORKS PLAN (STAGE 1)

DESIGNED	CCL REF. No.	DWG NAME & REV.
AP	12652-002	EW-01_RA
APPROVED: TSN		
STATUS: FOR REVIEW	SCALE: 1:2500 @ A3	SHEET No.: 1 OF 3

DATE PLOTTED: 9/03/2017 FILE PATH: Z:\12500-12999\12652\12652-002\CAD\12652-002 Earthworks Stage 1 170223.dwg



REV.	REVISION DETAILS	DRAWN	DATE
C			
B			
A	REVISED BULK EARTHWORKS	AP	02-03-17
-	FOR REVIEW	AP	23-12-16

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ACENZ

KELSON HEIGHTS LIMITED

PROPOSED SUBDIVISION

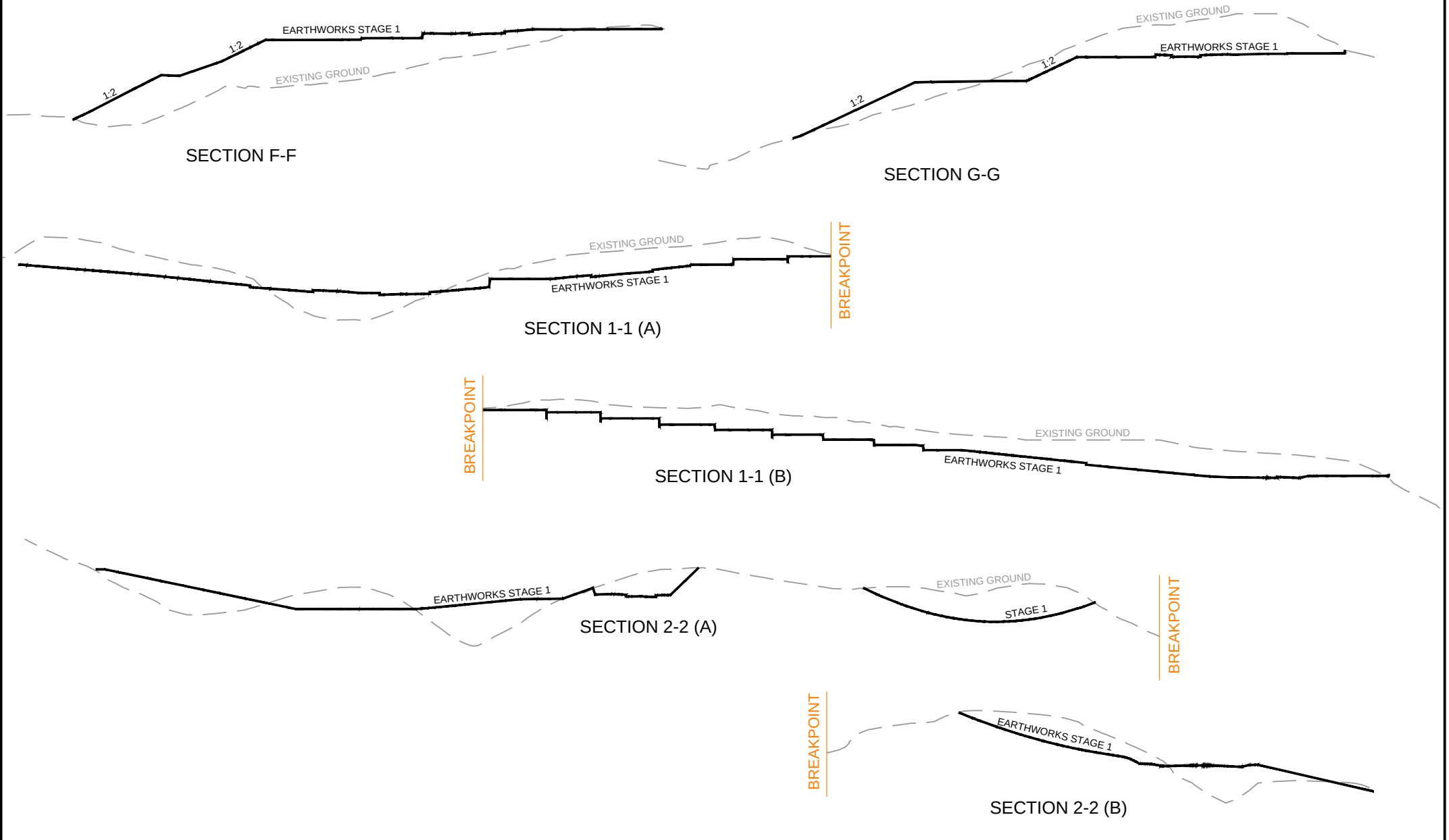
64 WAIPOUNAMU DRIVE, KELSON

TITLE

SECTIONS THROUGH SITE (1)

DESIGNED: AP	CCL REF. No.: 12652-002	DWG NAME & REV.: EW-02_RA
APPROVED: TSN		
STATUS: FOR REVIEW	SCALE: 1:1000 @ A3	SHEET No.: 2 OF 3

DATE PLOTTED: 2/03/2017 FILE PATH: Z:\12500-12999\12652\12652-002\CAD\12652-002 Earthworks Stage 1 170223.dwg



REV.	REVISION DETAILS	DRAWN	DATE
C			
B			
A	REVISED BULK EARTHWORKS	AP	02-03-17
-	FOR REVIEW	AP	23-12-16

SCALE 1:1000

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KELSON HEIGHTS LIMITED

PROPOSED SUBDIVISION

64 WAIPOUNAMU DRIVE, KELSON

TITLE

SECTIONS THROUGH SITE (2)

DESIGNED AP	CCL REF. No. 12652-002	DWG NAME & REV. EW-03_RA	
APPROVED TSN			
STATUS FOR REVIEW	SCALE 1:1000 @ A3	SHEET No. 3 OF 3	

DATE PLOTTED: 2/03/2017 FILE PATH: Z:\12500-12999\12652\12652-002\CAD\12652-002 Earthworks Stage 1 170223.dwg

10. SITE INVESTIGATIONS RESULTS

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 1
Location: TP1
Drilling Method: Excavator

Page: 1
Tested by: JAM
Logger: JAM
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0 -0.1 -0.3 -0.5 -1 -1.5 -2 -2.5 -3		ML	100mm TOPSOIL; dark brown, moist, Clayey SILT with traces of coarse sand, traces of sand; light brown, very stiff, slightly moist, slightly plastic; traces of cobbles Bedrock @ 1mbgl. EOB @ 1.2mbgl.		172/7			

Remarks:
Groundwater was not encountered. Could not embed SV.

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 2
Location: TP2
Drilling Method: Excavator

Page: 1
Tested by: TSN
Logger: TSN
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0 - -0.2			200mm TOPSOIL; dark brown,slightly moist, friable					
-0.3 - -0.5			300mm Weathered Rock					
-1			EOB @ 1mbgl. Too hard to auger					
-1.5								
-2								
-2.5								
-3								

Remarks:
Groundwater was not encountered.

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 3
Location: TP3
Drilling Method: Excavator

Page: 1
Tested by: JAM
Logger: JAM
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0 - -0.3			300mm TOPSOIL; dark brown, slightly moist, friable					
-0.3 - -0.5		ML	Clayey SILT with traces of coarse sand; light brown; stiff, slightly moist, slightly plastic, traces of cobbles		139/40			
-0.5 - -0.7								
-0.7 - -1					159/15			
-1 - -1.5			Clayey SILT; light brown; stiff, slightly moist, slightly plastic, traces of cobbles					
-1.5 - -2			Bedrock encountered @ 2mbgl. EOB @ 2mbgl.					
-2 - -2.5								
-2.5 - -3								
-3 -								

Remarks:
Groundwater was not encountered.

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 4
Location: TP4
Drilling Method: Excavator

Page: 1
Tested by: JAM
Logger: JAM
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0 - -0.2 - - -0.5 - - - - - -1 - - - - - -1.5 - - - - - -2 - - - - - -2.5 - - - - - -3 - -		ML	200mm TOPSOIL; dark brown,slightly moist, friable Clayey SILT with traces of coarse sand; orange brown; slightly moist, slightly plastic; traces of cobbles Clayey SILT with traces of coarse sand; dark orange brown; slightly moist; increasing traces of cobbles cobbles Bedrock encountered @ 1.8mbgl.		172/24			

Remarks:
Groundwater was not encountered.

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 5
Location: TP5
Drilling Method: Excavator

Page: 1
Tested by: TSN
Logger: TSN
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0			100 mm TOPSOIL; dark brown, moist, friable					
-0.5		ML	Clayey SILT with traces of medium to coarse sand; orange brown, stiff, slightly moist					
-1			Clayey SILT; orange mottled with blue alluvial material about 1mbgl 500mm deep.					
-1.5			Water table @ 1.2-1.5mbgl					
-2								
-2.5			Bedrock @ 2.8mbgl.					
-3								

Remarks:
Groundwater was encountered at 1.2-1.5mbgl.

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 6
Location: TP6
Drilling Method: Excavator

Page: 1
Tested by: JAM
Logger: JAM
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0 - -0.2			200mm TOPSOIL; dark brown, slightly moist, friable					
-0.3 - -0.5		ML	Clayey SILT with traces of medium to coarse sand; orange brown, stiff, slightly moist, slightly plastic, traces of cobbles		175/9 176/37			
-1			EOB 1mbgl. Terminated due to excavator slipping					
-1.5								
-2								
-2.5								
-3								

Remarks:
Groundwater was not encountered. Could not embed SV into soil.

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 7
Location: TP7
Drilling Method: Excavator

Page: 1
Tested by: TSN
Logger: TSN
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0			100mm TOPSOIL; dark brown, slightly moist, friable					
-0.2		CL	Silty CLAY, orange brown, very stiff, slightly moist, friable		139/7			
-3			EOB @ 3mbgl.					

Remarks:
Groundwater was not encountered. Could not embed SV into soil

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 8
Location: TP8
Drilling Method: Excavator

Page: 1
Tested by: JAM
Logger: JAM
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0 - -0.2			TOPSOIL; medium brown, dry, friable					
- -0.4 -0.5 - - -0.7 - - -1		ML	Clayey SILT with traces of medium to coarse sand, light brown, stiff, moist, plastic		159/16			
- - - - - -1.5 - - - - -2			Clayey SILT with traces of medium to coarse sand, light brown, firm, moist, plastic		95/16			
- - - - - -2.5 - - - - -3 - -			Clayey SILT with traces of medium to coarse sand, light brown, firm, moist, plastic EOB @ 3mbgl.					

Remarks:
Groundwater was not encountered.

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 9
Location: TP9
Drilling Method: Excavator

Page: 1
Tested by: TSN
Logger: TSN
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0			Pushover fill to a depth of 500mm					
-0.5		CL	Silty Clay with traces of medium to coarse sand, orange brown, slightly moist, traces of cobbles and weathered rock		185 at 1mbgl			
-1								
-1.5								
-2			EOB at 2mbgl.					
-2.5								
-3								

Remarks:
Groundwater was not encountered.

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 10
Location: TP10
Drilling Method: Excavator

Page: 1
Tested by: TSN
Logger: TSN
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0			100 mm TOPSOIL; dark brown, moist, friable					
-0.2		ML	Clayey SILT; mottled orange and blue alluvial material, stiff, physically uniform at depth					
-0.4								
-0.5								
-0.7								
-1								
-1.5								
-2			Change in colour, very stiff, traces of weathered/inferred rock, slightly plastic					
-2.5								
-3								
			EOB @ 3.2mbgl					

Remarks:
Groundwater was not encountered.

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 11
Location: TP11
Drilling Method: Excavator

Page: 1
Tested by: TSN
Logger: TSN
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0			TOPSOIL; medium brown, dry, friable					
-0.2		CL	Silty CLAY with traces of coarse sand; orange uniform constant colour		86/13			
-0.4								
-0.5								
-0.7					126/15			
-1								
-1.5					185kPa			
-2								
-2.5								
-3			EOB @ 3mbgl.					

Remarks:
Groundwater was not encountered.

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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BOREHOLE LOG AND TEST SHEET

NZGS November 1988

Ref.: 12652-002
Client: Chris Mason
Date: 14/06/2016
Borehole No.: 12
Location: TPA
Drilling Method: Excavator

Page: 1
Tested by: TSN
Logger: TSN
Checked:
Date Checked:

Depth (m)	Legend	Soil Symbol	Soil Description	Water Level	Vane Shear Strength maximum/ residual corrected kPa	Soil Sensitivity	Sample Number	Other Tests
0			TOPSOIL; medium brown, slightly moist, friable					
-0.5		ML	Clayey SILT with traces of medium to coarse sand; orange, stiff, slightly moist, friable		159			
-1.5			Watertable @ 1.5mbgl.		106/13			
-2			EOB @ 2mbgl.					
-2.5								
-3								

Remarks:
Groundwater was encountered at 1.5mbgl.

Topsoil		Sand	
Fill		Gravel	
Clay		Peat	
Silt		Rock	

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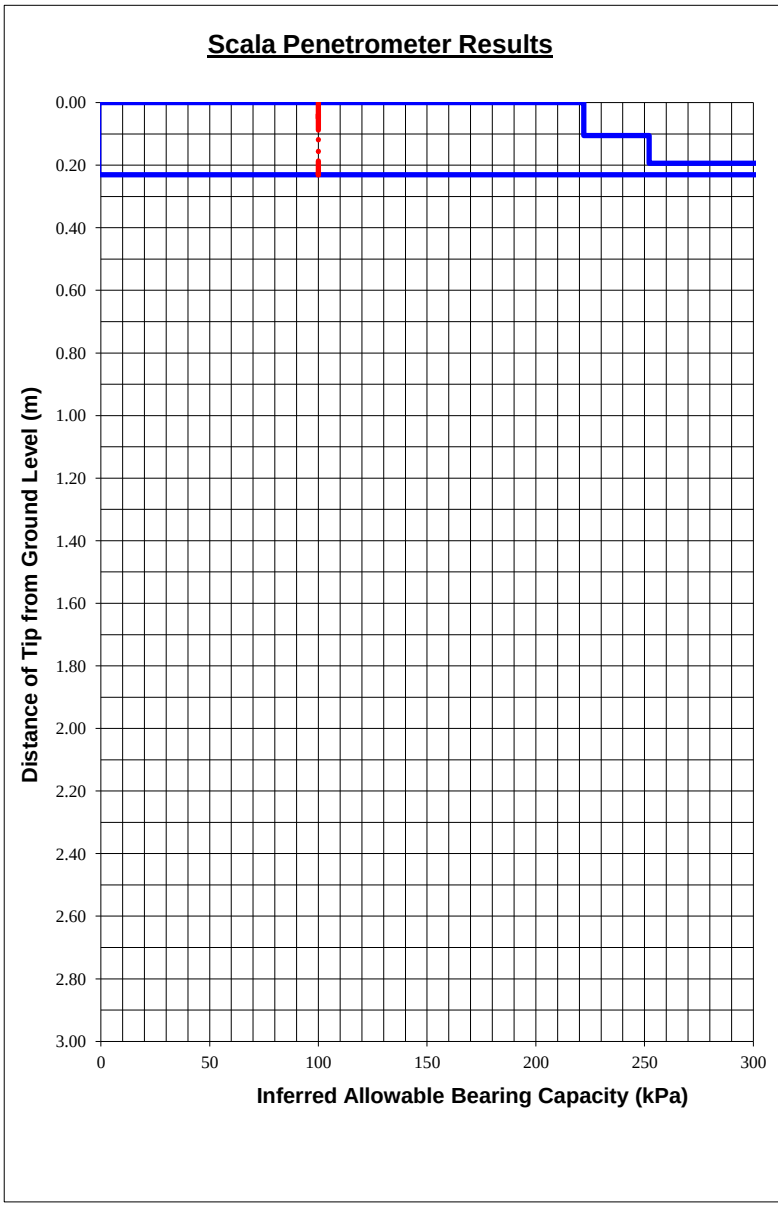
DYNAMIC CONE (SCALA) PENETROMETER

Test 23 / NZS 4402 : 1988 Test 6.5.2

Job: 12652-002
Client: Chris Mason
Date: 17-06-16
Location: TP1
Scala No.: 1
Page: 1

Tested by: JAM
Logged by: JAM
Checked: TSN
Date Checked:
Ground Level (m): 0
Required Allowable kPa: 100

No. Blows	Tip to ref (cm)	Total Blows	mm / blow	kPa	depth (m)
0	80.3	0	0	0	0.0
10	69.8	10	11	222	0.11
10	60.9	20	9	252	0.19
5	58.2	25	5	355	0.22
5	57.2	30	2	355	0.23



Line is the suggested correlation of e (mm/blow) and Bearing Pressure after STOCKWELL REF: NZ ENGINEERING (32,6) 15 June 1977

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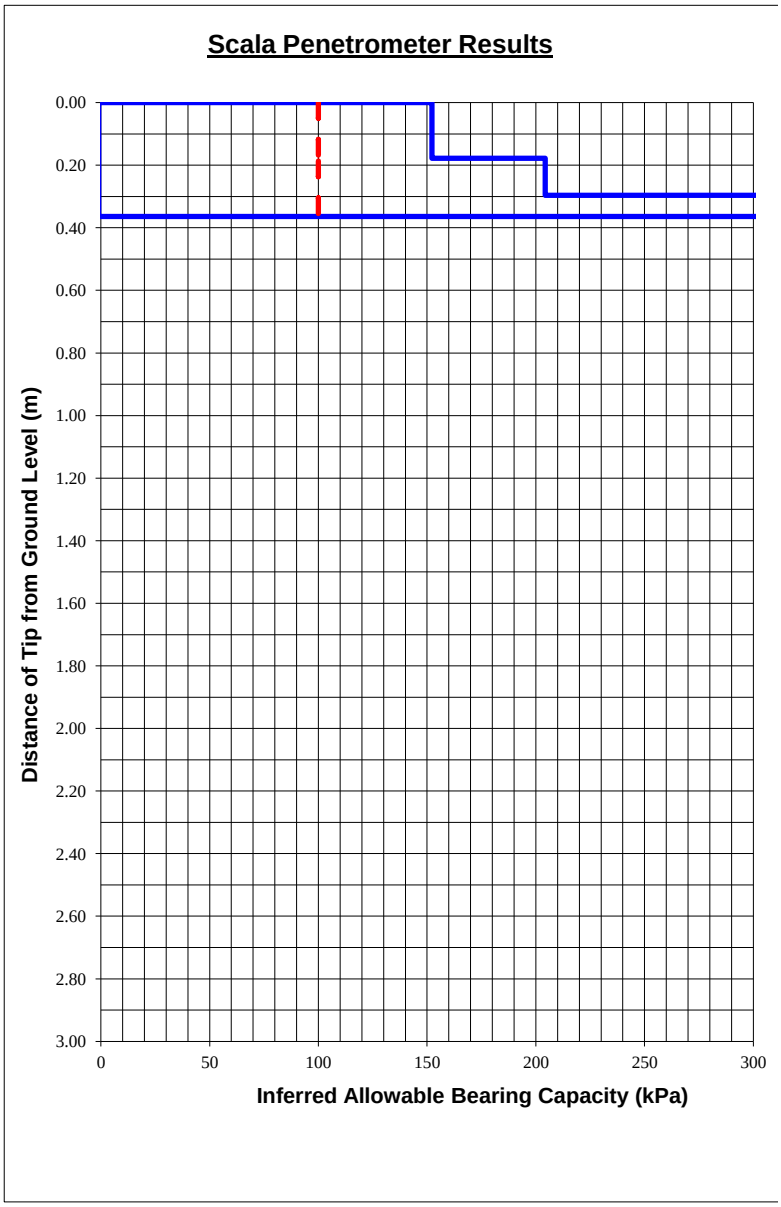
DYNAMIC CONE (SCALA) PENETROMETER

Test 23 / NZS 4402 : 1988 Test 6.5.2

Job: 12652-002
Client: Chris Mason
Date: 17-06-16
Location: TP2
Scala No.: 2
Page: 1

Tested by: JAM
Logged by: JAM
Checked: TSN
Date Checked:
Ground Level (m): 0
Required Allowable kPa: 100

No. Blows	Tip to ref (cm)	Total Blows	mm / blow	kPa	depth (m)
0	76.4	0	0	0	0.0
10	58.6	10	18	152	0.18
10	46.8	20	12	204	0.30
10	41.9	30	5	379	0.35
5	40.0	35	4	439	0.36



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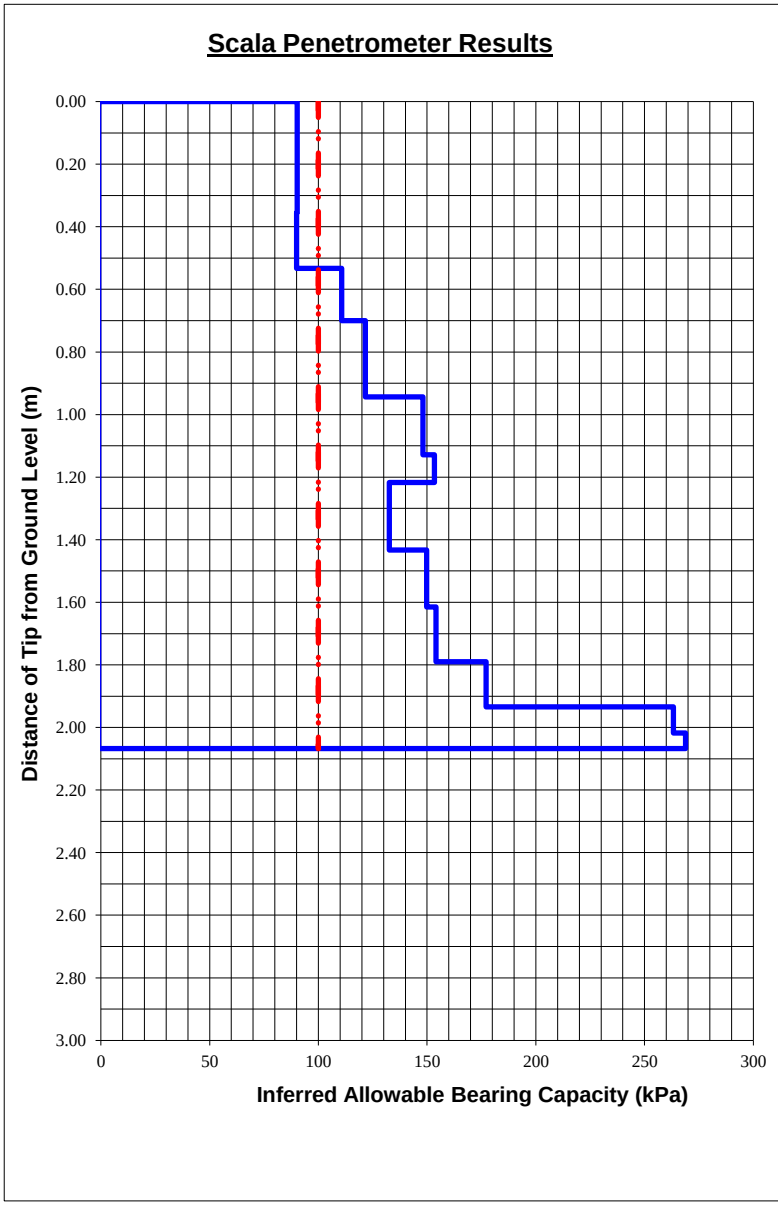
DYNAMIC CONE (SCALA) PENETROMETER

Test 23 / NZS 4402 : 1988 Test 6.5.2

Job: 12652-002
Client: Chris Mason
Date: 17-06-16
Location: TP3
Scala No.: 3
Page: 1

Tested by: JAM
Logged by: JAM
Checked: TSN
Date Checked:
Ground Level (m): 0
Required Allowable kPa: 100

No. Blows	Tip to ref (cm)	Total Blows	mm / blow	kPa	depth (m)
0	71.5	0	0	0	0.0
10	36.0	10	36	90	0.36
5	18.2	15	36	90	0.53
6	1.5	21	28	111	0.70
0	101.0	21	0	111	0.70
10	76.6	31	24	122	0.94
10	58.1	41	19	148	1.13
5	49.3	46	18	153	1.22
10	27.7	56	22	133	1.43
10	9.5	66	18	150	1.62
0	110.5	66	0	150	1.62
10	93.0	76	18	154	1.79
10	78.6	86	14	177	1.93
10	70.2	96	8	263	2.02
6	65.3	102	8	269	2.07



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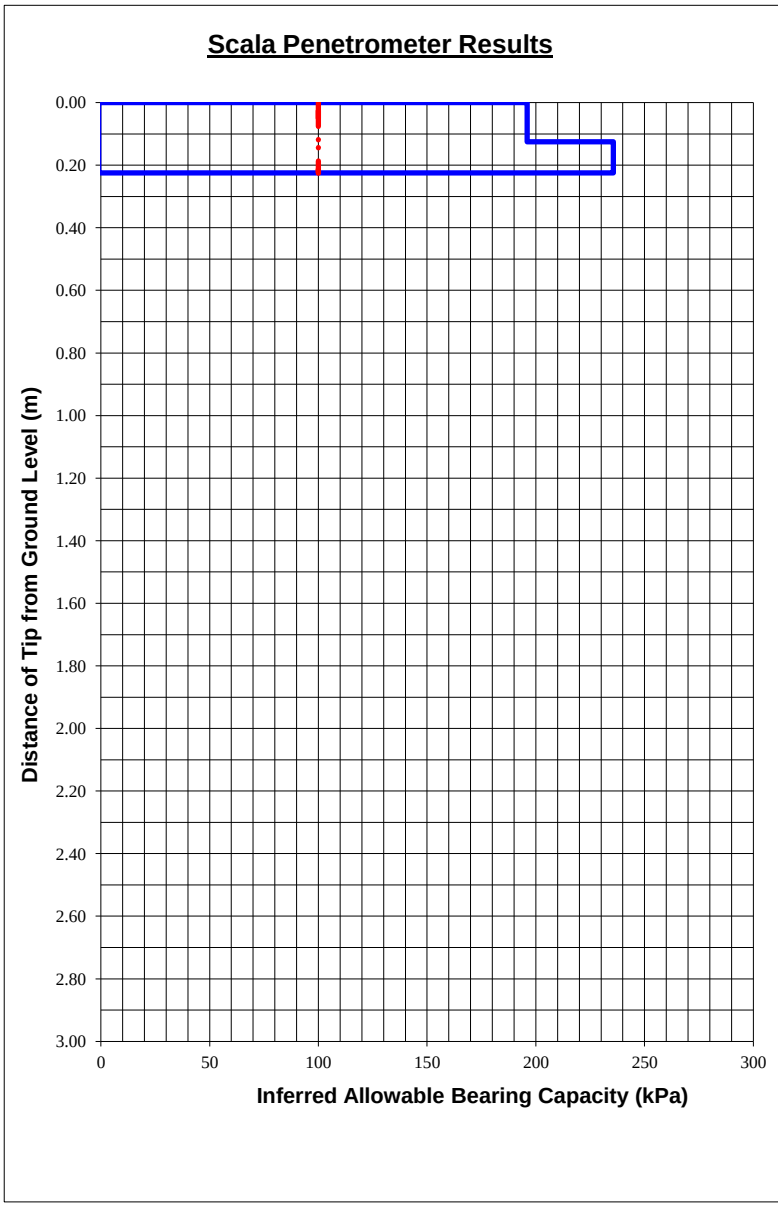
DYNAMIC CONE (SCALA) PENETROMETER

Test 23 / NZS 4402 : 1988 Test 6.5.2

Job: 12652-002
Client: Chris Mason
Date: 17-06-16
Location: TP4
Scala No.: 4
Page: 1

Tested by: JAM
Logged by: JAM
Checked: TSN
Date Checked:
Ground Level (m): 0
Required Allowable kPa: 100

No. Blows	Tip to ref (cm)	Total Blows	mm / blow	kPa	depth (m)
0	82.0	0	0	0	0.0
10	69.5	10	13	196	0.13
10	59.8	20	10	236	0.22
4	59.5	24	1	236	0.23



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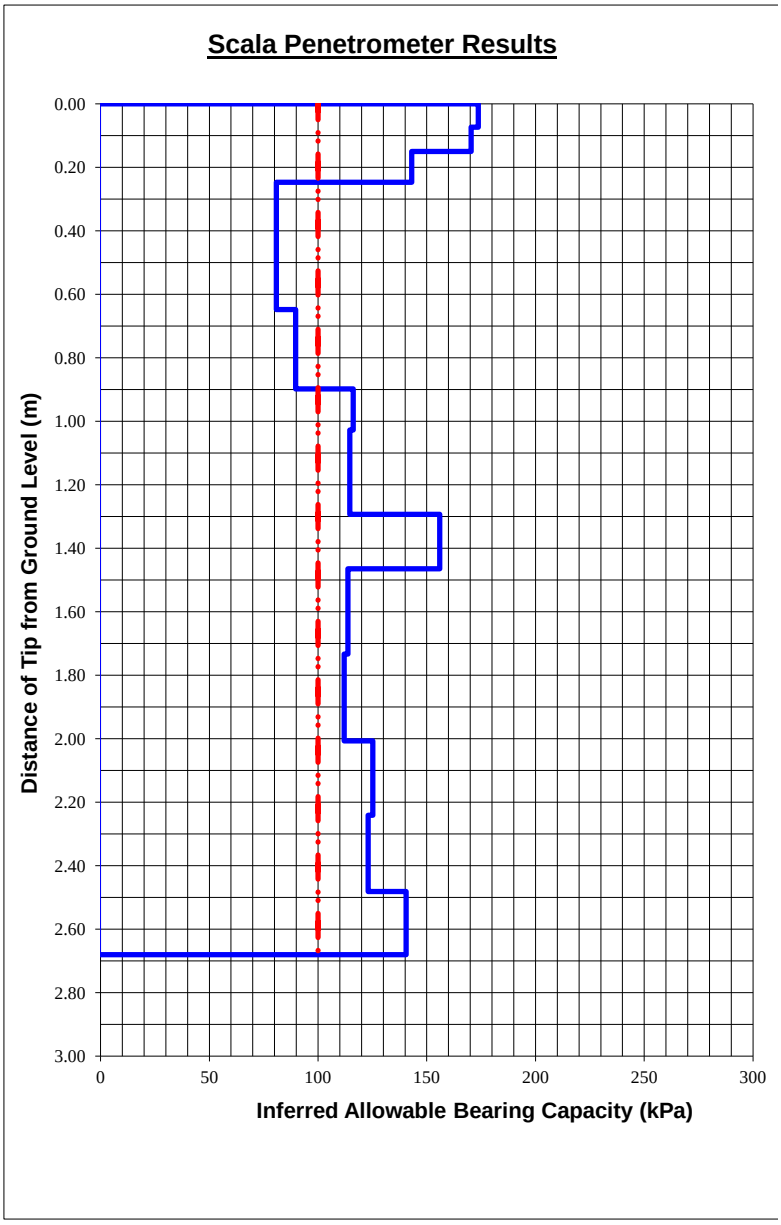
DYNAMIC CONE (SCALA) PENETROMETER

Test 23 / NZS 4402 : 1988 Test 6.5.2

Job: 12652-002
Client: Chris Mason
Date: 17-06-16
Location: TP5
Scala No.: 5
Page: 1

Tested by: JAM
Logged by: JAM
Checked: TSN
Date Checked:
Ground Level (m): 0
Required Allowable kPa: 100

No. Blows	Tip to ref (cm)	Total Blows	mm / blow	kPa	depth (m)
0	77.0	0	0	0	0.0
5	69.6	5	15	174	0.07
5	62.0	10	15	170	0.15
5	52.3	15	19	143	0.25
10	12.2	25	40	81	0.65
0	112.0	25	0	81	0.65
7	87.0	32	36	90	0.90
5	74.0	37	26	116	1.03
10	47.5	47	27	115	1.29
10	30.3	57	17	156	1.47
10	3.5	67	27	114	1.73
0	103.7	67	0	114	1.73
10	76.3	77	27	112	2.01
10	52.9	87	23	125	2.24
10	28.9	97	24	123	2.48
10	9.0	107	20	141	2.68



Line is the suggested correlation of e (mm/blow) and Bearing Pressure after STOCKWELL REF: NZ ENGINEERING (32,6) 15 June 1977

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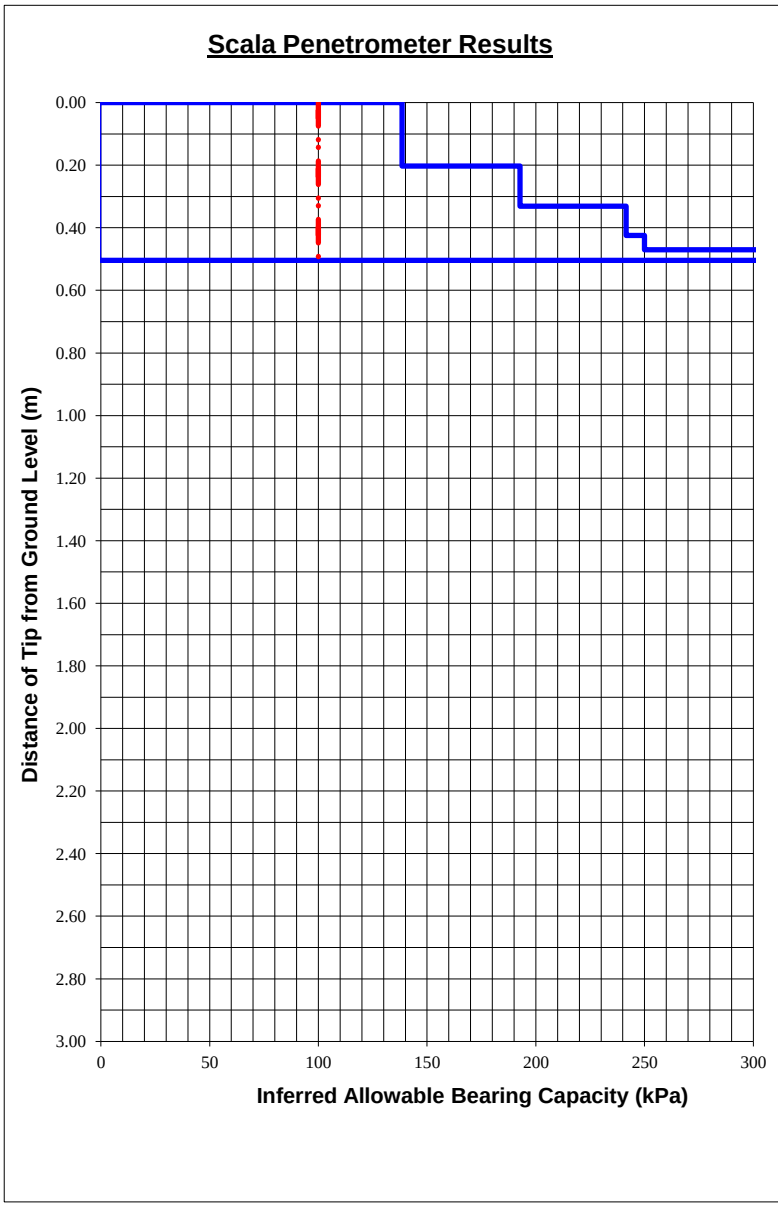
DYNAMIC CONE (SCALA) PENETROMETER

Test 23 / NZS 4402 : 1988 Test 6.5.2

Job: 12652-002
Client: Chris Mason
Date: 17-06-16
Location: TP6
Scala No.: 6
Page: 1

Tested by: JAM
Logged by: JAM
Checked: TSN
Date Checked:
Ground Level (m): 0
Required Allowable kPa: 100

No. Blows	Tip to ref (cm)	Total Blows	mm / blow	kPa	depth (m)
0	64.0	0	0	0	0.0
10	43.7	10	20	139	0.20
10	30.9	20	13	193	0.33
10	21.5	30	9	242	0.43
5	17.0	35	9	250	0.47
5	13.6	40	7	305	0.50



Line is the suggested correlation of e (mm/blow) and Bearing Pressure after STOCKWELL REF: NZ ENGINEERING (32,6) 15 June 1977

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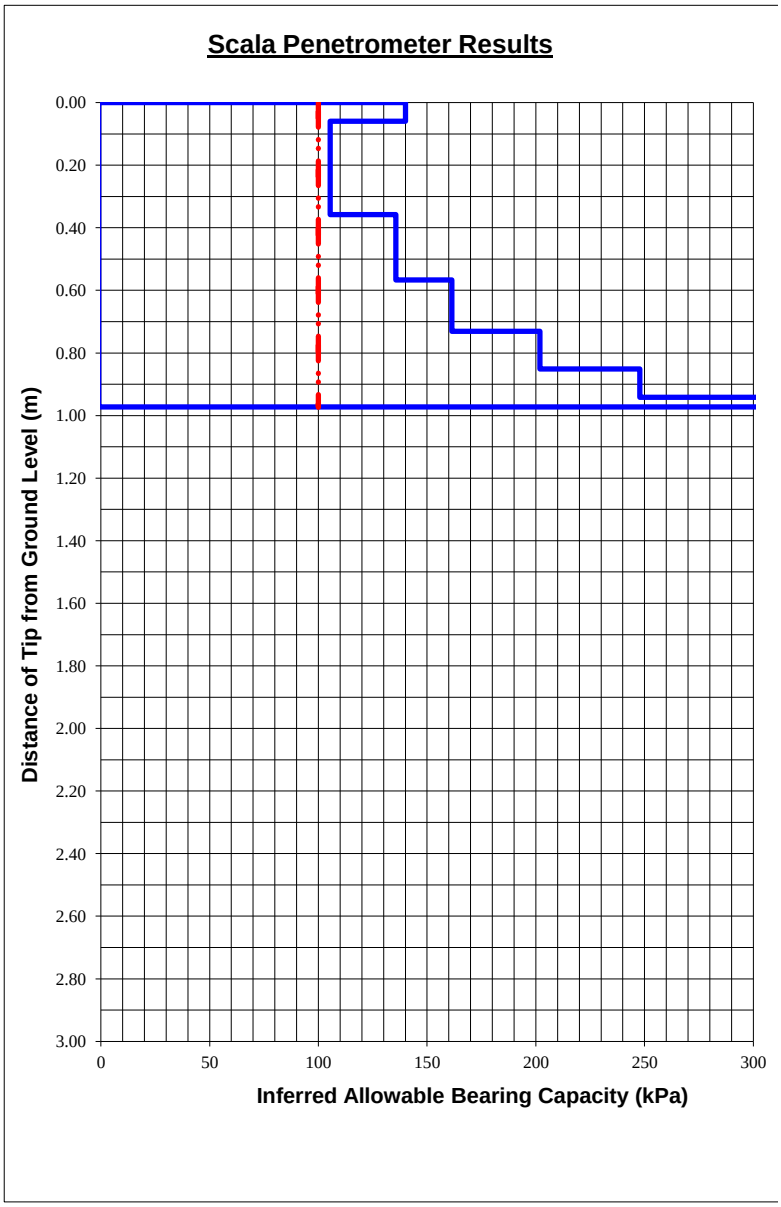
DYNAMIC CONE (SCALA) PENETROMETER

Test 23 / NZS 4402 : 1988 Test 6.5.2

Job: 12652-002
Client: Chris Mason
Date: 17-06-16
Location: TP7
Scala No.: 7
Page: 1

Tested by: JAM
Logged by: JAM
Checked: TSN
Date Checked:
Ground Level (m): 0
Required Allowable kPa: 100

No. Blows	Tip to ref (cm)	Total Blows	mm / blow	kPa	depth (m)
0	80.0	0	0	0	0.0
3	74.0	3	20	140	0.06
10	44.2	13	30	105	0.36
10	23.3	23	21	136	0.57
10	6.9	33	16	161	0.73
0	107.0	33	0	161	0.73
10	95.0	43	12	202	0.85
10	85.9	53	9	248	0.94
5	82.8	58	6	323	0.97



Line is the suggested correlation of e (mm/blow) and Bearing Pressure after STOCKWELL REF: NZ ENGINEERING (32,6) 15 June 1977

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Whangarei
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E ccl@coco.co.nz

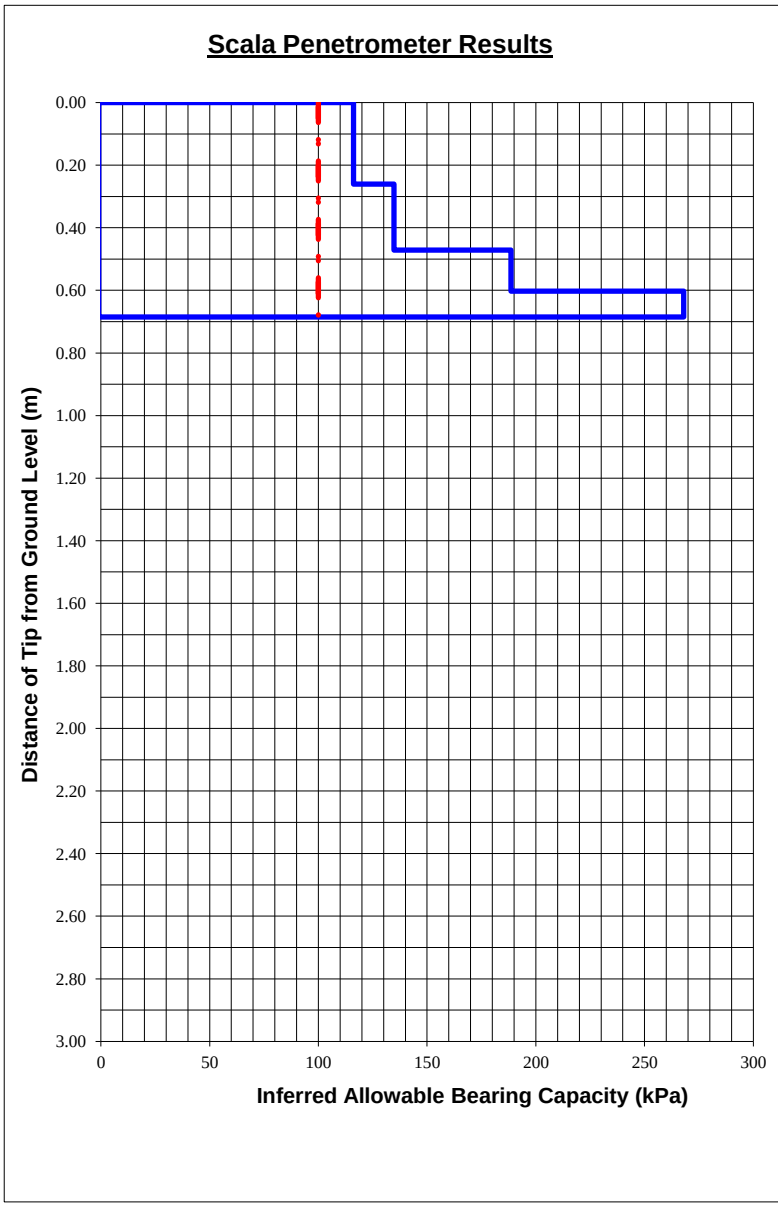
DYNAMIC CONE (SCALA) PENETROMETER

Test 23 / NZS 4402 : 1988 Test 6.5.2

Job: 12652-002
Client: Chris Mason
Date: 17-06-16
Location: TP9
Scala No.: 9
Page: 1

Tested by: JAM
Logged by: JAM
Checked: TSN
Date Checked:
Ground Level (m): 0
Required Allowable kPa: 100

No. Blows	Tip to ref (cm)	Total Blows	mm / blow	kPa	depth (m)
0	79.5	0	0	0	0.0
10	53.5	10	26	116	0.26
10	32.4	20	21	135	0.47
10	19.2	30	13	189	0.60
10	11.0	40	8	268	0.69



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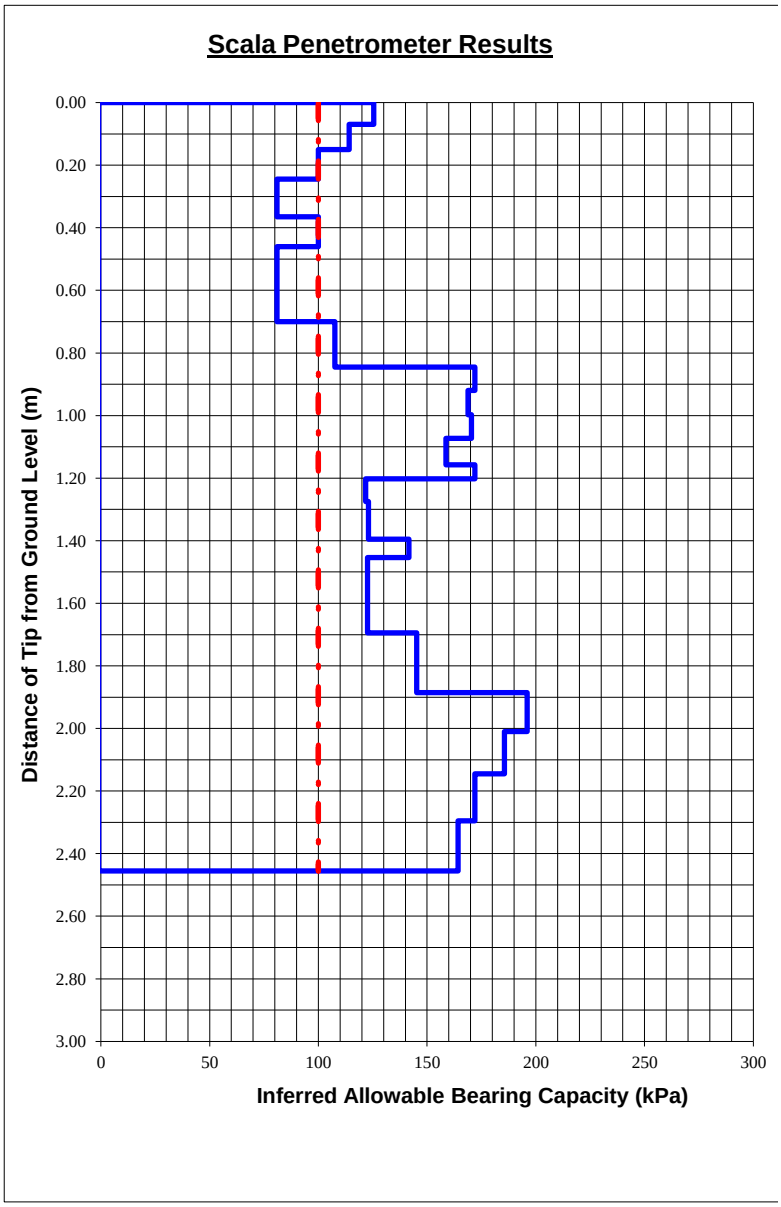
DYNAMIC CONE (SCALA) PENETROMETER

Test 23 / NZS 4402 : 1988 Test 6.5.2

Job: 12652-002
Client: Chris Mason
Date: 17-06-16
Location: TP10
Scala No.: 10
Page: 1

Tested by: JAM
Logged by: JAM
Checked: TSN
Date Checked:
Ground Level (m): 0
Required Allowable kPa: 100

No. Blows	Tip to ref (cm)	Total Blows	mm / blow	kPa	depth (m)
0	76.0	0	0	0	0.0
3	69.0	3	23	125	0.07
3	61.0	6	27	114	0.15
3	51.5	9	32	100	0.25
3	39.5	12	40	81	0.37
3	30.0	15	32	100	0.46
3	18.0	18	40	81	0.58
3	6.0	21	40	81	0.70
0	99.5	21	0	81	0.70
5	85.0	26	29	108	0.85
5	77.5	31	15	172	0.92
5	69.8	36	15	169	1.00
5	62.2	41	15	170	1.07
5	53.8	46	17	159	1.16
3	49.3	49	15	172	1.20
3	42.0	52	24	122	1.28
5	30.0	57	24	123	1.40
3	24.1	60	20	142	1.45
10	0.0	70	24	123	1.70
0	99.0	70	0	123	1.70
10	80.0	80	19	145	1.89
10	67.5	90	13	196	2.01
10	54.0	100	14	186	2.15
10	39.0	110	15	172	2.30
10	23.0	120	16	164	2.46



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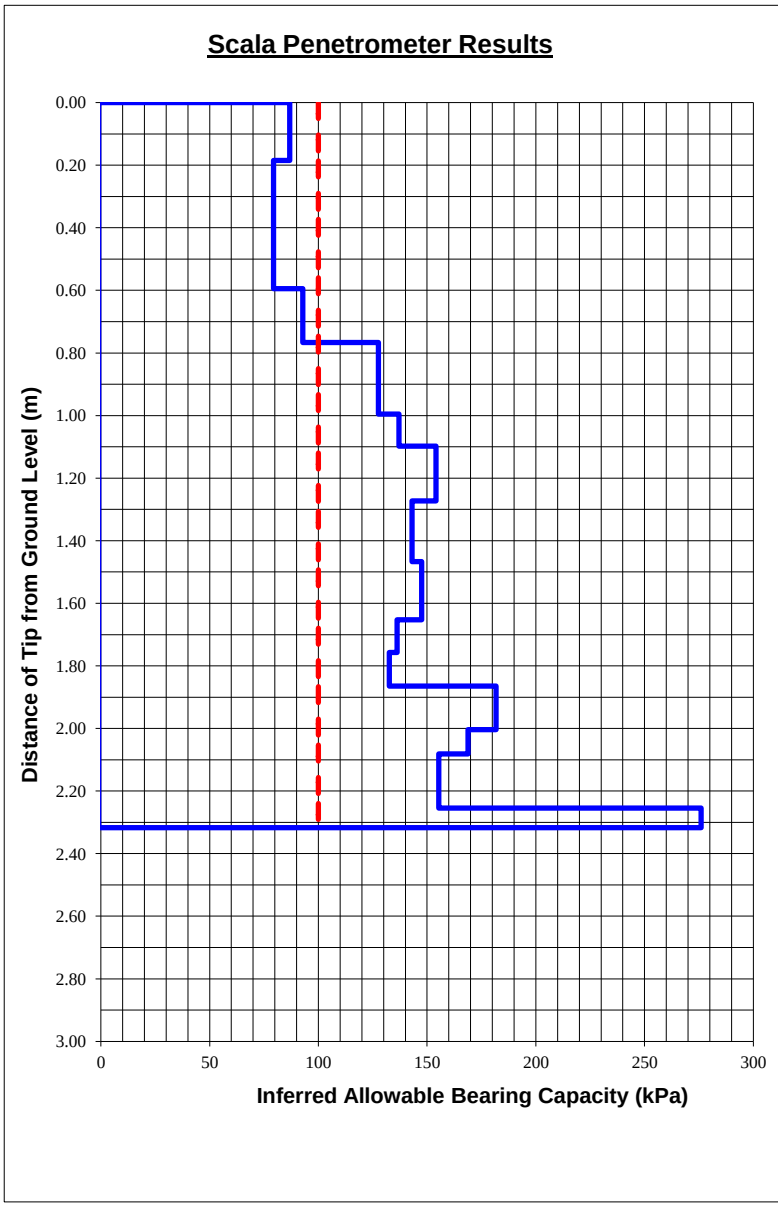
DYNAMIC CONE (SCALA) PENETROMETER

Test 23 / NZS 4402 : 1988 Test 6.5.2

Job: 12652-002
Client: Chris Mason
Date: 17-06-16
Location: TP11
Scala No.: 11
Page: 1

Tested by: JAM
Logged by: JAM
Checked: TSN
Date Checked:
Ground Level (m): 0
Required Allowable kPa: 100

No. Blows	Tip to ref (cm)	Total Blows	mm / blow	kPa	depth (m)
0	77.5	0	0	0	0.0
5	59.0	5	37	87	0.19
10	18.0	15	41	79	0.60
5	0.8	20	34	93	0.77
0	101.0	20	0	93	0.77
10	78.2	30	23	128	1.00
5	67.9	35	21	137	1.10
10	50.4	45	18	154	1.27
10	31.0	55	19	143	1.47
10	12.4	65	19	147	1.65
5	2.0	70	21	136	1.76
0	102.0	70	0	136	1.76
5	91.2	75	22	133	1.87
10	77.3	85	14	182	2.00
5	69.6	90	15	169	2.08
10	52.3	100	17	155	2.25
8	46.0	108	8	276	2.32



Line is the suggested correlation of e (mm/blow) and Bearing Pressure after STOCKWELL REF: NZ ENGINEERING (32,6) 15 June 1977

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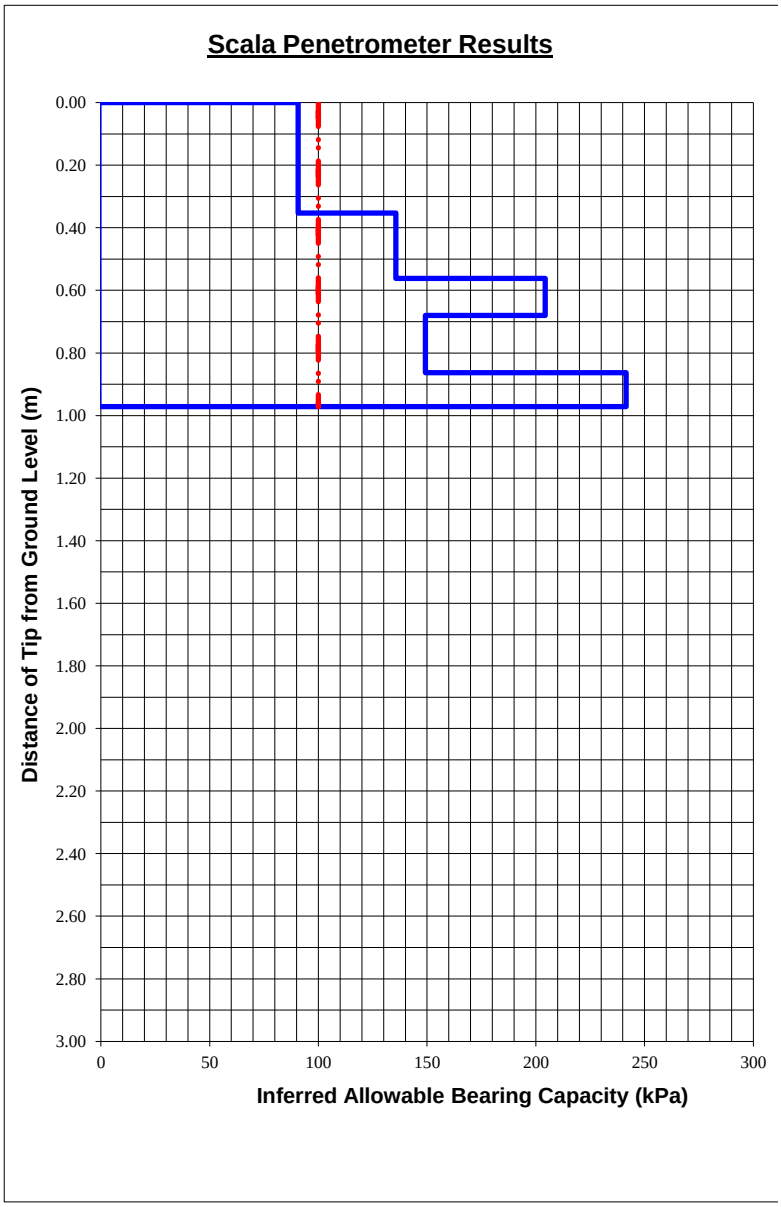
DYNAMIC CONE (SCALA) PENETROMETER

Test 23 / NZS 4402 : 1988 Test 6.5.2

Job: 12652-002
Client: Chris Mason
Date: 17-06-16
Location: TPA
Scala No.: A
Page: 1

Tested by: JAM
Logged by: JAM
Checked: TSN
Date Checked:
Ground Level (m): 0
Required Allowable kPa: 100

No. Blows	Tip to ref (cm)	Total Blows	mm / blow	kPa	depth (m)
0	80.0	0	0	0	0.0
10	44.7	10	35	91	0.35
10	23.8	20	21	136	0.56
10	12.0	30	12	204	0.68
0	98.5	30	0	204	0.68
10	80.2	40	18	149	0.86
10	70.8	50	9	242	0.96
7	69.3	57	2	242	0.97



Line is the suggested correlation of e (mm/blow) and Bearing Pressure after STOCKWELL REF: NZ ENGINEERING (32,6) 15 June 1977

Appendix 8 Transportation Assessment – Harriet Fraser Traffic Engineering & Transportation Planning

Harriet Fraser Traffic Engineering & Transportation Planning

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14 August 2017

Sam Gifford
Cuttriss Consultants Ltd
PO Box 30429
Lower Hutt

Copy via email: sam.gifford@cuttriss.co.nz

Dear Sam

Proposed Plan Change, 89 Waipounamu Drive, Kelson, Lower Hutt
Transportation Assessment

Further to your request, I am pleased to provide below a transportation assessment for the proposed plan change involving the rezoning of 89 Waipounamu Drive in Kelson from Hill Residential Activity Area to General Recreation Zone and General Residential Activity Area. The assessment that follows includes a review of the existing local transportation characteristics and a summary of the potential traffic effects associated with the development of the site for residential purposes under the proposed General Residential Activity Area zoning.

In summary the findings of the assessment show that the proposed rezoning would allow for the site to be developed for residential purposes in a manner which is consistent with the District Plan traffic and transportation related objectives and policies.

1. Background

The extent of the site is shown in Drawing No. 28923SK4 Sheet 1 prepared by Cuttriss Consultants. As shown within the detail of the Drawing No. 28923SK5 Sheet 1 there is the potential for around 163 residential lots to be created. The area of the proposed site is currently undeveloped but a resource consent is in place for 142 residential lots to be created on the site. The existing resource consent includes roading connections with Christchurch Crescent and Kaitangata Crescent. The proposed plan change would rely on roading connections with Kaitangata Crescent and Waipounamu Drive.

2. Existing Traffic Environment

The proposed subdivision site is located to the south of Kaitangata Crescent and to the west of Major Drive. Kaitangata Crescent, Waipounamu Drive, and Major Drive to the north of Waipounamu Drive are classified as Access Roads in the road hierarchy as included in the District Plan and as such have the primary function of accommodating slow moving vehicles, delivery of goods, servicing, access to car parks and providing for pedestrians. To the south of Waipounamu Drive and through to State Highway 2, Major Drive is classified as a Local Distributor in the road hierarchy as included in the District Plan and as such has the primary function of accommodating traffic near the beginning or end of the journey, bus stops and minor volumes of through traffic. There is a 50km/h speed limit on Kaitangata Crescent, Waipounamu Drive and Major Drive.

Traffic count data for Major Drive which has been collected by Council over recent years is summarised in Table 1.

Count Location on Major Drive	Daily Traffic Volume (vpd)	Year of Count
North of Kaitangata Crescent	859	2012
Between Becks Close & Invercargill Drive	2,042	2012
South of Waipounamu Drive	3,973	2009
Just before State Highway 2	5,948	2013

Table 1: Major Drive Traffic Counts HCC

A Council count from August 2012 shows Waipounamu Drive immediately to the north of Major Drive carrying 1,100 vehicles per day. With an estimated 186 houses accessed via Waipounamu Road, the existing daily trip generation rate is 5.9 vehicle movements per household. The hourly data from the same count shows existing weekday morning, weekday evening and peak hour Saturday trip generation rates of 0.55, 0.75 and 0.55 vehicle movements per household per hour respectively.

As part of this assessment the traffic flows on Major Drive at the intersection with State Highway 2 were counted in October 2016 as well as the turning movements at the intersection between Waipounamu Drive and Major Drive. The results are shown in Tables 2 and 3.

Traffic Movement	Weekday 8.00-9.00am	Weekday 5.00-6.00pm	Saturday 11.30am-12.30pm
Waipounamu Drive			
Left	14	1	8
Right	72	40	38
Major Drive (N)			
U-Turn	1	0	0
Right	4	4	7
Through	206	74	140
Major Drive (S)			
U-Turn	3	2	5
Through	64	180	115
Left	24	85	37
Total	388	386	350

Table 2: Waipounamu Drive Intersection with Major Drive (vph)

Time Period	Towards SH2 (vph)	Left in from SH2 (vph)	Right in from SH2 (vph)	Total (vph)
Weekday 8.00-9.00am	435	64	103	602
Weekday 5.00-6.00pm	170	223	266	659
Saturday 11.30am-12.30pm	266	109	130	505

Table 3: Major Drive Traffic Counts at SH2 (October 2016)

Household trip generation rates for the Waipounamu Drive catchment derived from the intersection counts are 0.61, 0.70 and 0.49 vehicle movements per household during the weekday morning, weekday evening and Saturday midday peak hours respectively.

There are bus stops on Major Drive immediately to the north of the intersection with Kaitangata Crescent, at 340m to the south of the intersection and also at the intersection with Waipounamu Drive. There are bus services every half hour throughout the day to Waterloo train station and central Lower Hutt.

The cross-section of Kaitangata Crescent in the vicinity of the site is described below and shown in Photo 1:

Kaitangata Crescent (from north to south)

- 1.3m wide footpath within 4.3m wide berm;
- 10m wide carriageway; and
- 1.3m wide footpath within 4.3m wide berm.

Photo 1: Looking along Kaitangata Crescent towards Major Drive

To the immediate south of Kaitangata Crescent, Major Drive has a carriageway width of 11.2m kerb-to-kerb as shown in Photo 2.

Photo 2: Looking South along Major Drive

The cross-section of Waipounamu Drive is shown in Photo 3 and comprises a 10m wide carriageway with 1.4m wide footpath within 5m berms along both sides.

Photo 3: Looking along Waipounamu Drive towards Major Drive

Photos 4 and 5 show the cross-section of Major Drive to the immediate north and south of Waipounamu Drive.

Photos 4 & 5: Looking North and South along Major Drive

There are sightlines in excess of 100m in each direction from each of Kaitangata Crescent and Waipounamu Drive along Major Drive. From the proposed intersection with Kaitangata Crescent there is an uphill sightline of more than 100m along Kaitangata Crescent and over 80m to the intersection with Major Drive.

A search of the NZTA crash database for the southern end of Kaitangata Crescent, the full length of Waipounamu Drive and the section of Major Drive from Kaitangata Crescent south to State Highway 2, shows that there have been the following reported crashes during the most recent five year period:

General

- no reported crashes on the southern end of Kaitangata Crescent or on Waipounamu Drive or at their respective intersections with Major Drive;

Major Drive/ SH2

- three non-injury crashes associated with vehicles turning into or out of Major Drive at the intersection with SH2;
    - an eastbound car on Major Drive hit the rear end of a car stopped or slowed for a queue. The crash factors include use of wrong pedal/ foot slipped;
    - a northbound car on SH2 hit the rear of a car turning left;
    - a southbound car on Major Drive hit the rear end of a van that had stopped or slowed for signals;

Major Drive (SH2 to Kaitangata Crescent, 2.6km)

- one serious injury, four minor injury and eight non-injury crashes on Major Drive between SH2 and Kaitangata Crescent;
    - a serious injury crash, 130m north of Taieri Crescent (S), involving a northbound van losing control and hitting kerb, post or pole. Crash factors include travelling too fast and distracted by passengers and cigarette;
    - a minor injury crash, 100m north of Invercargill Drive, involving a car turning right out of a private property not giving way and being hit by a cyclist;
    - a minor injury crash, 140m north of Taieri Crescent (S), involving a southbound car hitting a parked car. Crash factors include illness;

- a minor injury crash, 70m south of Taieri Crescent (S), involving a southbound car losing control and hitting a fence, parked vehicle, post or pole. Crash factors include too fast on straight and alcohol test above limit or test refused;
- a minor injury crash, 130m north of SH2, involving a southbound motorcycle losing control on a bend. Crash factors include inappropriate speed, new driver/ under instruction and road slippery with frost or ice;
- three non-injury crashes involving a southbound vehicle on Major Drive hitting a parked vehicle. One of these included the crash factor of new or under instruction driver swerving to avoid household pet;
- a non-injury crash, 60m north of Levin Grove, involving a southbound car hitting a car doing a driveway manoeuvre;
- a non-injury crash, 20m north of Sunshine Crescent (S), involving northbound car travelling at inappropriate speed and losing control when turning left;
- a non-injury crash, 20m north of Taieri Crescent (N), involving a bus hitting the rear end of a car that had stopped or slowed for a queue;
- a non-injury crash, 60m north of SH2, involving a southbound car losing control on right hand bend. Crash factors include new or under instruction driver; and
- a non-injury crash, 140m west of SH2, involving a southbound car losing control while returning to seal from unsealed shoulder.

As such, given the nature of the reported accidents and in particular that ten of the crashes were single vehicle incidents, the crash factors involved and the length of this section of Major Drive, there are no particular underlying safety concerns.

3. District Plan Transportation Requirements

The proposed plan change involves the rezoning of the site to General Residential Activity Area. Objectives, policies and rules included in the District Plan which have an influence on transportation matters within the General Residential Area and would apply to this site include:

4A General Residential Activity Area

Rule 4A 2.1.1 Permitted Activities – Conditions

(b) Minimum Yard Requirements:

For all buildings on the net site area:

Front Yard 3.0m

All Other Yards 1.0m

Provided that:

(i) In the case of a vacant site, or in the case of the erection of an additional dwelling unit on a site any garage or carport (whether it be part of the dwelling, attached to the dwelling or separate from the dwelling) must be a minimum distance of 5 metres from the front boundary if it has vehicular access directly from the street.

(ii) In the case of a vacant site, or in the case of the erection of an additional dwelling unit on a site where a garage or carport (whether it be part of the dwelling or separate from the dwelling) is parallel to the street, and the vehicle has the ability to turn on the site and drive off the site in a forward direction, such a set back is not required, and the normal front yard restriction shall apply.

(iii) In all cases, for Through Sites and Corner Sites all road frontages shall be treated as front yards.

***(n) General Rules**: Compliance with all matters in the General Rules – see Chapter 14.*

11 Subdivision

11.1.2 Engineering Standards

Objective 11.1.2

To ensure that utilities provided to service the subdivision protect the environment and that there are no adverse effects on the health and safety of residents and occupier.

Policy 11.1.2 (a)

To ensure that utilities provided comply with specified performance standards relating to such matters as access, street lighting, stormwater, water supply, wastewater, gas, telephone, electricity and earthworks.

The Rules in Section 11.2.2.1 include provisions for Engineering Design as follows:

- access and road design;
- footpath provision; and
- street lighting provision.

14A(i) Road Hierarchy

Objective 14A(i) 1.1.1

To accommodate a roading network that is safe, convenient and efficient; and which avoids or mitigates any adverse effects on the community and the environment.

Policy 14A(i) 1.1.1(a)

That adequate levels of service for access and movement are provided to meet the travel demands of pedestrians, cyclists and motorised traffic during the off-peak period, with maximum safety for all users and local residents at all times.

Policy 14A(i) 1.1.1(b)

That the safety and amenity values of local access areas be protected from the intrusion of through traffic, particularly speeding vehicles, large volumes of traffic, and heavy commercial vehicles, using the Road Hierarchy.

The Rules in Section 14A(i) include provisions for the following:

- classification of new roads;
- geometric and design standards for new roads;
- visibility requirements;
- provision for pedestrians; and
- treatment of berms.

14A(ii) Property Access and Manoeuvring Space

Objective 14A(ii) 1.1.1

To maintain the safety and efficiency of the roading network.

Policy 14A(ii) 1.1.1(a)

That the location and design of access to properties is managed to provide for safe entry and exit movements, particularly in relation to intersections.

Policy 14A(ii) 1.1.1(b)

That adequate provision is made on site for turning movements to allow exit movements in a forward direction for sites ……. accommodating more than four parking spaces.

Policy 14A(ii) 1.1.1(c)

That adequate provision is made on site for turning movements associated with heavy commercial vehicles to ensure that access and exit movements are in a forward direction.

The Rules in Section 14A(ii) include provisions for the following:

- how vehicle accesses shall be located and designed;
- separation of driveways from intersections;
- the number and width of vehicle crossings; and
- on-site vehicle circulation and manoeuvring space.

14A(iii) Car and Cycle Parking

Objective 14A(iii) 1.2.1 On Site Parking Provision For Activities

To provide adequate on site car parking in a safe and visually attractive manner, to maintain the safety and efficiency of the roading system, and the amenity values of the area.

Policy 14A(iii) 1.2.1(a)

That adequate on site parking space is provided for each type of activity in a safe and visually attractive manner.

The Rules in Section 14A(iii) include provisions for the following:

- the number of vehicle and bicycle parking spaces needed;
- the location of the parking spaces; and
- the design of any parking spaces.

New residential dwellings are required to provide two parking spaces per dwelling as a permitted activity.

14A(iv) Loading and Unloading

Objective 14A(iv) 1.1.1 Safe and Adequate Provision for Servicing

To maintain the safety and efficiency of the roading network and the amenity values of the area.

Policy 14A(iv) 1.1.1(a)

That adequate on site loading and unloading provision be made in a safe and attractive manner.

The Rules set out that there is no requirement to provide loading beyond the parking requirements for residential developments having fewer than 20 dwelling units or accommodating fewer than 20 residents.

4. Traffic Effects – Existing Zoning and Activity

The site is currently undeveloped and there is little, if any regular traffic activity associated with the site.

As previously mentioned, there is an existing resource consent in place for some 142 residential lots to be developed on the site. The Traffic Impact Assessment that accompanied the resource consent application anticipated that the proposed subdivision would have a trip generation rate of 8 vehicle movements per day per household and result in some additional 1,200 vehicle movements per day on Major Drive. The Assessment includes the following statement in the conclusion:

'The surrounding road network has sufficient capacity to accommodate the additional traffic'.

It is understood that the consented development is of a higher density than anticipated by the Hill Residential Activity Area zoning and that the site could reasonably be developed with around 80 lots and comply with the existing zoning requirements for density. This level of development would be expected to generate additional traffic flows on Major Drive of around 640 vehicle movements per day.

5. Traffic Effects – Residential Development with Proposed Zoning

The concept plan developed by Cuttriss Consultants shows that up to some 163 additional residential lots could reasonably be accommodated on the site with the proposed zoning. Based on the recorded daily trip generation rate for Waipounamu Drive of 5.9 vehicle movements per day per household, this level of residential development could be expected to generate up to 962 vehicle movements per day. As such, the forecast level of additional traffic activity is similar to that forecast for the consented subdivision which has been based on a non-local and more conservative trip generation rate.

The key off-site traffic effects associated with the proposed plan change are the additional vehicle movements through each of the Major Drive intersections with Kaitangata Crescent, Waipounamu Drive and SH2. With regard to the intersections with Kaitangata Crescent and Waipounamu Drive, Austroads Guide to Traffic Management Part 3 : Traffic Studies and Analysis (2009) includes the following guidance with regard to assessing the capacity of unsignalised intersections.

6.1.1 Unsignalised Intersections with Minor Roads

At unsignalised intersections with minor roads where there are relatively low volumes of cross and turning traffic, capacity considerations are usually not significant, and capacity analysis is unnecessary. Table 6.1 sets out details of intersection volumes below which capacity analysis is unnecessary.

Table 6.1: Intersection volumes below which capacity analysis is unnecessary

Type of road	***Light cross and turning volumes Maximum design hour volumes Vehicles per hour (two-way)***		
Two-lane major road	*400*	*500*	*650*
Cross road	*250*	*200*	*100*

It is estimated that there are around 64 existing houses accessed from Kaitangata Crescent and that around 90 of the potential lots would be accessed via Kaitangata Crescent rather than via Waipounamu Drive. Based on local traffic trip generation rates, 154 houses could be expected to generate up to some 116 vehicle movements per hour during the busiest hours. Based on the Council's weeklong count of Waipounamu Road, the busiest hour of traffic activity is equivalent to 12.7% of the total daily traffic. As such, with a daily traffic flow of 859 vehicle movements per day on Major Drive to the north of Kaitangata Crescent, the peak hour traffic flows will be up to 109 vehicle movements per hour. Accordingly, the intersection between Kaitangata Crescent and Major Drive can readily accommodate the additional traffic activity.

It is estimated that there are around 186 existing houses accessed via Waipounamu Drive and that around 73 of the potential lots would be accessed via Waipounamu Drive. Council's traffic count shows up to 139 vehicle movements per hour on Waipounamu Drive. Using the existing local peak hour trip generation rate it is forecast that Waipounamu Drive would carry up to 194 vehicles per hour with residential development in line with the proposed zoning. Based on the Council's traffic counts for Waipounamu Drive and on Major Drive to the south of Waipounamu Drive, it is estimated that the traffic volumes on Major Drive through the intersection are around 2,900 vehicle movements per day with up to 370 vehicle movements in the busiest hour. Adding around 70 vehicle movements per hour associated with traffic accessing the possible future subdivision via Kaitangata Crescent, there would be some 440 vehicle movements per hour on the main road and 194 vehicle movements per hour on the side road. The intersection can be expected to readily accommodate this level of traffic activity.

With regard to any traffic effects at the intersection of Major Drive and SH2, Table 4 shows the forecast additional traffic activity at the intersection based on existing turning patterns and the conservative assumption that all vehicle movements are to and from locations outside the suburb.

Time Period	**Major Drive Towards SH2 (vph)**	**Left in from SH2 (vph)**	**Right in from SH2 (vph)**	**Total (vph) (trip generation rate)**
Weekday 8.00-9.00am	75	10	15	100 (0.61)
Weekday 5.00-6.00pm	39	38	46	123 (0.75)
Saturday 11.30am-12.30pm	46	20	24	90 (0.55)

Table 4 : Forecast Additional Traffic Activity on Major Drive at SH2

With up to 140s cycle times at the signals, there would be an additional one or two vehicles on each approach during each cycle at peak hours except on the Major Drive approach which would have up to three additional vehicles during the weekday morning peak. Given the small amount of additional traffic activity per cycle of the signals plus there being three traffic lanes at the Major Drive stop line, the additional traffic activity is not expected to be discernible from day to day fluctuations in traffic flows.

As such, the forecast traffic effects associated with the proposed zone change can be safely and efficiently accommodated and are not expected to be different from those forecast for the consented 142 lot subdivision.

6. Summary and Conclusion

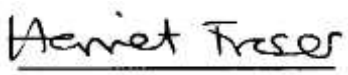
The findings of this transportation assessment can be summarised as follows:

- the site is currently undeveloped with little if any regular traffic activity;
- there is a resource consent in place for 142 residential lots to be created on the site with anticipated traffic activity of 1,200 vehicle movements per day;
- the recorded local traffic generation rates are lower than those assumed in the original resource consent application;
- there is local access to bus services and the future potential for a bus route to loop through the subdivision;
- the historic road safety record shows no crashes at the Major Drive intersections with either Kaitangata Crescent or Waipounamu Drive. There is no particular pattern of crashes elsewhere on Major Drive; and
- the forecast additional traffic activity can be readily accommodated at each of the Major Drive intersections with Kaitangata Crescent, Waipounamu Drive and SH2.

Accordingly the site can be rezoned to General Residential Activity Area and developed for residential purposes with the development meeting the transportation related objectives, policies and rules of the District Plan.

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

Yours faithfully



Harriet Fraser

Part 5: Submission Form

RMA FORM 5

Submission on publicly notified Proposed District Plan Change

Clause 6 of the First Schedule, Resource Management Act 1991

To: Chief Executive, Hutt City Council

1. **This is a submission from:**

Full Name	*Last* *First*	
Company/Organisation		
Contact *if different*		
Address	*Number* *Street*	
	Suburb	
	City *Postcode*	
Address for Service *if different*	*Postal Address*	*Courier Address*
Phone	*Home*	*Work*
	Mobile	
Email		

2. This is a **submission** on the following proposed change to the City of Lower Hutt District Plan:

Proposed District Plan Change No: ☐

Title of Proposed District Plan Change: ☐

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

(Please tick one)

3.b *If you could gain an advantage in trade competition through this submission:*

I ☐ **am** ☐ **am not** directly affected by an effect of the subject matter of that submission that–

(a) adversely affects the environment; and

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

(Please tick one)

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.

4. The specific provisions of the proposal that my submission relates to are:

Please give details:

(Please use additional pages if you wish)

5. My submission is:

Please include whether you support or oppose the specific provisions or wish to have them amended; and reasons for your views:

(Please use additional pages if you wish)

6. I seek the following decision from Hutt City Council:

Please give precise details:

(Please use additional pages if you wish)

7. I ☐ **wish** ☐ **do not wish** to be heard in support of my submission

(Please tick one)

8. If others make a similar submission,

I ☐ **will** ☐ **will not** consider presenting a joint case with them at the hearing.

(Please tick one)

Signature of submitter
(or person authorised to sign on behalf of submitter)

	Date

A signature is not required if you make your submission by electronic means

Personal information provided by you in your submission will be used to enable Hutt City Council to administer the submission process and will be made public. You have the right under the Privacy Act 1993 to obtain access to and to request correction of any personal information held by the Council concerning you.