



**PROPOSED STORMWATER MANAGEMENT PLAN
FOR
BENTLEY STUDIOS LIMITED
96 BEACH HAVEN ROAD/13 CRESTA AVENUE
BEACH HAVEN**

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Executive Summary

This Stormwater Management Plan addresses the stormwater management and treatment considerations for the proposed development at 96 Beach Haven Road and 13 Cresta Avenue, Beach Haven. The proposed development will involve the development of 81 Residential units in four separate apartment blocks. As the development has over 20 lots on a Brownfields development, this Stormwater Management Plan has been prepared to accompany the Stormwater Network Discharge Consent application.

This plan is intended to provide a framework for the design of new stormwater reticulation and treatment associated with the development of the site. Stormwater flows from the development will be attenuated in accordance with the requirements of GD01 to limit stormwater runoff from the 10% AEP 10-minute storm event to no more than the stormwater flows existing pre development. This will remove any increased demand on the existing downstream stormwater infrastructure.

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1. INTRODUCTION

This Stormwater Management Plan describes the stormwater management approach to the proposed development at 96 Beach Haven Road/13 Cresta Avenue.

The Stormwater Assessment has been undertaken in accordance with the Auckland Council Unitary Plan requirements, along with the requirements of the Network Discharge Consent (NDC), Auckland Design Manual, and GD01

2. EXISTING SITE APPRAISAL

2.1 Summary of Data sources and dates

<i>Existing site appraisal item</i>	<i>Source and date of data used</i>
Topography	<ul style="list-style-type: none">• Third-party topographic survey, Easdale Surveyors Ltd, 2021
Geotechnical/soil conditions	<ul style="list-style-type: none">• Third-party geotechnical report, Lander Geotechnical, 2021
Existing stormwater network	<ul style="list-style-type: none">• Auckland Council GeoMaps data, 2020• Third-party topographic survey, Easdale Surveyors Ltd, 2021
Existing hydrological features	<ul style="list-style-type: none">• Auckland Council GeoMaps Overland Flow Paths and Stream Layers, 2021• Auckland Land Surveys, 2019 Auckland Council Unitary Plan Viewer, significant ecological area layer, 2021
Flooding and flowpaths	<ul style="list-style-type: none">• Auckland Council GeoMaps Overland Flow Paths Layer, 2021• Auckland Council GeoMaps Flood Plain Layer, 2021
Coastal Inundation	<ul style="list-style-type: none">• Auckland Council GeoMaps Emergency Management Layer, 2021
Ecological/environmental areas	<ul style="list-style-type: none">• Auckland Council GeoMaps Unitary Plan Viewer, Significant Ecological Area Layer, 2021• Auckland Council GeoMaps Unitary Plan Viewer, Significant Vegetation Layer, 2021
Cultural and heritage sites	<ul style="list-style-type: none">• Auckland Council GeoMaps Cultural Heritage Site Layer, 2021

2.2 Location

The subject site comprises of the following two parcels of land totalling 7,147.00m².

<i>Existing site elements</i>	
Site address	• 96 Beach Haven Road and 13 Cresta Avenue
Legal description	• Lot 1 and Lot 2 DP 157383
Current Land Use	• Residential – Single Housing Zone
Current building coverage	• 305.17m ² (4.27%)
Historical Land Use	• Residential



Figure 1. Aerial view of Subject Site – Council Geomaps

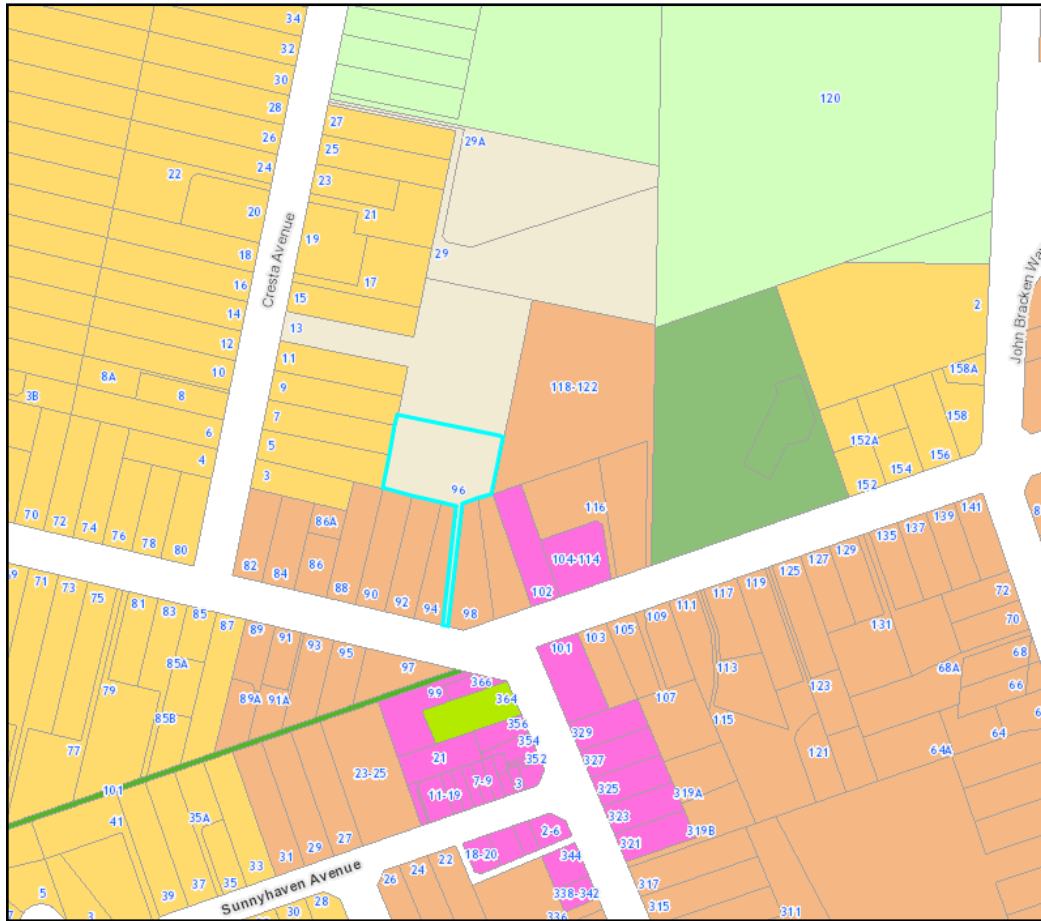


Figure 2. Auckland Unitary Plan, Operative in Part: Zoning Map

2.3 Topography

The subject site slopes in a Northerly direction towards 29 Cresta Avenue, with gradients ranging from 4% in the central portion of the site, to approximately 6% towards the Northern section of the site.

A 100-year overland Flowpath is present within the site currently flowing along a depression on the Western side of the site and thereafter existing into the property at 15 Cresta Avenue.

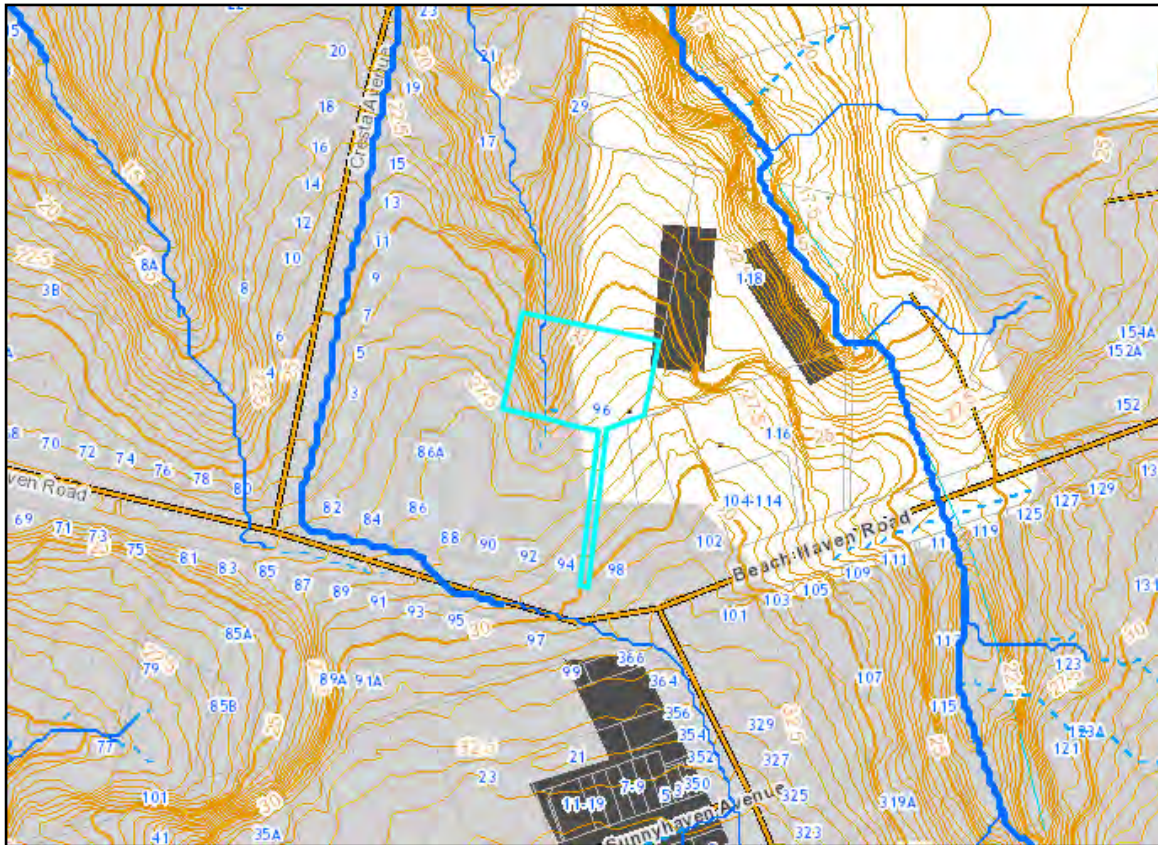


Figure 3. Site Topography and Flooding (Contours from Auckland Council and Geomaps)

2.4 Geotechnical

Below is an extract from the Geotechnical Report as prepared by Lander Geotechnical, dated 2 March 2021:

A review of GNS digital Q Maps indicated that the site is located within the East Coast Bays Formation (ECBF) of the Waitemata Group flysch deposits which consist of alternation beds of sandstones and mudstones. These deposits generally weather to a dark grey, partially weathered 'transitional' soils before weathering completely to orange, light grey and brown silts, clays and sands. Please refer to Appendix F for Lander Geotechnical, Geotechnical Report, 2 March 2021.

2.5 Existing Drainage Features and Stormwater Infrastructure

According to a topographical survey prepared by Easdale Surveyors and Auckland Council Geomaps, there is an existing 300mmØ public stormwater line running along the southern boundary and the Western boundary of the site. This line connects to an existing 750mmØ public stormwater line running in a North-westerly direction through 13 Cresta Avenue. Please refer to Appendix A, Existing Site Features.

Table of Public Stormwater Manholes and Lines traversing the Proposed Development boundary as follows:

Asset Type	Legacy Asset ID	Size
Stormwater Line	Null	300mmØ
Stormwater Manhole	Null	1050mmØ
Stormwater Line	Null	300mmØ
Stormwater Manhole	Null	1500mmØ
Stormwater Line	NSC_483772	750mmØ
Stormwater Manhole	Null	-
Stormwater Line	NSC_483770	750mmØ

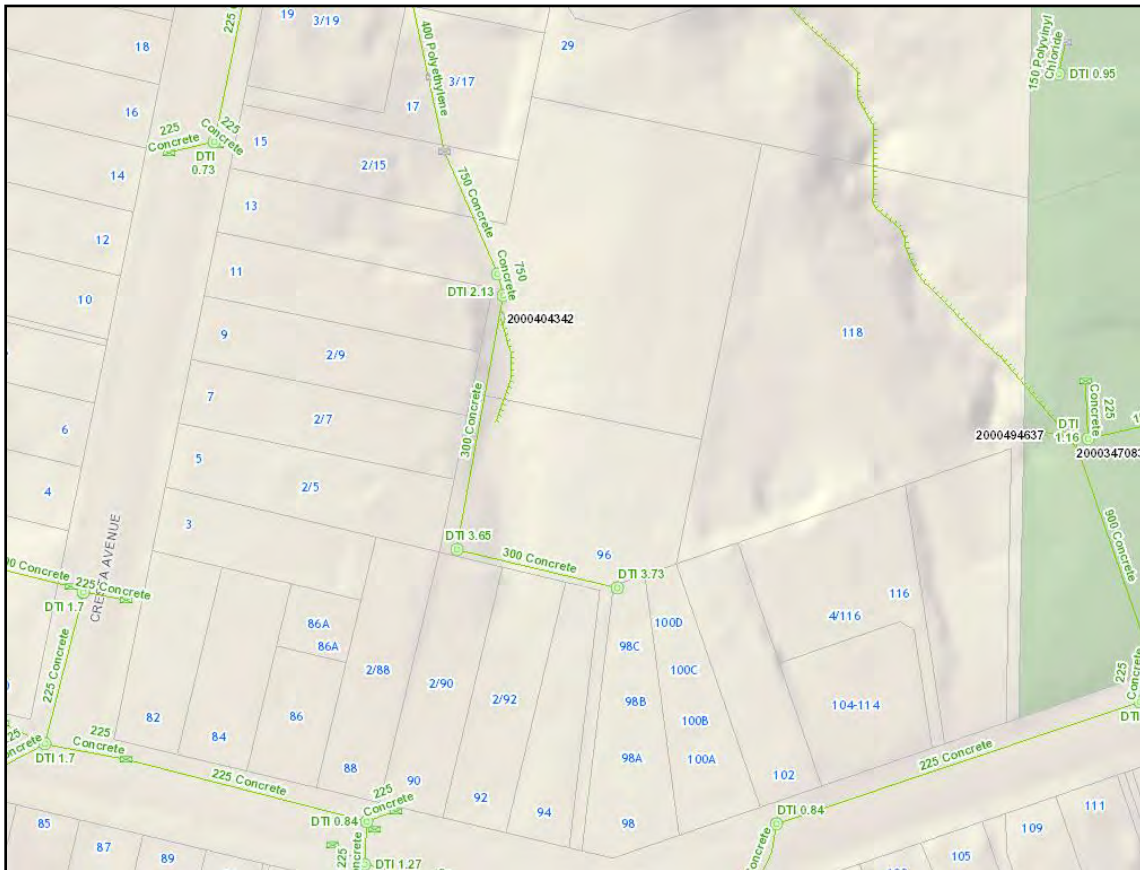


Figure 4. Existing Public Stormwater Network (Auckland Council Geomaps)

2.6 Receiving Environment

From the subject sites, the public stormwater network collects stormwater from a number of other upstream properties forming what was formerly known as the Tramway Catchment. This catchment discharges through a stream/watercourse, approximately 497m from the subject site into the Waitemata Harbour

The Tramway catchment was one of the lower priority catchments in the North Shore, with the last CMP published in February 2000. No recent stormwater models for this catchment have been undertaken.



Figure 5. Existing Public Stormwater Network (Auckland Council Geomaps)

2.7 Existing Hydrological Features

There are no natural streams, wetlands or ponds in the development area.

2.8 Flooding and Flowpaths

2.8.1 Flood plain and Flood Sensitive Areas

The site is not situated within the 100-year flood plain, nor flood sensitive area.

2.8.2 Overland Flow Paths

Council GIS Indicates that there is an overland flow path traversing the site, along the western boundary of 96 Beach Haven Road. Following a site visit and a desktop Flood Assessment, it is apparent the overland flow path is a local feature originating in 92 Beach Haven Road, immediately upstream of the subject site. It is concluded that the overland flow path can easily be accommodated down the western boundary within the proposed development.

2.9 Coastal Inundation

Auckland Council GeoMaps indicates that the sites are not subject to coastal inundation.

2.10 Biodiversity

Auckland Council GeoMaps indicates that there is no Significant Ecological Area (SEA) located within the subject sites. The downstream discharge point of the public network is located within a SEA.

2.11 Cultural and Heritage Sites

No cultural or heritage site have been identified within the development area.

2.12 Contaminated Land

The Former Auckland Regional Council records system was searched for previous pollution incidents on the site. The contaminated sites register has identified the following for both properties. The site has been used for previous horticultural activities HAIL Item (10A) and therefore there is a potential for contaminated soils resulting from the use of pesticides etc used during these activities. This will require further investigation as part of the Resource Consent Application.

2.13 Mana Whenua Consultation and Engagement

An email was sent on the 21 December 2020 to the following mana whenua groups requesting feedback on the proposed private plan change:

- Ngāi Tai ki Tāmaki - Ngāi Tai ki Tāmaki Tribal Trust
- Ngāti Maru - Ngāti Maru Rūnanga Trust
- Ngāti Pāoa - Ngāti Paoa Iwi Trust
- Ngāti Pāoa - Ngāti Paoa Trust Board

- Ngāti Tamaterā - Ngāti Tamaterā Settlement Trust
- Ngāti Te Ata - Te Ara Rangatu o Te Iwi o Ngāti Te Ata Waiohua
- Ngāti Whanaunga - Ngāti Whanaunga Incorporated
- Ngāti Whātua o Kaipara - Ngā Maunga Whakahii o Kaipara Development Trust
- Ngāti Whātua Ōrākei - Ngāti Whātua Ōrākei Trust
- Te Ākitai Waiohua - Te Ākitai Waiohua Iwi Authority
- Te Kawerau ā Maki - Te Kawerau Iwi Settlement Trust
- Te Rūnanga o Ngāti Whātua - Te Rūnanga o Ngāti Whātua

A response was received from Ngā Maunga Whakahii o Kaipara Development Trust, Ngāti Whātua Ōrākei Trust and Ngāi Tai ki Tāmaki Tribal Trust confirming that no further action was required.

3. STORMWATER MANAGEMENT

The stormwater management strategy for the development has been developed in accordance with the objectives of the Auckland Regionwide Stormwater Network Discharge Consent.

3.1 General

As per the Auckland Unitary Plan, the subject site is not situated within the areas of Stormwater Management Areas, SMAF 1 or SMAF 2.

Discharge of Stormwater from the Proposed Development will not require resource consent as this is considered a permitted activity per the AUP: OP, Section E8.4.1 Item A1 – *Diversion of stormwater runoff from lawfully established impervious areas directed into an authorised stormwater network or a combined sewer network that complies with Standard E8.6.2.1.*

The proposed future development of the site will increase the impervious area on site from its current situation. Per AUP: OP, Section H4.6.8 Item 1 – the maximum impervious area must not exceed 60 percent of the site area.

Stormwater attenuation will be provided by installing Detention tanks with a throttle discharge to attenuate the Stormwater discharge from the post development flows back to the pre development flows. The Stormwater design will be undertaken to comply with the Auckland Unitary Plan stormwater mitigation requirements, providing attenuation for the 10% AEP storm event (including 2.1°C climate change). A throttle system will be proposed to attenuate the discharge to pre

developed conditions in accordance with GD01 Both roofed and paved areas will be drained by means of catch pits and downpipes respectively and discharge directly into the piped network

A table of site catchment areas as follows:

Description	Catchment Areas (m ²)
Total Impervious Area (m²)	4,288.20 (60%)
Total Pervious Area (m²)	2,858.80 (40%)
Total Gross Area (m²)	7,147.00 (100%)

The existing connection currently servicing No. 13 Cresta Avenue will be upgraded to form a new public connection for the proposed development. The existing connection currently servicing No. 96 Beach Haven Road will be abandoned. The existing Public Stormwater Lines currently located on site including all neighbouring Stormwater connections will be retained. During Earthworks, if sufficient cover is not achieved over the existing Public Stormwater Lines, then these lines will be protected or upgraded as required.

3.2 Water Quality

The stormwater will be discharged into an existing public system which, in turn, discharges to the Waitemata Harbour through a river/watercourse located to the North of the subject sites.

The downstream receiving environment is located within a Significant Ecological Area (SEA) under the Auckland Unitary Plan, Section D9. Stormwater treatment will be provided to runoff from all impervious surfaces by an Auckland Council Approved stormwater treatment device designed in accordance with Auckland Council Guideline Document GD01 2017/001 (GD01) along with the requirements of Schedule 4 of the Networks Discharge Consent for Large Brownfield Areas.

Inert Building Materials are also proposed for the new dwellings. This will be by means of colour steel roofing, plastic guttering and downpipes etc.

3.3 Flooding

3.3.1 10 Percent AEP event (Network Capacity)

The downstream pipe capacity of the existing network has been assessed up to the Stormwater Manhole located within 21 Cresta Avenue (Council ID NSC_1507244)

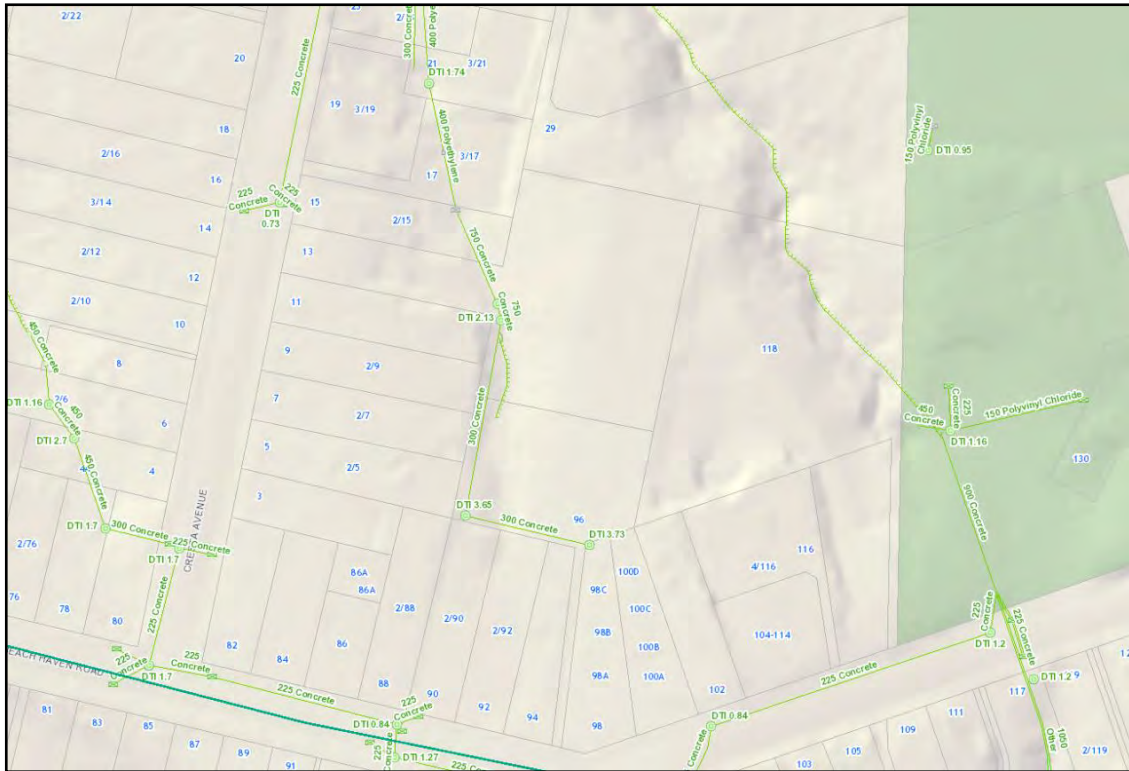


Figure 6. Existing Public Stormwater Network (Auckland Council Geomaps)

The existing 400 diameter line running into this Manhole has sufficient capacity to convey the 10% AEP stormwater event from the full catchment including the proposed development.

We note that it is proposed to provide Stormwater detention to limit post developed Stormwater flows to those existing in the pre developed condition which will throttle the stormwater flows from the 10% AEP 10 minutes storm event. This will ensure there is no additional demand on the downstream network.

3.3.2 1 Percent AEP event

The proposal will lead to a small increase in peak runoff flow rates during the 1% AEP storm. Our calculations show that the 1% storm event can easily be catered for within the proposed development. Currently, overland flow from the 1% AEP storm event exits the site at the lowest point in the north west corner, and follows the topography in a Northward Direction through 15 Cresta Avenue. From there the overland flow continues in a Northerly direction on through a number of properties on Cresta Avenue.

3.3.3 Overland Flowpath and Floodplain Management

An overland Flowpath has been identified on Auckland Council GIS entering the site at the Southern Boundary, traversing along the Western Boundary and exiting the site at the North West Boundary.

Following a site visit and a review of the topography of the area, it has been established that the overland Flowpath does behave in the manner as presented on GIS. The following table is a summary of the pre-development and post development flows:

Cross Section	Q100 Pre-development m ³ /s	Q100 Post Development m ³ /s	Flood Depth Pre-Development (mm)	Flood Depth Post Development (mm)	Velocity Pre-Development (m/s)	Velocity Post-Development (m/s)
A-A	0.444	0.457	130	150	2.166	1.738
B-B	0.444	0.457	130	150	2.257	1.785
C-C	0.444	0.457	130	100	2.201	3.027
No. 15 Cresta Avenue	0.525	0.532	360	370	1.021	1.031
No. 17 Cresta Avenue	0.619	0.650	470	480	0.734	0.749

We have assessed the catchment from the Auckland Council GIS records. We note as per our attached catchment plan, there is a small area of the site that currently discharges to the North East that has not been included in our calculations. This is a very minor catchment and will have very little effect on the calculations completed to date.

Several cross sections of the overland flowpath were developed along the western boundary of the proposed development and within the properties of No.15 and No. 17 Cresta Avenue. This was to determine the flood levels post development. We have adopted a hypothetical channel based loosely on Auckland Council GIS levels to create the cross sections at the location shown in the attached Section Plan. In reality the channel will be much wider than assessed and will result in a lower flood depth.

The overland flow path is through generally well-maintained grassed areas through the site and traverses through the properties of No. 15 and No. 17 Cresta Avenue. The design has been based on a Manning's co-efficient of 0.03 for the well-maintained grass areas, and a co-efficient of 0.1 for the downstream properties based on the Auckland Council Stormwater Code of Practice.

Based on the 100yr Overland Flow, all cross sections indicate a minimal increase in the water levels along the overland flow path in the post development scenario. The maximum flood depth increase is circa 10mm. These changes in the overland flow behaviour will not cause any adverse effect to downstream properties.

A grassed conveyance channel is proposed within the site of the proposed development to accommodate for the 100yr Overland Flow. Due to the low flows, this will be more of a localised small depression in the grass surface. The channel will discharge into a scruffy dome manhole located at the low point of the site. The scruffy dome will outlet into the existing public network. This is primarily to remove the overland flow from discharging over the proposed retaining wall at the intersection of 15 Cresta Avenue. There is sufficient capacity in the 750mm diameter stormwater line at this location. The 750mm SW line decreases to a 400mm diameter line at the boundary with 17 Cresta Avenue and a cesspit is located there which will allow the flood flows to bubble up to the surface again should the pipe capacity be exceeded. This is considered to be the same philosophy adopted previously given the current configuration of the change in SW lines through the development, so it matched with what is currently happening in the area.

Based on the above assessment, we conclude that the flood depths will have no measurable impact on the downstream properties at No. 15 and No. 17 Cresta Avenue, and further down the catchment.

3.3.4 Development staging

The construction works will not be undertaken in a Staged approach.

3.4 Assets

With the exception of the existing 300mm diameter and 750mm diameter Public Stormwater Line, all other assets within the development will be private. A pipe network will service the units collecting roof runoff into attenuation tanks from downpipes and catch pits will collect driveway runoff and discharge into a communal attenuation tank. All this collected stormwater will discharge to the public system via a proprietary Auckland Council approved stormwater treatment device, designed in accordance with the requirements of Auckland Council GD01/TP10. The private infrastructure will be constructed in accordance with the NZ Building Code and Stormwater Bylaw 2015. Unless otherwise approved, the private stormwater system connecting to the public system will be designed and built-in compliance with the design processes and standards per the Auckland Council Stormwater Code of Practice. This will be further designed under the Building Consent for the development.

The public infrastructure will be constructed in accordance with the Auckland Council Stormwater Code of Practice and will be vested in the Auckland Council. The private infrastructure will be jointly

owned by the residents of the development (by way of an owner's corporation or similar mechanism). Responsibility for maintenance of the system will, therefore, be held by the owner's corporation. An operations and maintenance manual for the private stormwater system will be prepared and will be provided at the Building Consent stage for the private drainage.

3.5 Ongoing Maintenance Requirements

There will be ongoing maintenance requirements for the Stormwater Treatment System which will fall on the Body Corporate. These will be detailed in the Building Consent documentation.

4. CONCLUSION


We consider that the stormwater management proposed for the development at 96 Beach Haven Road and 13 Cresta Avenue is in accordance with the objectives and policies of the Auckland Unitary Plan, the Regionwide Stormwater Network Discharge Consent, Auckland Design Manual and GD01. The proposed development will have minimal effects on the downstream receiving environment.

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Reviewed and approved by



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Appendix A

Existing Site Features

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FINAL

Job Title:
PROPOSED STORMWATER MANAGEMENT PLAN FOR BENTLEY STUDIOS LTD 96 BEACH HAVEN ROAD & 13 CRESTA AVENUE BEACH HAVEN

FOR CONSENT

AIREY CONSULTANTS LTD.
 CONSULTING CIVIL & STRUCTURAL ENGINEERS
 Takapuna, Botany, Queenstown

Drawing Title: EXISTING SERVICES PLAN	
File No. 200626/1	Rev. -
Dwg. No. P100	

Appendix B

Proposed Zoning Plans



REZONING PROPOSAL

96 Beach Haven Road & 13 Cresta Road
Beach Haven

NOVEMBER 2020

B&A

Urban & Environmental

Prepared by: Nick Mitchell
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WIDER CONTEXT



LOCAL CONTEXT

