From: Per Lugnet
Sent: Monday, 9 June 2025 12:34 pm
To: Sarah Trinder <Sarah.Trinder@fndc.govt.nz>
Subject: Info for submissions to rezone land in Coopers Beach and Ahipara

Hi Sarah

As discussed some time ago, please find some relevant info regarding the rezoning requests.

We have now received the RC for stages 2&3 of the Coopers Heights Village retirement project. Existing residential infrastructure has been available for many years.
This development was supported by 275 individual submissions at the public notification process in 2019. It is important that this is rezoned to the correct residential status. Current zoning adds cost to construction without achieving anything other than unnecessary delays and extra time spent by Council staff processing applications.

Regarding Ahipara, we have now received the titles for Stage 2 of the development (western side of Albatross Alley). Residential infrastructure including footpaths and streetlights, constructed and paid for by the developer, has been available since 2007 and this inclusive subdivision encourages affordable housing which is in desperate short supply in the area. Current zoning adds cost and processing time to construction and limits supply of the remaining potential sections in proposed stage 1 at the SE corner of Weka St.

Please let me know if this requires further clarification

Kind regards

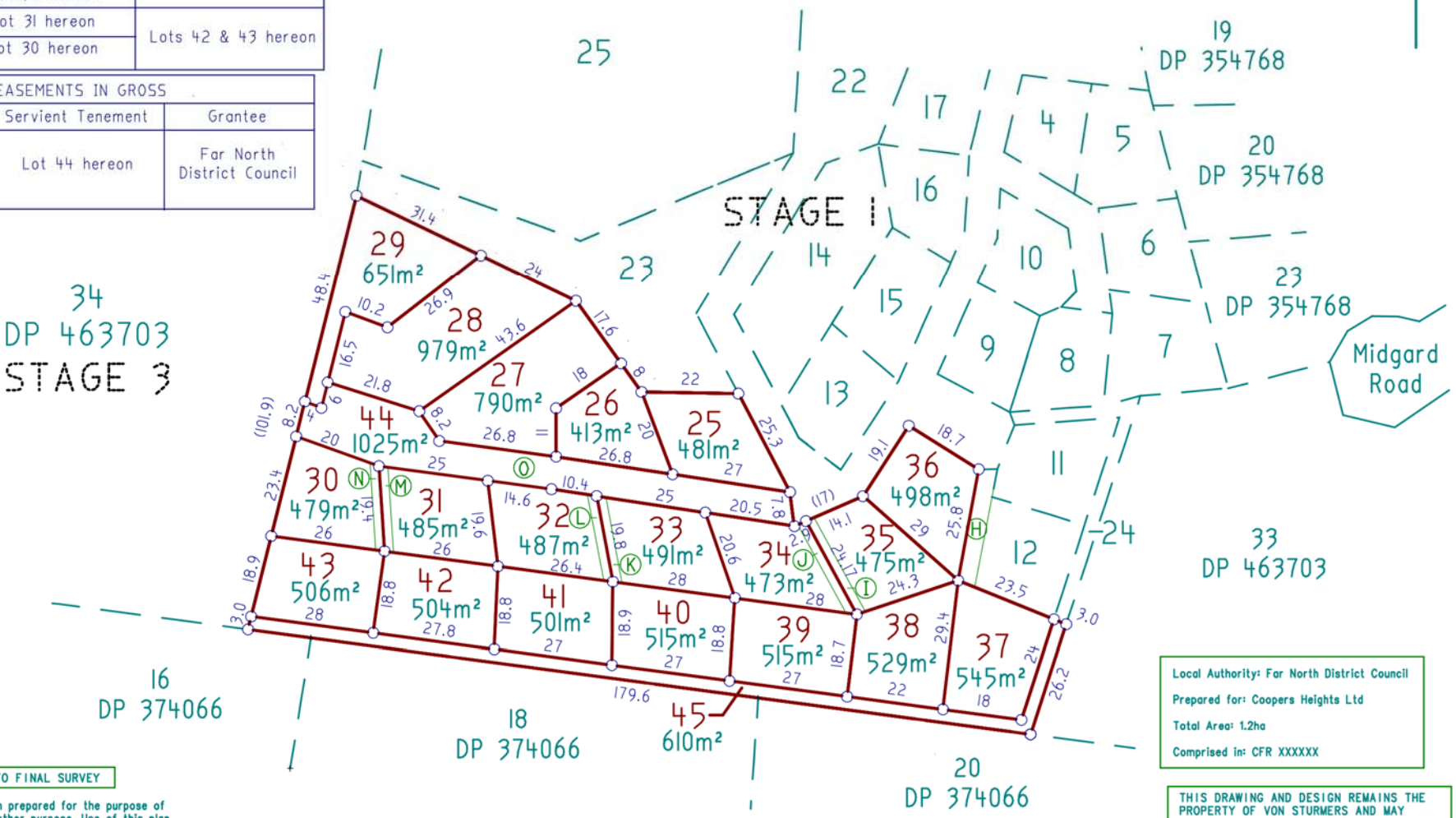
Per Lugnet

MEMORANDUM OF EASEMENTS			
Purpose	Shown	Servient Tenement	Dominant Tenement
Right of Way Right to Convey Telecommunic-ations & Computer Media Right to Convey Water Right to Drain Water & Sewage	(H)	Lot 12 DP XXXXXX	Lot 37 hereon
	(I)	Lot 35 hereon	Lots 38 & 39 hereon
	(J)	Lot 34 hereon	
	(K)	Lot 33 hereon	Lots 40 & 41 hereon
	(L)	Lot 32 hereon	
	(M)	Lot 31 hereon	Lots 42 & 43 hereon
	(N)	Lot 30 hereon	

SCHEDULE OF EASEMENTS IN GROSS			
Purpose	Shown	Servient Tenement	Grantee
Right to Drain Sewage	(O)	Lot 44 hereon	Far North District Council

APPROVED PLAN

Planner: Nicola Cowley
pp: ERamsay
RC: 2190696-RMACOM
Date: 13/02/2025



Local Authority: Far North District Council
Prepared for: Coopers Heights Ltd
Total Area: 1.2ha
Comprised in: CFR XXXXXX

AREAS AND MEASUREMENTS SUBJECT TO FINAL SURVEY

This plan and accompanying report(s) have been prepared for the purpose of obtaining a Resource Consent only and for no other purpose. Use of this plan and/or information on it for any other purpose is at the user's risk.

VON STURMERS
Registered Land Surveyors, Planners & Land Development Consultants
Ph: (09) 408 6000
Email: kaitaia@surveyandplanning.co.nz
131 Commerce St
P.O. Box 128
Kaitaia

Proposed Subdivision of Lot 26 DP XXXXXX - Stage 2
Coopers Heights Village

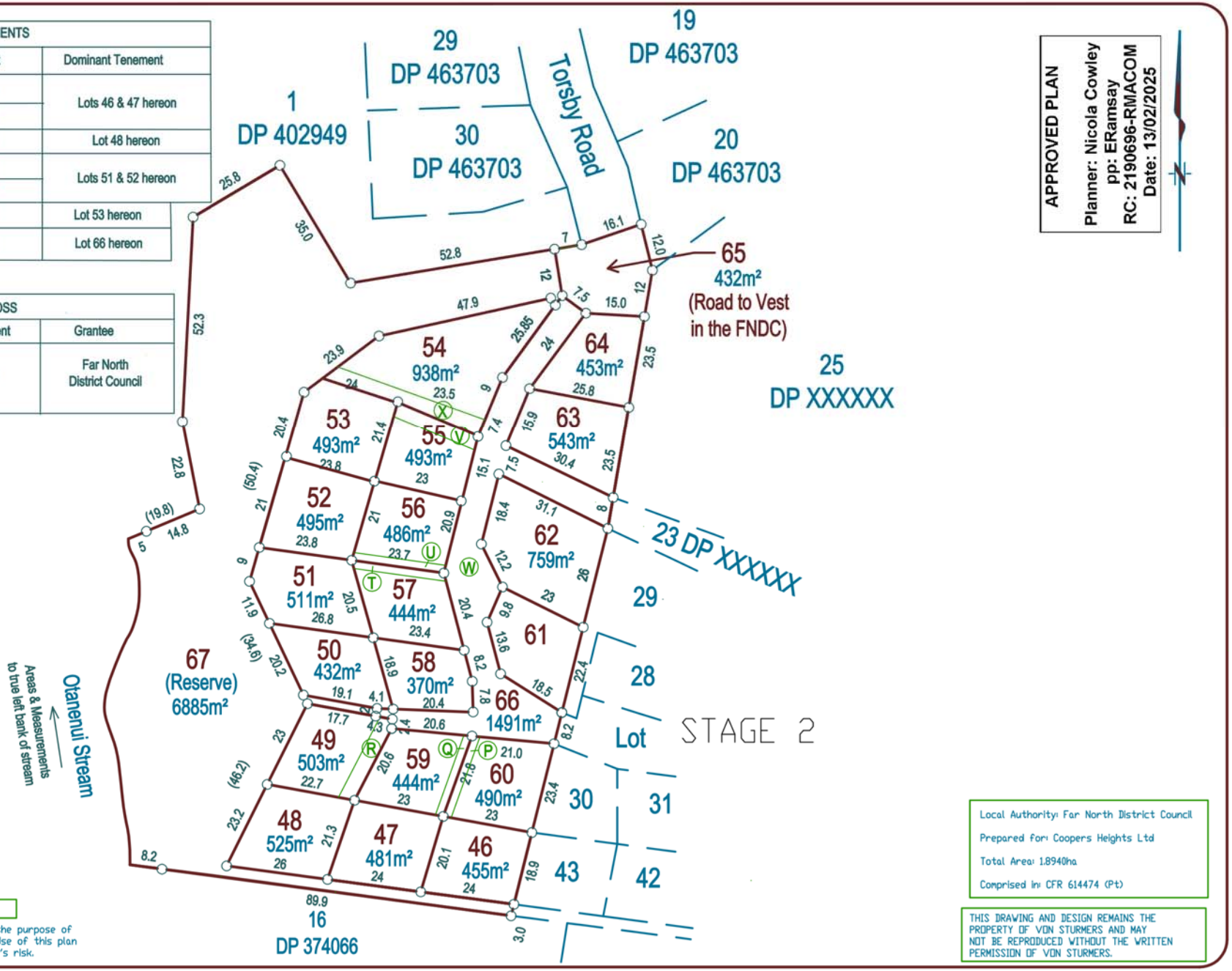
	Name	Date
Survey		
Design		
Drawn	TY	Nov 18
Approved		
Rev	TY	Dec 18

ORIGINAL SCALE: 1:1000
SHEET SIZE: A3

Surveyors Ref. No: 13130.03
Series

MEMORANDUM OF EASEMENTS			
Purpose	Shown	Servient Tenement	Dominant Tenement
Right of Way Right to Convey Telecommunic-ations & Computer Media Right to Convey Water Right to Drain Water & Sewage	(P)	Lot 60 hereon	Lots 46 & 47 hereon
	(Q)	Lot 59 hereon	
	(R)	Lot 49 hereon	Lot 48 hereon
	(T)	Lot 57 hereon	Lots 51 & 52 hereon
	(U)	Lot 56 hereon	
	(V)	Lot 55 hereon	Lot 53 hereon
Right to Drain Water	(X)	Lot 54 hereon	Lot 66 hereon

SCHEDULE OF EASEMENTS IN GROSS			
Purpose	Shown	Servient Tenement	Grantee
Right to Drain Sewage	(W)	Lot 66 hereon	Far North District Council



APPROVED PLAN
Planner: Nicola Cowley
pp: ERamsay
RC: 2190696-RMACOM
Date: 13/02/2025

Local Authority: Far North District Council
Prepared for: Coopers Heights Ltd
Total Area: 1.8940ha
Comprised in: CFR 614474 (Pt)

AREAS AND MEASUREMENTS SUBJECT TO FINAL SURVEY

This plan and accompanying report(s) have been prepared for the purpose of obtaining a Resource Consent only and for no other purpose. Use of this plan and/or information on it for any other purpose is at the user's risk.

Easements for s92

Proposed Subdivision of Lot 34 DP 463703
Coopers Heights Village - Stage 3

	Name	Date
Survey		
Design		
Drawn	TY	Nov 18
Approved		
Rev	AL	Dec 24

ORIGINAL SCALE 1:1000 SHEET SIZE A3

Surveyors Ref. No: 13130.03 Series Sheet 3 of 3

Ahipara Google Maps View

Hawthorn Geddes
engineers & architects ltd

ENGINEERING SUITABILITY REPORT FOR NEW SUBDIVISION Rev. 1

PREPARED FOR NORTHSTAR LTD

C/- PER LUGNET

WEKA STREET, AHIPARA

LOT 11 DP 380768 & LOT 1 DP 474635

7 Selwyn Avenue
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09 438 7139

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09 283 3428

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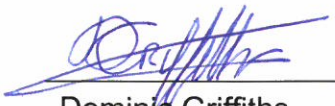
GEOTECHNICAL REPORT FOR NORTHSTAR LTD Rev. 1

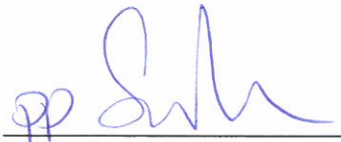
Table of Contents

Report
Prepared by:



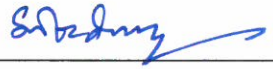
Dominic Griffiths
BSc (Geo), MEngNZ

Report
Prepared by:



Linta Joy
M Tech (Env), MEngNZ

Report
Reviewed by:



SM Ferdous
MSc Eng (Geo), MEngNZ,
CEng MICE

Report
Approved by:

Peter Geddes
BE, CPEng, FEngNZ

DOCUMENT TRANSMITTAL			
Prepared for: NORTHSTAR LTD			Job No.: 12372
Revision	**Issued To**	**Copies Issued**	**Date**
0	Client: Northstar Ltd c/- Per Lugnet Email: northstar.p@gmail.com	email	10/03/21
1	Client: Northstar Ltd c/- Per Lugnet Email: northstar.p@gmail.com	email	22/03/21

1. Purpose

The purpose of this report is to provide an outline of the engineering suitability investigation, to support a subdivision application for 19 Lots in accordance with Section 106 of the RMA 1991. Advice on soil conditions for building, stability and stormwater is given for the proposed new subdivision development at the property located at the end of Weka Street and Albatross Alley; legally described as Lot 11 DP 380768 & LOT 1 DP 474635.

The site is connected to the Far North District Council (FNDC) stormwater network and wastewater disposal network to which the new buildings can be connected, therefore, on-site effluent disposal will not be required.

This report is to support a resource consent application to Far North District Council (FNDC). This report is not suitable for building consent.

2. Proposal

It is proposed to subdivide the existing Lot 11 DP 380768, located west of Albatross Alley, and LOT 1 DP 474635, located south-west of Weka Street. These are to be subdivided into 18 new residential Lots and an access Lot.

Proposed new Lots 1 - 19 will each cover an area ranging between 687m2 (Lot 18) and 1,220m2 (Lot 10); shown on the Von Sturmers – Subdivision Scheme Plan1 in Appendix A.

The subdivision scheme plan is also shown on the site plan aerial image with Northland Regional Council (NRC) LiDAR data in Figure 1 below and Appendix A.

[1] Lots 1 – 19 being a Proposed Subdivision of Lot 11 DP 380768 & LOT 1 DP 474635. Ref: 13278, Series 2, Sheets 1 to 3. Dated: 01/05/2019. Von Sturmers registered land surveyors, planners & land development consultants.

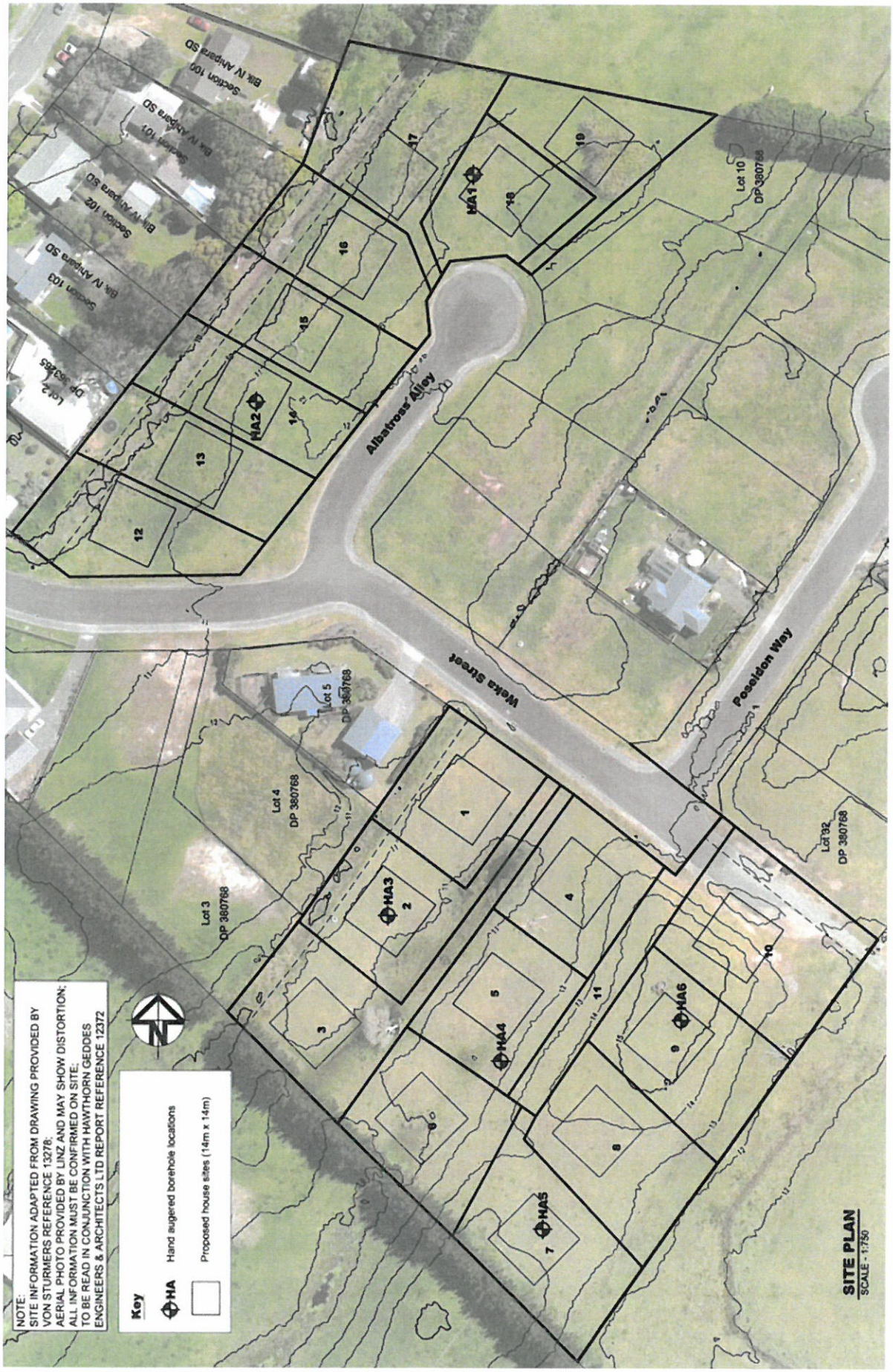


Figure 1: Aerial photograph of proposed site showing proposed Lot boundaries (bold black lines) (source: NRC LiDAR data and Von Sturmers – Subdivision Scheme Plan).

3. Geological Setting

The geological map of the Kaitaia area (Map 1) produced by the Institute of Geological and Nuclear Sciences shows the property is underlain by Early Pleistocene - Middle Pleistocene windblown dune deposits.

The windblown dune deposit is described as "uncemented to moderately cemented and partly consolidated sand in coastal foredunes. Clay-rich sandy soils."

Soils encountered in this investigation were generally consistent with the windblown dune deposit profile.

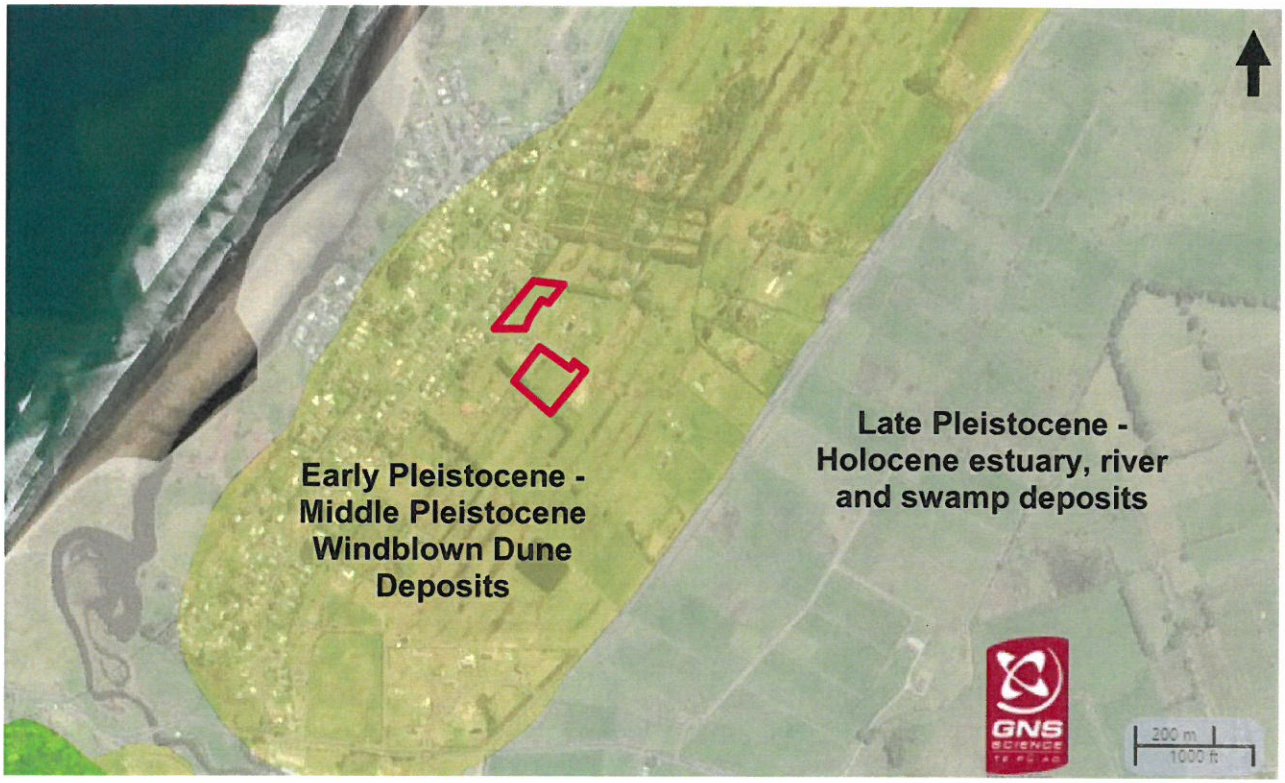


Figure 2: Geology of the Ahipara Township showing the proposed site (red) (source: GNS maps).

4. Geomorphology

The geomorphology of the site is consistent with the underlying windblown dune sand with the site situated near the centre of a relic foredune area, consisting of multiple gently rolling dunes which parallel the coastline to the west.

Some 230m north-west and south-east of the site are low lying, near flat, paddocks consistent with estuary, river and swamp deposit geomorphology indicating the presence of a relic lagoon east over 230m east of the site.

5. Hazards Maps

No hazard features are mapped for the site on the FNDC GIS Maps and Northland Regional Council Hazard Maps.

6. Site Description

The property is centrally located within the Ahipara Township, within a south-west trending dune area which parallels the coastline west of the property.

Weka Street bisects the wider property, separating the two existing subject Lots; existing Lot 1 DP 474635 located south-west of Weka Street (new Lots 1-11), with existing Lot 11 DP 380768 located on the northern side of Weka Street and west of Albatross Alley (new Lots 12-19).

The larger site consists of near flat to gently rolling (<10°) grassed dune slopes. Two existing stormwater drains, approximately 5m wide with slope angles up to approximately 10°, run north-east to south-west. These drains are situated along the western boundaries of proposed Lots 1 - 3 & Lots 12 - 17.

A small number of stand-alone, light, timber framed, dwellings primarily on timber pile foundations, occupy the neighbouring land and properties.

Access to the building sites is proposed to be via the existing Weka Street and Albatross Alley, with Lot 11 proposed to provide access and electricity easement to proposed Lots 5 - 10 off Weka Street.

Figure 3: View westward across proposed Lot 1 to Lot 10 area on the southern side of Weka Street.

Figure 4: View eastward across Lots 1 to 10 on the southern side of Weka Street.

Figure 5: View south-west across Lots 12 to 17 on the western side of Albatross Alley.

Figure 6: View north-east across proposed Lot 17, Lot 18 & Lot 19.

7. Geotechnical Investigation

7.1. Soil Investigation

A geotechnical investigation was undertaken across the site, including six hand augered boreholes (HA1 - HA6) drilled to refusal between 0.4m (HA1) and 2m (HA2) below ground level (bgl). Scala penetrometer testing was performed at nominal 0.1m intervals as the holes were advanced.

No groundwater was encountered within any of the hand augered boreholes during our investigations. The groundwater table is therefore expected to be below the hard pan (compacted sand layer) encountered. The near surface soils have been identified as coarse to medium sand; free draining, so the groundwater table is not expected to rise within 1.2m of the surface, based on our investigation and observed water topography.

Logs of the boreholes and a site plan indicating the borehole locations are attached to this report. Table 1 below summarises the sub-surface conditions encountered.

Table 1: Summary of Soils Encountered.

Hand Augered Boreholes	Hand Auger Termination Depth	Topsoil Depth	Groundwater Depth	Scala Penetrometer Strength Natural Soils (min - max)	Description
All depths measured in (m) below current ground level				Blows/ 100mm	
HA1	0.4	0.2	NE(1)	4 - 20	**Topsoil (Organic Sand)** encountered from surface to approximately 0.2m within HA1, HA2 & HA3 and consisting dark brown organic silt. **Windblown Dune Deposit (Sand)** encountered from the surface or below the organic sand / topsoil layer within all hand augered boreholes, down to between 0.4m (HA1) and 2m (HA2). This unit consisted of medium dense increasing to very dense, yellowish brown to grey coarse sand. **Hard Pan (Well Compacted Sand)** encountered below the coarse windblown dune sand within HA1, HA3 to HA5 at depths between 0.4m (HA1) and 0.9m (HA3). This unit consisted of very dense dry sand. **No groundwater** was encountered within any of the hand augered boreholes during our investigations.
HA2	1.2	0.2	NE(1)	5 - 20	
HA3	0.9	0.2	NE(1)	4 - 20	
HA4	0.6	-	NE(1)	3 - 20	
HA5	0.7	-	NE(1)	4 - 20	
HA6	1	-	NE(1)	4 - 20	

Table 1 Notes:

(1) Not Encountered (NE)

8. Stormwater

The previous site suitability report on the parent lot, by Richard I.R. Catterall and dated 17 June 2009, states that the stormwater swale drains along the western property boundary can service the adjacent lots, and a detention pond is provided downstream which is designed for the full development of the area. However, we are unable to confirm the presence of a downstream detention pond from the site visit or from the aerial photos, and we have therefore designed a conventional attenuation solution for on-site stormwater management in accordance with the Far North District Plan to address the runoff generated by a 10-year ARI storm event.

In accordance with the Far North District Plan, stormwater attenuation will be required for any impervious coverage proposed for Lots 1 - 10 and 12 - 19. The proposed JOAL (Lot 11) will also require attenuation in addition to any required for impervious areas created on the Lots.

It is considered appropriate that specific design of attenuation and the installation be carried out for the proposed impervious surfaces at the building stage. We have however designed example solutions for a Lot (Lot 1 - 10, Lot 12 - 19) and a specific analysis for the JOAL based on attenuation of the post-development peak flow to the pre-development rates.

The example design for a Lot is based on attenuation storage using the top 350mm of two 25m3 tanks to collect stormwater from the roof area and a soakage trench to collect stormwater from the associated driveway or parking area with the overflows to the proposed swale drains. The proposed design for the JOAL is based on two soakage trenches to be located under the JOAL pavement, integrated with the sub-base. The storage elements have been designed to address the runoff generated by a 10% AEP (10-year ARI), limiting the flows to the pre-development runoff rate.

The site was modelled in HydroCAD adopting modified rational method (1:2 rise:fall) for pre and post development for the 10 year storm event established from HIRDS v4.

8.1. Lot Attenuation

Pre-Development

Currently the site is grassed. The soil has been assessed as hydrologic soil group B and as a result the runoff coefficient of 0.44 has been used. The pre-development form has been defined as 250m² of pasture area for the dwelling. Refer to the attached HydroCAD report summary sheets.

The pre-development runoff rates were defined by applying a 10% AEP storm event established from HIRDS v4 with a 60 min duration. The resulting pre-development peak flow from the dwelling is calculated as 1.2ℓ/sec for the 10% AEP storm event. This is used as the upper limit for controlled runoff post-development peak flow.

Post-Development

The site has been modelled with an impervious area of 250m² for the dwelling and 90m² for the driveway. All roof downpipes are to discharge to the water tanks and runoff from the driveway is to be collected and discharged to the soakage trench.

Using two 25m3 tanks, the peak flow from the dwelling is calculated as 1.1ℓ/sec with a 120min critical duration for a 10% AEP storm event. Refer to the attached figures and HydroCAD report summary sheets for details of the rainwater tank discharge control details and dimensions.

For the critical duration for the tank at 120min for the 10% AEP storm event, the peak stored volume is 7m³.

For the design of the soakage trench for the driveway, an approximate, site specific, infiltration rate of 200mm/hr has been used, and after applying a factor of safety of 2, an infiltration rate of 100mm/hr is adopted for the design.

A soakage bed of 9m² and 0.5m deep will be required to address the runoff volume generated by the critical duration 10-year ARI storm event for the driveway area. Excess flows for events greater than 10-year storm event will runoff as overland flow to the proposed swale drains or existing open drains.

We note that the driveways of some lots (Lots 2 & 3) could be significantly larger than 90m². It is estimated from the HydroCAD model that, for every additional 10m length of the driveway in excess of 90m2, an additional soakage trench of 3m2 in area and 500mm deep is required.

The depth stated is storage depth, with total depth defined by the thickness of cover to the installation. Calculations and a drawing are attached to this report which set out the construction requirements.

Please note that the design includes wrapping the soakage trench in geotextile cloth to minimise the risk of ingress of sand and fines into the soakage granular material. Failure to do this will prevent the soakage systems from working correctly in the long term, ultimately causing the soakage trench to fail and subsequently needing to be rebuilt.

8.2. JOAL Attenuation

JOAL falls both to the north and south and therefore attenuation has been split into two soakage trench areas. The catchment to soakage trench 1 has been defined as 90m2 of impervious area and the catchment to soakage trench 2 has been defined as 300m2 of impervious area.

Two soakage beds of 9m² and 33m² in area respectively, and 0.5m deep, will be required to address the runoff volume generated by the critical duration 10-year ARI storm event, for the JOAL area. Excess flows for events greater than 10-year storm event will runoff as overland flow to the proposed swale drains.

The depth stated is storage depth, with total depth defined by the thickness of cover to the installation. Calculations and a drawing are attached to this report which set out the construction requirements.

Please note that the design includes wrapping the soakage trench in geotextile cloth to minimise the risk of ingress of sand and fines into the soakage granular material. Failure to do this will prevent the soakage systems from working correctly, in the long term, ultimately causing the soakage trench to fail and subsequently needing to be rebuilt.

9. Stability Assessment

A site stability assessment was undertaken during our site investigation. The site is near flat consisting of slight rolling dune topography with no slope greater than 10°.

The property is not mapped for stability by the FNDC or NRC GIS maps, however the site is considered to be of low instability risk based on our assessment of the geomorphology and the subsoil investigation.

No evidence of instability features was observed across the proposed building sites.

10. Acid Sulphate Soil Assessment

Acid Sulphate Soils (ASS) are soils that were historically deposited when the sea level was around 5.0m higher than it presently is, this occurred in the last 5 to 10 thousand years. Soils that were deposited in this time are typically described as Holocene river deposits, comprising unconsolidated to poorly consolidated mud, sand, gravel and peat deposits of alluvial, colluvial and lacustrine origins. ASS normally require the presence of organic material to allow the formation of iron sulphides.

Acid Sulphate Soils can either be an actual acid sulphate soil (AASS), where sulphides have oxidised to form sulphuric acid, or they can be Potential Acid Sulphate Soils (PASS). PASS will become AASS if the groundwater is lowered, or earthworks result in soil aeration, as sulphides react with oxygen producing sulphuric acid which can damage infrastructure.

Acid Sulphate Soils Risk is not mapped in the FNDC however, the findings of our sub-surface investigation show that the property is not an Acid Sulphate Soil Risk. Our findings are outlined below:

- The near surface soils encountered are of Early to Middle Pleistocene age windblown dune despots.
- No groundwater was encountered within the near surface soils to hand augered boreholes and Scala penetrometer refusal during sub-surface investigation.

11. Recommendations and Conclusions

11.1. Stormwater

This design meets the requirements of the operative Far North District Plan in terms of attenuation of post-development peak flow for the proposed development.

11.2. Stability

Although the FNDC GIS has not mapped the site for instability, the geomorphology assessment indicates low instability risk across the near flat dune topography including the gentle (<10°) slopes.

We therefore conclude that the building sites are stable.

11.3. Acid Sulphate Soils

The sub-surface investigation confirmed the site is underlain with Early to Middle Pleistocene age windblown dune deposits. We therefore conclude that the site is not an Acid Sulphate Soil Risk.

11.4. Earthworks

The building sites are proposed on near flat sand and therefore earthworks to form a level building platform within each Lot will be minor.

11.5. Foundations

The site is underlain by medium dense, increasing to very dense, coarse sand. The Scala penetrometer strengths of the soils were typically in the range of 4 - 20 blows/100mm, with an average of 11 blows/100mm to refusal.

We consider the underlying soils to be good ground in accordance with NZS3604:2011 with the near surface soil identified as Class A (sand sites with little to no ground movement from moisture changes) in accordance with AS2870:2011. We therefore consider conventional shallow foundations such as slab on-grade in accordance with NZS3604:20011 and B1/AS1 Amendment 19 to be suitable for the site. Engineered waffle slabs or conventional pile foundations in accordance with NZS3604:2011 are also considered suitable for the site.

11.6. Section 106 of the RMA 1991

Based on our observations, the shear strengths recorded during our investigation, and subject to our recommendations, the property is suitable for the proposed residential development. It is our opinion that the risk of future hazards affecting the property is low and in terms of Section 106 of the RMA 1991:

a) the land in respect of which a consent is sought, or any structure on the land, is not and is not likely to be subject to material damage by erosion, falling debris, subsidence, slippage, or inundation from any source; and

b) any subsequent use that is likely to be made of the land is not likely to accelerate, worsen, or result in material damage to the land, other land, or structure by erosion, falling debris, subsidence, slippage or inundation from any source; and

c) sufficient provision has been made for physical access to each allotment to be created by the subdivision.

12. Limitation

Recommendations and opinions in this report are based on data from the investigation described herein. The nature and continuity of subsoil conditions away from the boreholes is inferred and it is possible that actual conditions could vary from those assumed. Should subsoil conditions vary from those described in this report, it is essential that Hawthorn Geddes engineers and architects ltd be contacted to confirm the applicability of the recommendations.

This report has been prepared solely for the benefit of our client Northstar Ltd and Far North District Council (FNDC) in relation to the purpose for which this report has been prepared.

The comments in it are limited to the purpose stated in this report. No liability is accepted by Hawthorn Geddes engineers & architects ltd in respect of its use by any other person, and any other person who relies upon any matter contained in this report does so entirely at their own risk.

Appendix A – Figures

NOTE:
SITE INFORMATION ADAPTED FROM DRAWING PROVIDED BY VON STURMERS REFERENCE 13278;
AERIAL PHOTO PROVIDED BY LINZ AND MAY SHOW DISTORTION;
ALL INFORMATION MUST BE CONFIRMED ON SITE;
TO BE READ IN CONJUNCTION WITH HAWTHORN GEDDES ENGINEERS & ARCHITECTS LTD REPORT REFERENCE 12372

Key

- HA — Hand augered borehole locations
- Proposed house sites (14m x 14m)
- Swale drain (refer to Figure 2 for details)

Soakage trench 2
33m² x 0.5m depth
overflows to swale drain

Soakage trench 1
9m² x 0.5m depth
overflows to roadside kerb

Rodding eye

Rodding eye

Lot 3 DP 380768

Lot 4 DP 380768

Lot 5 DP 380768

Lot 2 DP 363265

Section 103 Blk IV Ahipara SD

Section 102 Blk IV Ahipara SD

Section 101 Blk IV Ahipara SD

Section 100 Blk IV Ahipara SD

Lot 10 DP 380768

Lot 32 DP 380768

Albatross Alley

Weka Street

Poseidon Way

HA1 HA2 HA3 HA4 HA5 HA6

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

SITE PLAN
SCALE - 1:750

TO BE READ ONLY IN CONJUNCTION WITH ASSOCIATED REPORT

USE WRITTEN DIMENSIONS DO NOT SCALE FROM DRAWING.

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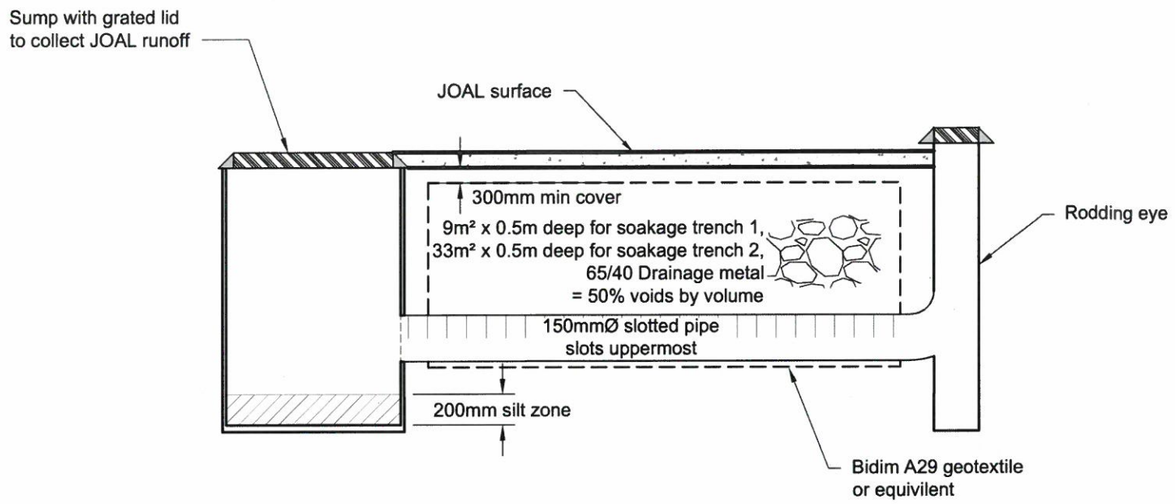
www.hawthorngeddes.co.nz

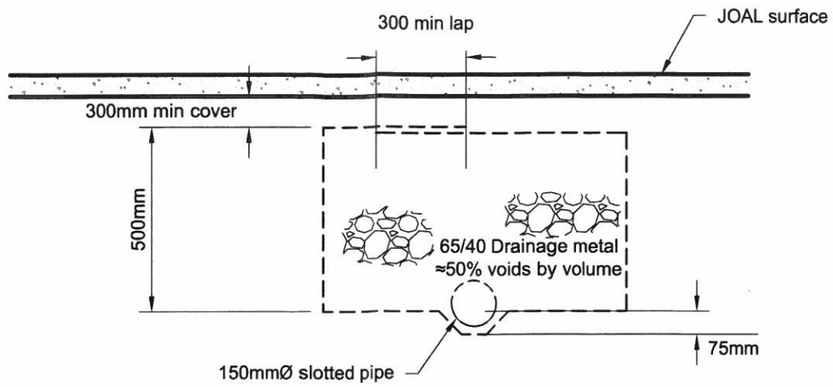
CLIENT NORTHSTAR LTD
PROJECT SUBDIVISION SUITABILITY REPORT
WEKA STREET, AHIPARA
DRAWING SITE PLAN

SCALE @ A3 1:750
PROJECT No. 12372
FIGURE No. 01
REV. R1

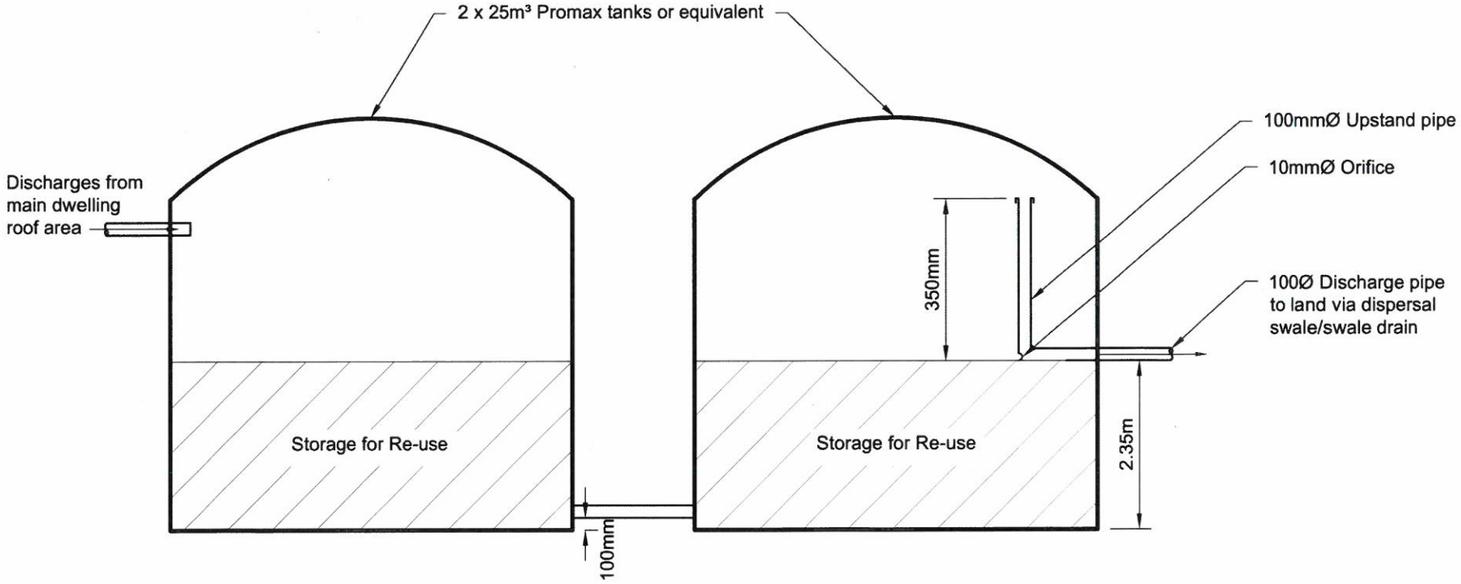
5/03/2021 4:29:15 PM 12372 210202 site plan.dwg



CD01 Fig01 SOAKAGE TRENCH DETAIL
SCALE - NTS

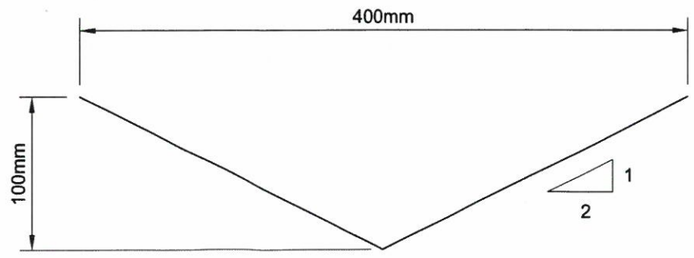


SOAKAGE TRENCH SECTION CD02
SCALE - NTS



Example solution based on 250m² of roof area

CD03 Fig01 ATTENUATION TANK DETAIL
SCALE - NTS



CD04 Fig01 SWALE DRAIN DETAIL
SCALE - NTS

TO BE READ ONLY IN CONJUNCTION WITH ASSOCIATED REPORT

USE WRITTEN DIMENSIONS DO NOT SCALE FROM DRAWING.

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www.hawthorngeddes.co.nz

CLIENT NORTHSTAR LTD
PROJECT SUBDIVISION SUITABILITY REPORT
WEKA STREET, AHIPARA
DRAWING STORMWATER DETAILS

SCALE @ A3 NOT TO SCALE
PROJECT No. 12372
FIGURE No. 02
REV. R1

5/03/2021 4:31:26 PM 12372 210202 site plan.dwg

Appendix B – Borehole Logs

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LOG OF HAND AUGER

HA1

CLIENT Northstar Ltd
PROJECT Northstar Ltd Subdivsion
PROJECT NUMBER 12372
PROJECT LOCATION Weka St, Ahipara
START DATE 28/01/21 **COMPLETED DATE** 28/01/21 **COORDINATES** **LEVEL** 0.00
DRILLING CONTRACTOR
DRILLING METHOD 50mm Hand Auger
LOGGED BY DG
HOLE LOCATION Weka St, Ahipara

DEPTH (m)	SCALA (Blows / 100mm)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER	DEPTH (m)
	3 4 6 20			organic SAND; coarse, some organics, black, dry, non-plastic (TOPSOIL) 0.20 coarse SAND; dark grey, dry, non-plastic (WINDBLOWN DUNE DEPOSIT) 0.3m: dark brown 0.40 EOH: 0.40m 0.4m: Refusal due to auger spin - Hard Pan	Groundwater Not Encountered	
1						
2						

PHOTO / SKETCH

WATER OBSERVATIONS

Date / Time	Water Level (m)	Type	Remarks

REMARKS

SYMBOLS

- ▼ Standing Water Level
- ◁ Water Out flow
- ▷ Water In flow

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LOG OF HAND AUGER

HA2

CLIENT Northstar Ltd
PROJECT Northstar Ltd Subdivsion
PROJECT NUMBER 12372
PROJECT LOCATION Weka St, Ahipara
START DATE 28/01/21 **COMPLETED DATE** 28/01/21 **COORDINATES** **LEVEL** 0.00
DRILLING CONTRACTOR
DRILLING METHOD 50mm Hand Auger
LOGGED BY DG
HOLE LOCATION Weka St, Ahipara

DEPTH (m)	SCALA (Blows / 100mm)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER	DEPTH (m)
	3			organic SAND; coarse, some organics, black, dry, non-plastic (TOPSOIL)	Groundwater Not Encountered	
	4			0.20		
	5			coarse SAND; yellowish brown, dry, non-plastic (WINDBLOWN DUNE DEPOSIT)		
	6					
	9					
	8					
	9					
	11					
	11					
	11			0.9m: moist		
1	11					
	11			1.20 EOH: 2.00m		
	11			1.2m: Refusal due to auger spin		
	11					
	11					
	12					
	14					
	11					
	14					
	20					
2						

PHOTO / SKETCH

WATER OBSERVATIONS

Date / Time	Water Level (m)	Type	Remarks

REMARKS

SYMBOLS

- ▼ Standing Water Level
- ◁ Water Out flow
- ▷ Water In flow

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LOG OF HAND AUGER

HA3

CLIENT Northstar Ltd
PROJECT Northstar Ltd Subdivsion
PROJECT NUMBER 12372
PROJECT LOCATION Weka St, Ahipara
START DATE 28/01/21 **COMPLETED DATE** 28/01/21
COORDINATES **LEVEL** 0.00
DRILLING CONTRACTOR
DRILLING METHOD 50mm Hand Auger
LOGGED BY DG
HOLE LOCATION Weka St, Ahipara

DEPTH (m)	SCALA (Blows / 100mm)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER	DEPTH (m)
	3			organics SAND; coarse, some organics, black, dry, non-plastic (TOPSOIL)	Groundwater Not Encountered	
	4			0.20		
	4			coarse SAND; grey, dry, non-plastic (WINDBLOWN DUNE DEPOSIT)		
	6			0.3m: brown		
	8					
	11					
	11			0.7m: yellowish brown		
	17					
	20			0.90 EOH: 0.90m		
1				0.9m: Refusal due to unable to penetrate Hard Pan		
2						

PHOTO / SKETCH

WATER OBSERVATIONS

Date / Time	Water Level (m)	Type	Remarks

REMARKS

SYMBOLS

- ▼ Standing Water Level
- ◁ Water Out flow
- ▷ Water In flow

Hawthorn Geddes engineers & architects ltd

LOG OF HAND AUGER

HA4

CLIENT Northstar Ltd
PROJECT Northstar Ltd Subdivsion
PROJECT NUMBER 12372
PROJECT LOCATION Weka St, Ahipara
START DATE 28/01/21 **COMPLETED DATE** 28/01/21 **COORDINATES** **LEVEL** 0.00
DRILLING CONTRACTOR
DRILLING METHOD 50mm Hand Auger
LOGGED BY DG
HOLE LOCATION Weka St, Ahipara

DEPTH (m)	SCALA (Blows / 100mm)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER	DEPTH (m)
	3			coarse SAND; yellowish brown, dry, non-plastic (WINDBLOWN DUNE DEPOSIT)	Groundwater Not Encountered	
	4					
	5					
	6					
	8					
	11			0.5m: light yellow brown		
	20			0.60 EOH: 0.70m		
				0.6m: Refusal due to unable to penetrate Hard Pan		
1						
2						

PHOTO / SKETCH

WATER OBSERVATIONS

Date / Time	Water Level (m)	Type	Remarks

REMARKS

SYMBOLS

- Standing Water Level
- Water Out flow
- Water In flow

Hawthorn Geddes
engineers & architects ltd

LOG OF HAND AUGER

HA5

CLIENT	Northstar Ltd	**PROJECT**	Northstar Ltd Subdivsion
PROJECT NUMBER	12372	**PROJECT LOCATION**	Weka St, Ahipara
START DATE	28/01/21	**COMPLETED DATE**	28/01/21
COORDINATES		**LEVEL**	0.00
DRILLING CONTRACTOR			
DRILLING METHOD	50mm Hand Auger		
LOGGED BY	DG		
HOLE LOCATION	Weka St, Ahipara		

DEPTH (m)	SCALA (Blows / 100mm)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER	DEPTH (m)
	4			coarse SAND; yellow brown, dry, non-plastic (WINDBLOWN DUNE DEPOSIT)	Groundwater Not Encountered	
	4					
	4			0.2m: dark grey		
	4					
	6					
	6					
	8			0.6m: dark brown		
	20			0.70 EOH: 0.80m		
				0.7m: Refusal due to unable to penetrate Hard Pan		
1						
2						

PHOTO / SKETCH

WATER OBSERVATIONS

Date / Time	Water Level (m)	Type	Remarks

REMARKS

SYMBOLS

- ▼ Standing Water Level
- ◁ Water Out flow
- ▷ Water In flow

Hawthorn Geddes engineers & architects ltd

LOG OF HAND AUGER

HA6

CLIENT Northstar Ltd
PROJECT Northstar Ltd Subdivsion
PROJECT NUMBER 12372
PROJECT LOCATION Weka St, Ahipara
START DATE 28/01/21 **COMPLETED DATE** 28/01/21 **COORDINATES** **LEVEL** 0.00
DRILLING CONTRACTOR
DRILLING METHOD 50mm Hand Auger
LOGGED BY DG
HOLE LOCATION Weka St, Ahipara

DEPTH (m)	SCALA (Blows / 100mm)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER	DEPTH (m)
	4			coarse SAND; yellowish brown, dry, non-plastic (WINDBLOWN DUNE DEPOSIT)	Groundwater Not Encountered	
	4					
	6					
	8					
	8					
	8					
	6					
	6					
	10			1.00 EOH: 2.90m		
1	10			1.0m: Refusal due to auger unable to penetrate		
	7					
	8					
	7					
	6					
	6					
	6					
	6					
	6					
	6					
2	6					
	6					
	6					
	6					
	6					
	10					
	10					
	10					
	10					

PHOTO / SKETCH

WATER OBSERVATIONS

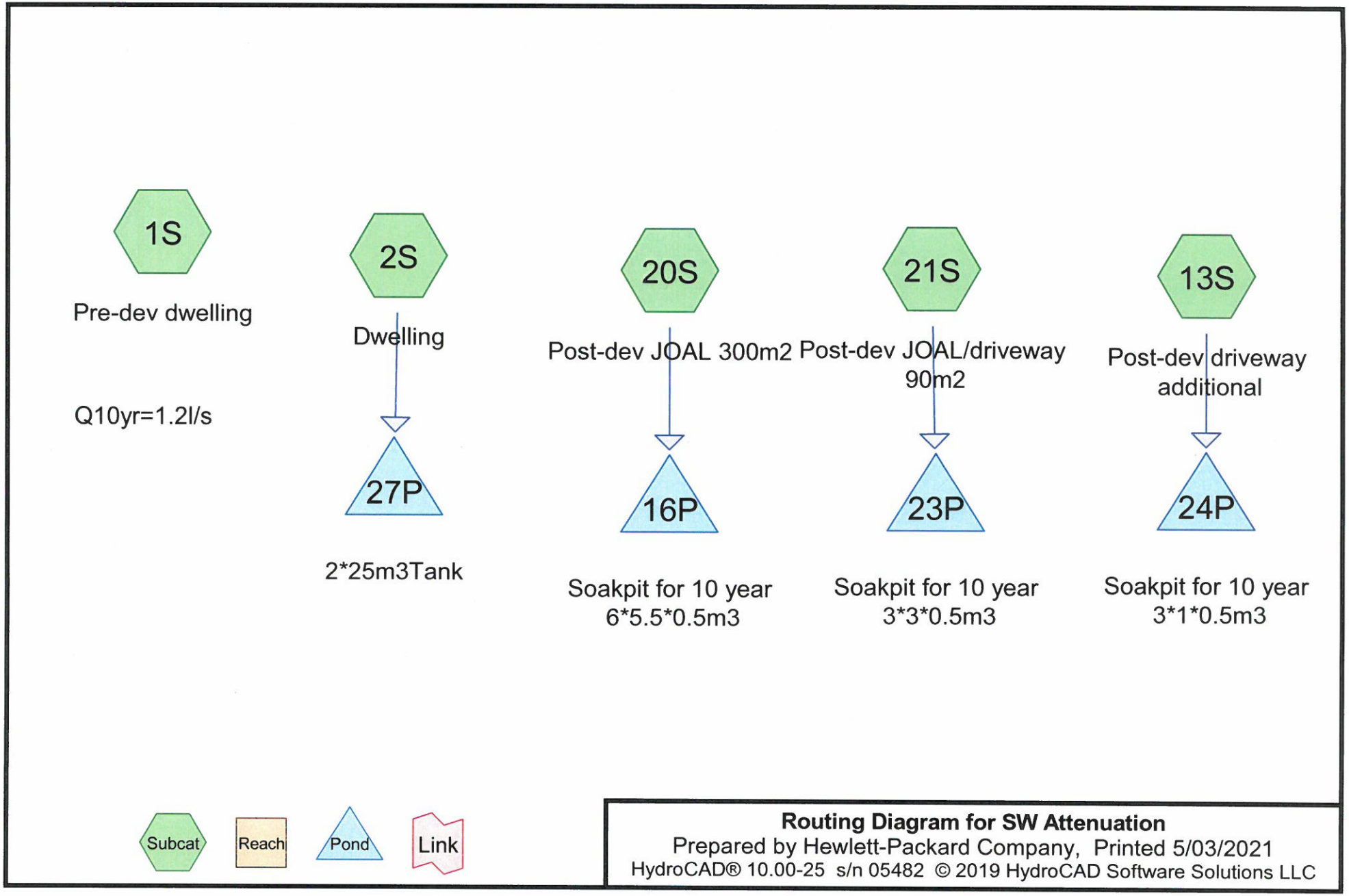
Date / Time	Water Level (m)	Type	Remarks

REMARKS

SYMBOLS

- ▼ Standing Water Level
- ◁ Water Out flow
- ▷ Water In flow

Appendix C – Stormwater Calculations



Routing Diagram for SW Attenuation

Prepared by Hewlett-Packard Company, Printed 5/03/2021

Summary for Subcatchment 1S: Pre-dev dwelling

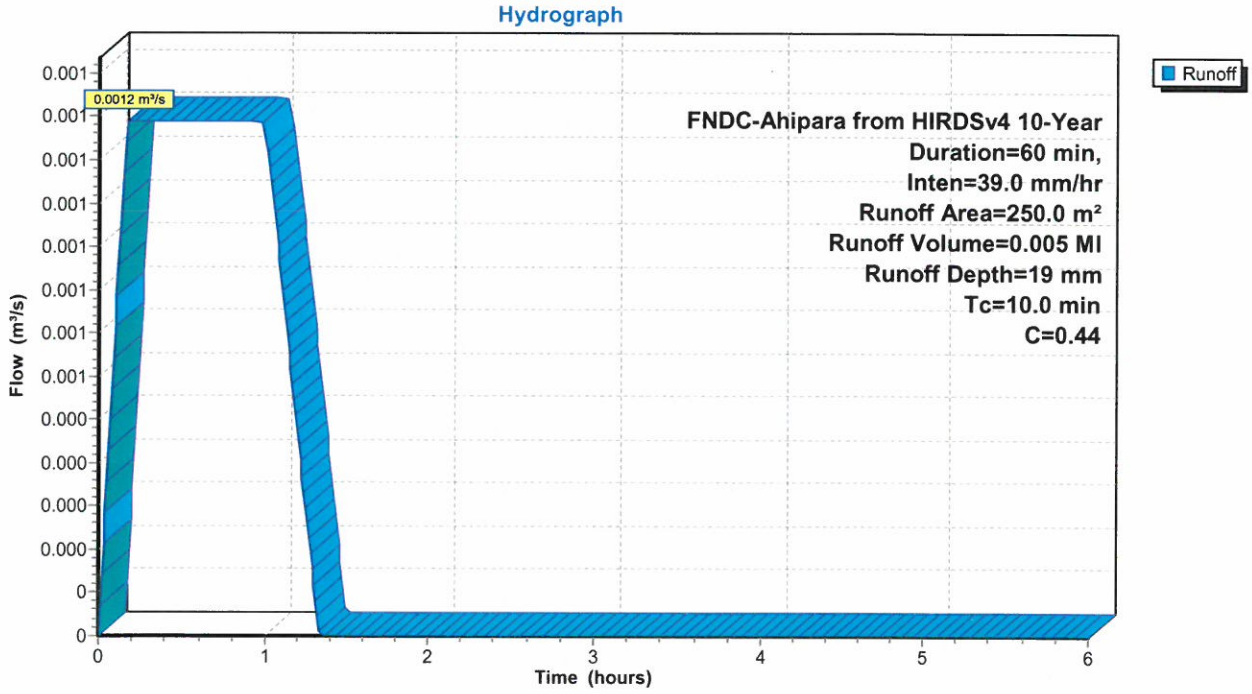
Runoff = 0.0012 m³/s @ 0.17 hrs, Volume= 0.005 Ml, Depth= 19 mm

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
FNDC-Ahipara from HIRDSv4 10-Year Duration=60 min, Inten=39.0 mm/hr

Area (m²)	C	Description
250.0	0.44	Pasture, HSG B
250.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1S: Pre-dev dwelling



Summary for Pond 27P: 2*25m3Tank

Inflow Area = 0.0250 ha,100.00% Impervious, Inflow Depth = 52 mm for 10-Year event
Inflow = 0.0018 m³/s @ 0.05 hrs, Volume= 0.013 Ml
Outflow = 0.0011 m³/s @ 2.04 hrs, Volume= 0.013 Ml, Atten= 39%, Lag= 119.4 min
Primary = 0.0011 m³/s @ 2.04 hrs, Volume= 0.013 Ml

Routing by Dyn-Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.349 m @ 2.04 hrs Surf.Area= 0.0021 ha Storage= 0.007 Ml

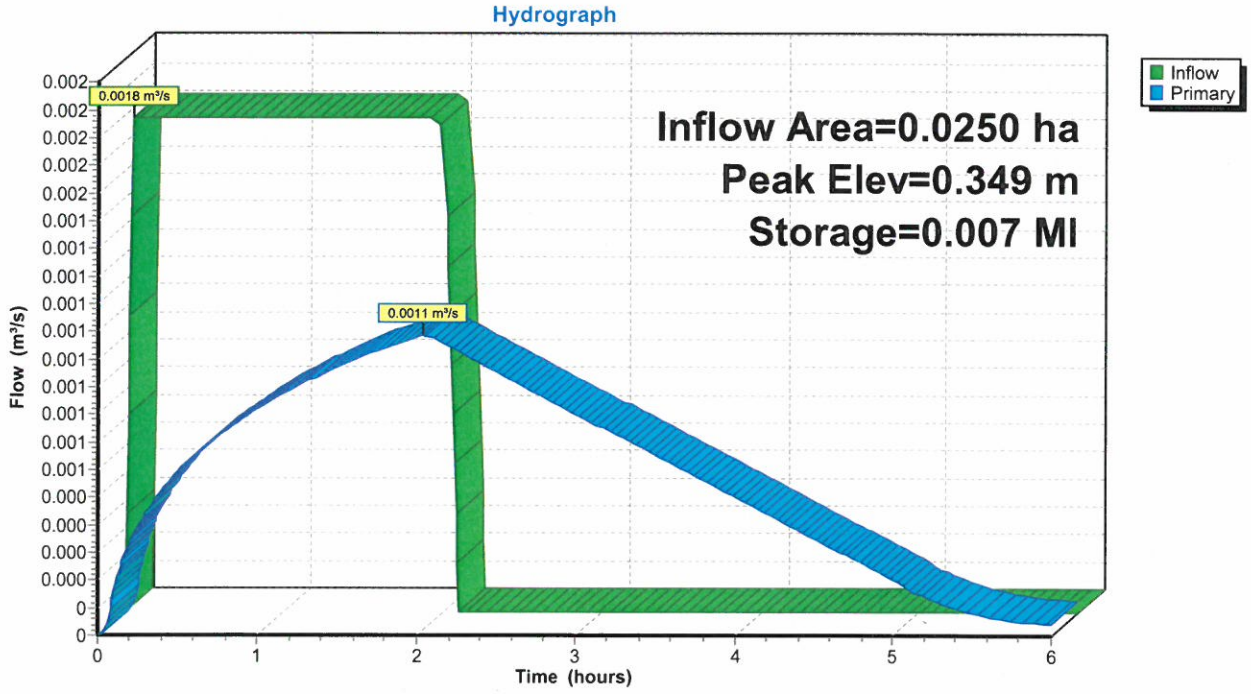
Plug-Flow detention time= 81.9 min calculated for 0.013 Ml (98% of inflow)
Center-of-Mass det. time= 81.2 min (143.4 - 62.3)

Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.057 Ml	**3.66 mD x 2.70 mH Vertical Cone/Cylinder** x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**100 mm Round Culvert** L= 10.00 m Ke= 0.500 Inlet / Outlet Invert= 0.000 m / -0.100 m S= 0.0100 m/m Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.008 m²
#2	Device 1	0.000 m	**30 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0011 m³/s @ 2.04 hrs HW=0.349 m (Free Discharge)
↑—**1=Culvert** (Passes 0.0011 m³/s of 0.0101 m³/s potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.0011 m³/s @ 1.54 m/s)

Pond 27P: 2*25m3Tank



Summary for Pond 16P: Soakpit for 10 year 6*5.5*0.5m3

Inflow Area = 0.0300 ha,100.00% Impervious, Inflow Depth = 48 mm for 10-Year event
Inflow = 0.0024 m³/s @ 0.09 hrs, Volume= 0.014 Ml
Outflow = 0.0012 m³/s @ 1.73 hrs, Volume= 0.014 Ml, Atten= 49%, Lag= 98.5 min
Discarded = 0.0012 m³/s @ 1.73 hrs, Volume= 0.014 Ml

Routing by Dyn-Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.466 m @ 1.73 hrs Surf.Area= 33.0 m² Storage= 7.7 m³

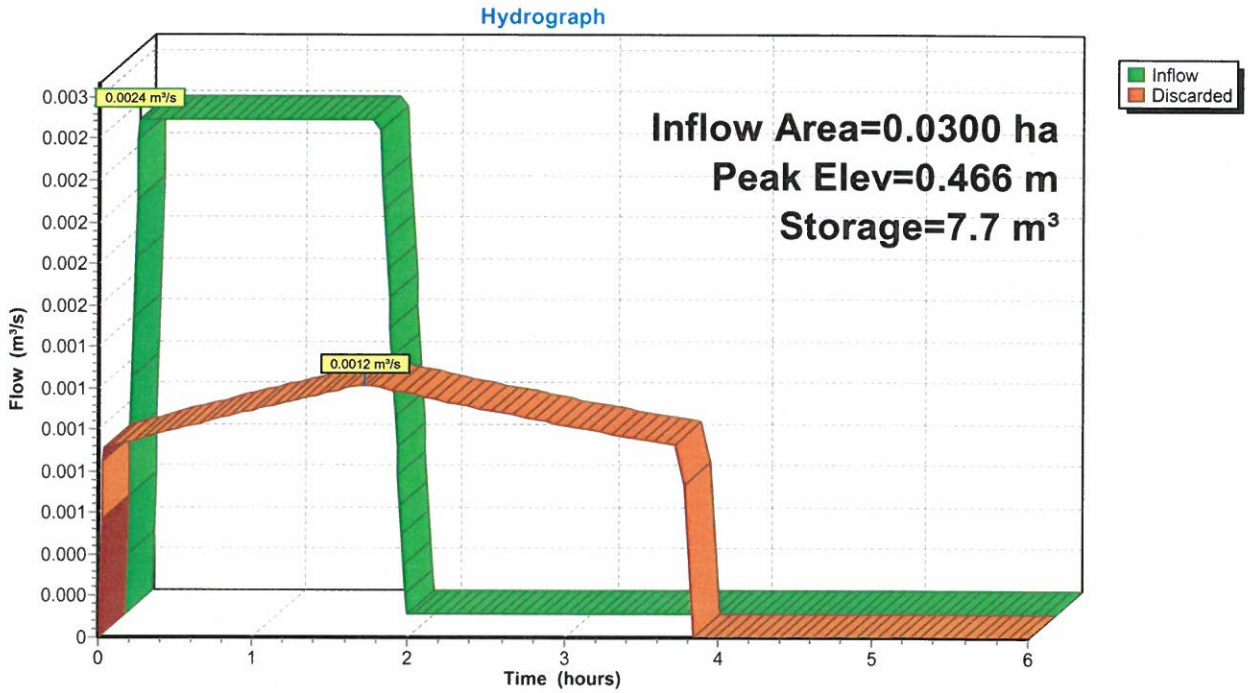
Plug-Flow detention time= 60.2 min calculated for 0.014 Ml (100% of inflow)
Center-of-Mass det. time= 60.3 min (113.6 - 53.3)

Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	8.3 m³	**5.50 mW x 6.00 mL x 0.50 mH Prismatoid** 16.5 m³ Overall x 50.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.000 m	**100.00 mm/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.0012 m³/s @ 1.73 hrs HW=0.466 m (Free Discharge)
↑—1=Exfiltration (Exfiltration Controls 0.0012 m³/s)

Pond 16P: Soakpit for 10 year 6*5.5*0.5m3



Summary for Pond 23P: Soakpit for 10 year 3*3*0.5m3

Inflow Area = 0.0090 ha,100.00% Impervious, Inflow Depth = 46 mm for 10-Year event
Inflow = 0.0008 m³/s @ 0.05 hrs, Volume= 0.004 Ml
Outflow = 0.0004 m³/s @ 1.54 hrs, Volume= 0.004 Ml, Atten= 45%, Lag= 89.7 min
Discarded = 0.0004 m³/s @ 1.54 hrs, Volume= 0.004 Ml

Routing by Dyn-Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.493 m @ 1.54 hrs Surf.Area= 9.0 m² Storage= 2.2 m³

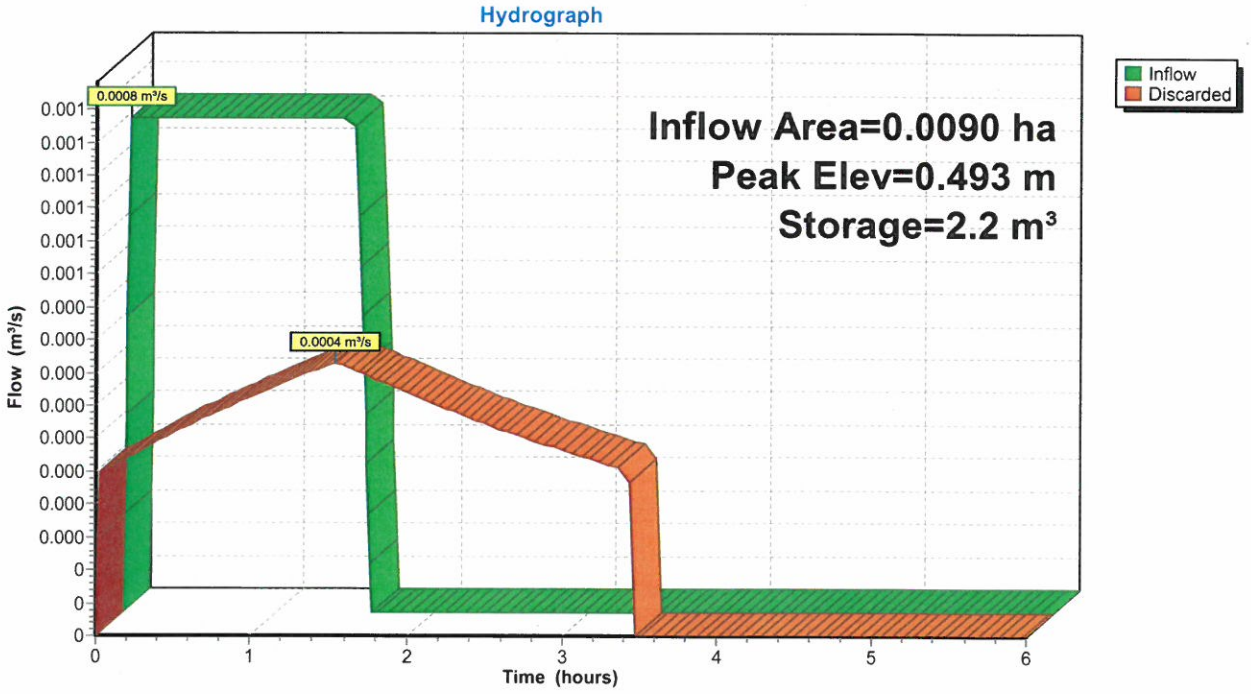
Plug-Flow detention time= 55.2 min calculated for 0.004 Ml (100% of inflow)
Center-of-Mass det. time= 55.3 min (102.6 - 47.3)

Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	2.3 m³	**3.00 mW x 3.00 mL x 0.50 mH Prismatoid** 4.5 m³ Overall x 50.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.000 m	**100.00 mm/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.0004 m³/s @ 1.54 hrs HW=0.493 m (Free Discharge)
↑—1=Exfiltration (Exfiltration Controls 0.0004 m³/s)

Pond 23P: Soakpit for 10 year 3*3*0.5m3



Summary for Pond 24P: Soakpit for 10 year 3*1*0.5m3

Inflow Area = 0.0030 ha,100.00% Impervious, Inflow Depth = 39 mm for 10-Year event
Inflow = 0.0003 m³/s @ 0.05 hrs, Volume= 0.001 Ml
Outflow = 0.0002 m³/s @ 1.09 hrs, Volume= 0.001 Ml, Atten= 42%, Lag= 62.5 min
Discarded = 0.0002 m³/s @ 1.09 hrs, Volume= 0.001 Ml

Routing by Dyn-Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.422 m @ 1.09 hrs Surf.Area= 3.0 m² Storage= 0.6 m³

Plug-Flow detention time= 39.9 min calculated for 0.001 Ml (100% of inflow)
Center-of-Mass det. time= 40.0 min (73.7 - 33.8)

Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.8 m³	**1.00 mW x 3.00 mL x 0.50 mH Prismatoid** 1.5 m³ Overall x 50.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.000 m	**100.00 mm/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.0002 m³/s @ 1.09 hrs HW=0.422 m (Free Discharge)
↑—1=Exfiltration (Exfiltration Controls 0.0002 m³/s)

Pond 24P: Soakpit for 10 year 3*1*0.5m3