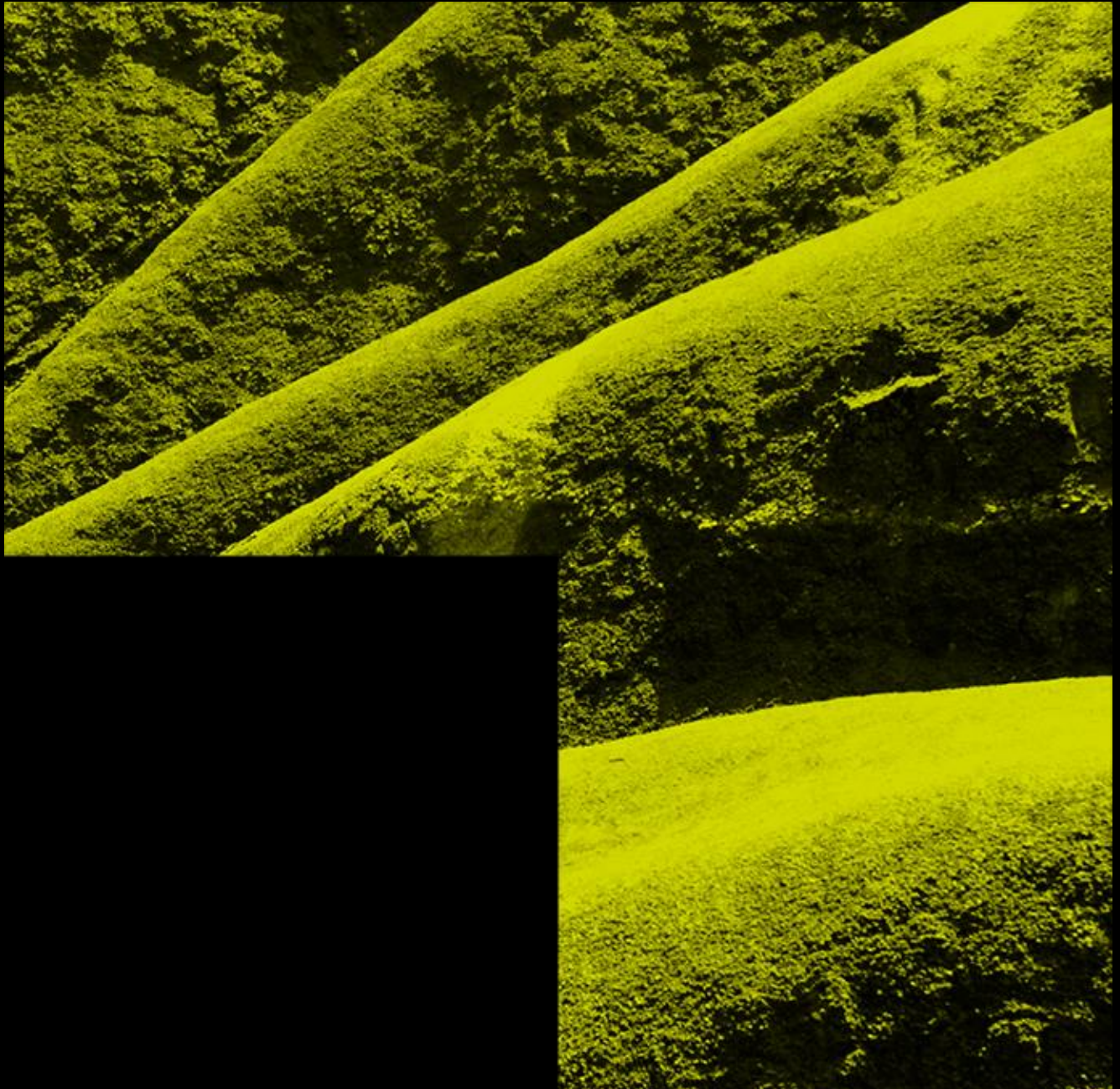


TAUWHARE SUBDIVISION

3-Waters Assessment

Bowrock Properties Limited



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BOWROCK PROPERTIES

3-Waters Assessment – Tauwhare

HG PROJECT NO: 1610-147689-01

DATE: 26 August 2020

1.0 INTRODUCTION

Harrison Grierson has been commissioned by Bowrock Properties Limited (BPL) to prepare a 3-waters assessment to support a rezoning application for 1110 Tauwhare Road, Tauwhare.

BPL have made a submission on the Proposed Waikato District Plan (PWDP) seeking rezoning from Rural to Country Living. Our assessment addresses the 3-waters requirements based on the preliminary lot layouts provided by the client.

2.0 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

Site Address

1110 Tauwhare Road, Tauwhare, Waikato

Site Location

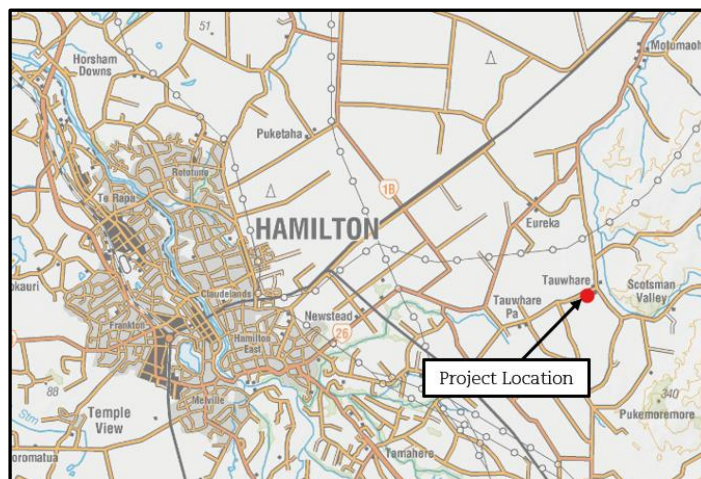


Figure 1: Project Location (NZ-LINZ Topographic Maps)

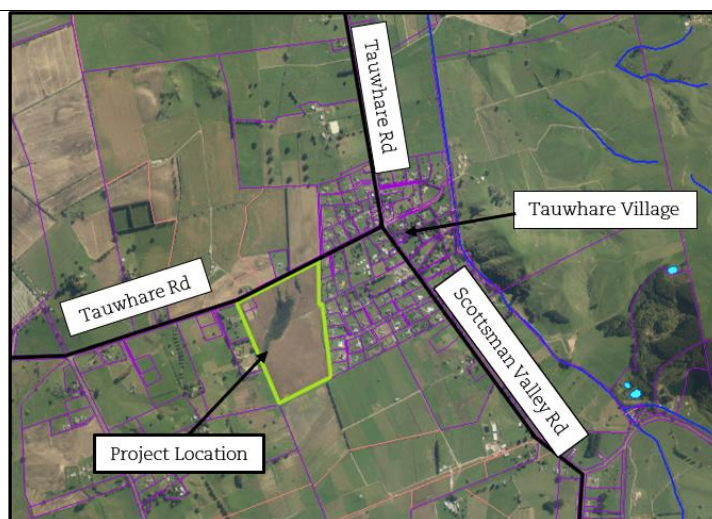


Figure 2: Site Location (Waikato Regional Council Maps)

Legal Description	Lot 3 DP 325499 and Lot 32 DPS 81580
Site Area	20.155 Ha
Local Authority	Waikato District Council (WDC)
Zone	Rural (Current) Country Living (Intended)
Overlay	Hauraki Gulf Catchment
Drainage District	Waitakaruru
Existing Topography	<p>The site is gently rolling with a small lake situated within the property. The lake sits in a depression between two low ridges.</p> <p>The ground rises gently from the lake to the north-eastern corner where it borders Tauwhare Road. The south-eastern side rises gently (less than 10% grade) from the lake to form a low ridge running roughly south to north through the property. This ridge falls steeply (up to 17% grade) to the south and east before flattening out towards the eastern boundary.</p> <p>There is a farm drain that flows north through the property along the eastern boundary.</p>
Existing Structures and Land Use	The site has no buildings and is currently used for farming
Existing Services	<p>Water Supply</p> <p>The site is within the Southern Districts Rural Supply zone. This is a restricted (low pressure) rural potable water supply network.</p> <p>There is a public 100mm diameter PVC main located on the southern side of the Tauwhare Road reserve.</p> <p>There are currently no connections to the site.</p> <p>Wastewater</p> <p>There are no public sewer networks servicing the site or nearby.</p>

Stormwater

The lake drains intermittently into the Tauwhare Road drains. The road drain connects to the farm drain that runs through the property from the south-eastern corner flowing north into the Waihou River.

Groundwater Bore

The closest registered groundwater bore is situated about 250m northeast of the property boundary.

Proposed Development

The intended subdivision is expected to have 22 residential lots.

Two proposals are currently considered for the subject site. One proposal is a typical rural-residential subdivision with minimum lot sizes of 5,000m². The second proposal has reduced lot sizes with the balance of the land being retained for farming activities.

The proposed preliminary layouts are included in the Attachments.

3.0 WATER SUPPLY

3.1 DOMESTIC SUPPLY

This subdivision falls within the Southern Districts rural supply zone – this is a Restricted Water Supply Area. The water supply and storage requirements need to comply with the Waikato District Council Bylaw 2014.

As a rural subdivision each lot is required to have a rainwater tank with a minimum size of 22,000L or the equivalent of at least 48 hours storage, whichever is greater. A 22,000L tank is expected to provide 22 days storage for a five person household.

A backup supply may be provided with a restricted flow connection to the 100mm diameter water main within the Tauwhare Road reserve.

3.2 SUMMARY

Based upon the use of roof water supply with the backup of restricted flow reticulated water supply; water supply is not considered a constraint for the proposed development plan options.

4.0 STORMWATER MANAGEMENT

4.1 DESIGN REQUIREMENTS

The stormwater management will be designed in accordance with the following policy and guidance documents

- Waikato District Council's Operative District Plan
- Waikato Local Authority Shared Services Regional Infrastructure Technical Specifications (RITS)

- Waikato Stormwater Management Guideline (TR2020/07)

Stormwater runoff from any new impervious areas within the development will require stormwater management for the 10-year ARI storm.

4.2 SOIL CONDITIONS AND SOAKAGE REQUIREMENTS

Soakage tests were carried out at various location within the property to determine the in-situ soil's capacity to receive concentrated stormwater flows. The tests were carried out by HDGeo as part of the wider geotechnical investigation for the site.

The results of the tests indicate that the soil is not suitable for soakage systems. The hills within the site generally consist of Walton Subgroup (Hamilton Ash Formations) and Hinuera Formations were encountered in the lower areas.

The Hamilton Ash Formations are a stiff low permeability clay, unsuitable for soakage systems. The Hinuera Formations are silts however as they are located in the lower portions of the property, the test augers encountered high water table in these areas.

Two soakage tests were carried out on site, within the Hinuera Formations, and both had very low soakage rates. ST01 had a soakage rate of 0 mm/hour and ST02 had a soakage rate of 71 mm/hour. The RITS recommends a minimum threshold rate of 150mm/hour for soakage devices

4.3 STORMWATER MANAGEMENT DESIGN

As Soakage is not considered a suitable option for stormwater management, we propose a combination of retention (for reuse) and detention with gradual release to dispersal trenches for the roof water and treatment and detention for the paved impermeable areas like accesses and roads

4.3.1 RESIDENTIAL LOTS

We propose that the rainwater storage tanks are designed with additional capacity to cater for stormwater attenuation for excess roof runoff. The excess rainfall will be detained in these tanks and released gradually overland through dispersal trenches.

The dispersal trenches will be positioned within the property below any wastewater effluent disposal devices in such a way that they mimic natural overland flow.

For planning purposes, a provisional area of 25m long and 1m wide should be provided on each lot for the dispersal trenches.

4.3.2 ROADS AND ACCESSES

The stormwater runoff from paved surfaces within the development will be treated with grass swales and/or raingardens. It is anticipated that the stormwater from the road network will be attenuated within the existing lake. The outlet from the lake will need to control the release of the peak flows into the stormwater drains along the northern boundary of the property.

4.4 FLOOD RISK

This property does not fall within a regional flood hazard area.

Within the property the possible areas affected by local flooding would be the lowland areas around the lake and farm drain. The restriction to both areas is the culvert under Tauwhare Road at the northeast corner of the property. Should this become inundated or blocked, then the low point of the adjacent length of Tauwhare Road will determine the level of the overland flow and maximum flood Level. This level is approximately

RL 84.4m, based on the local datum of the Topographic Survey Plan prepared by Cogswell Surveys (included in the attachments), or approximately RL 53.0m based on the WRC Lidar Maps. The zone that would fall under this level is shown in Figure 3, below.

Figure 3 shows that this maximum level would result in a large portion of Tauwhare being flooded and is assumed to be a conservative evaluation. Even given this conservative constraint, minor earthworks on the subject site would allow building platforms to be provided above the “flood level” for both proposed options.

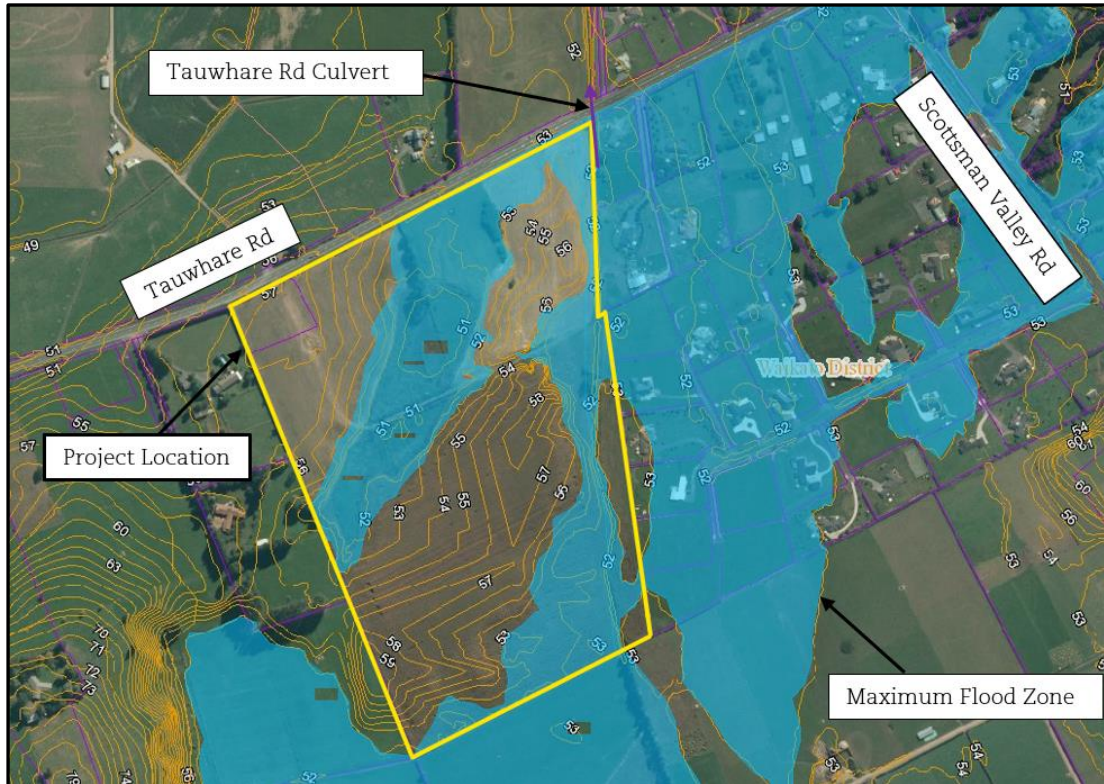


Figure 3 Maximum flood level (WRC Lidar Maps)

4.5 SUMMARY

With on-lot stormwater management using roof-tanks and dispersal trenches, and hardstand stormwater management provided by treatment swales, rain gardens and the additional option of utilising the existing lake, stormwater management is not considered a constraint for the proposed development options.

Minor earth working of the site may be required to provide building platforms above a minimum flood level on the site.

5.0 WASTEWATER

5.1 WASTEWATER PROPOSAL

As the existing site is not serviced by a public reticulated wastewater system, each lot will be required to have an onsite wastewater treatment and disposal system.

This will require each property developer to construct their own septic tank and effluent disposal fields within their lot.

To provide an indicative size for the system we have carried out a design in accordance with ASNZS 1547:2012 On Site Wastewater Management and WRC 3.5.7 Implementation Methods - On-Site Sewage Discharges.

5.2 WASTEWATER FLOW

For the purposes of this assessment we have based the design of the wastewater system on the following parameters:

- a typical three-bedroom house with five person occupancy,
- Wastewater flow rates of 180 l/person/day (Table H3 ASNZS 1547:2012) for houses with on-site roof water supply,

Therefore, the assumed daily wastewater flow for sizing the treatment device and irrigation field is 900 l/day. This is within the permitted activity requirements of WRC's Regional Plan Rule 3.5.7.5, as the volume of effluent does not exceed 1.3 m³ per day averaged over any one-month period.

5.3 SOIL CONDITIONS

Based on the proposed lot layouts it is expected that the wastewater irrigation fields will be placed on the higher hills. These areas are generally underlain with Hamilton Ash Formations. These are generally stiff to hard silty clays with poor permeability.

In accordance with ASNZS 1547:2012 (Table 5.1) these soils are classed as Category 6, medium to heavy clays. No groundwater was encountered in these areas.

5.4 SECONDARY TREATMENT

A conventional septic tank would need to comply with WRC 3.5.7.5 Permitted Activity Rule – Discharge of Domestic Sewage from New On-Site Systems. This rule requires that an effective disposal area for any one treatment and disposal system discharge shall not be less than 2,500m².

Based on the soil type, and to provide the option of reduced lot sizes, a higher level of effluent treatment is recommended. This is permitted under WRC 3.5.7.6 Permitted Activity Rule – Discharge of Sewage from Improved On-Site Domestic Sewage Treatment and Disposal Systems and requires secondary treatment of effluent prior to disposal. This can be achieved using a Secondary Aerated Wastewater Treatment System (AWTS) coupled with a suitable disposal system.

AWTS systems are commercially available multi-chamber tanks that involve both anaerobic and aerobic (with oxygen) treatment of wastewater to a higher level than a primary treatment system (conventional septic tank). The advantage of using AWTS is that the effluent disposal area is reduced.

It is recommended that an all-waste AWTS tank system be provided to cater for both grey and black water waste. Table J1, ASNZS 1547:2012, provides options for the minimum tank capacity for all-waste tanks based on the number of bedrooms being serviced in a standard house.

Using an all waste AWTS the minimum primary treatment tank capacity required for a three-bedroom, five-person house is 3000 L.

This type of AWTS package treatment plant would normally be contained within a buried plastic, fibreglass or concrete unit and would require an area of about 10m²

5.5 TREATED EFFLUENT DISPOSAL (LAND APPLICATION METHOD)

As it is likely that the systems may be placed on slopes steeper than 10% we have selected shallow subsurface irrigation beds as the effluent disposal method for this assessment. This will also provide a larger, more conservative, area requirement for the planning stage of the development.

Irrigation systems distribute the treated effluent into the topsoil layers to provide in-soil treatment of the remaining effluent residuals as well as provide nutrient uptake and evapotranspiration by grass, shrubs, or other plantings.

Shallow subsurface drip systems shall be installed at 100-150mm depth into 150 to 250mm of topsoil in grassed or other suitably vegetated areas. The base of the system should be a minimum of 600mm above the watertable.

The design irrigation rate (DIR) for secondary treated effluent in Category 6 soils is 2 mm/day (ASNZS 1547:2012 - Table M1).

Based on the daily flow of 900 l/day and drip irrigation lines spaced 1m apart, an area of approximately 450m² would be required for disposal.

A Schematic layout of the drip irrigation system is shown in Figure 4, below:

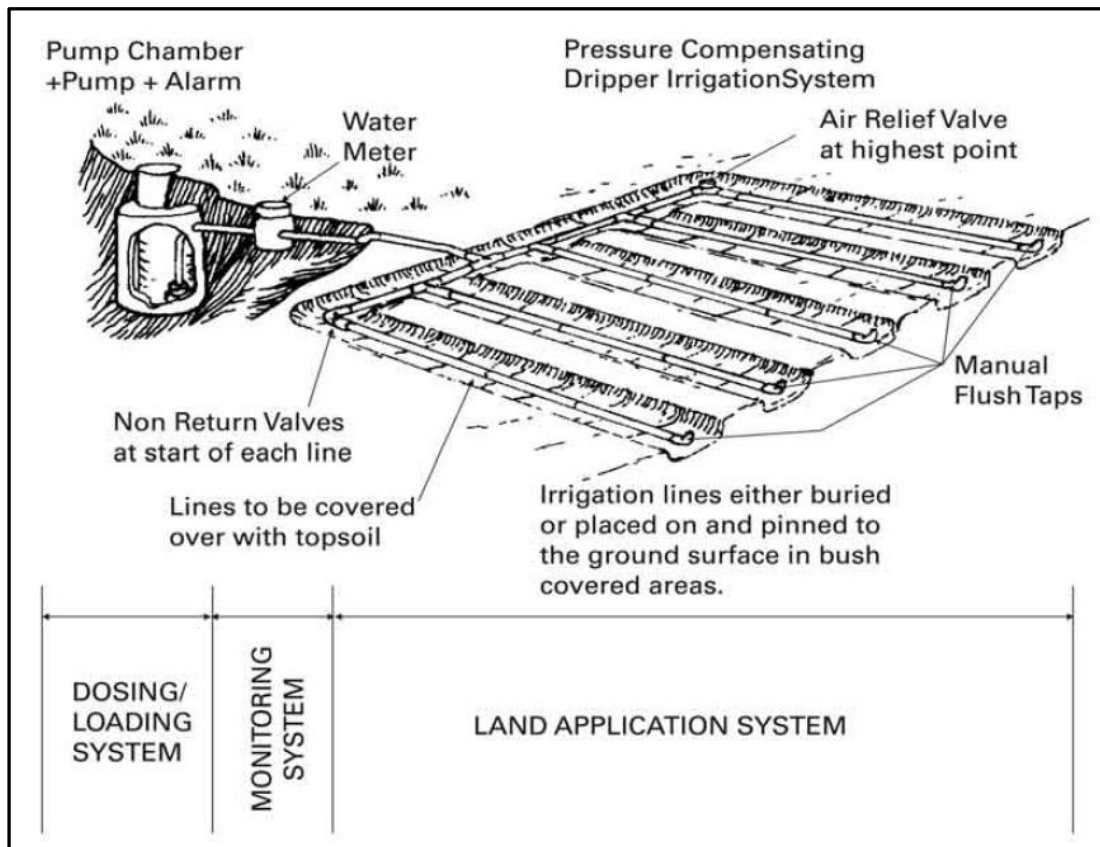


Figure 4 Shallow Drip Irrigation System (TP58 On-site Wastewater Systems 2004)

5.6 SYSTEM LAYOUT & LAND REQUIREMENTS

When finalizing the lot sizes and layouts allowances need to be made to cater for the treatment devices, setbacks and buffers to ensure the system can be accommodated within the lots. Access for maintenance purposes will also need to be taken into consideration during the detailed design stages.

The setbacks specified in 3.5.7.6 Permitted Activity Rule – Discharge of Sewage from Improved On-Site Domestic Sewage Treatment and Disposal Systems require that the sewage disposal system shall not be sited within 30 metres of a Natural State Water Body, and 10 metres from any other surface water body. ASNZS 1547:2012 recommends an offset of 50m from groundwater bores.

Treatment and disposal systems are also required to have minimum offsets of 3m from buildings and 1.5m from the property boundary.

Based on ASNZS 1547:2012 5.5.3.4 an area equal to the disposal area needs to be reserved within the lot as backup for failure of the initial disposal area. Figure 5 provides an indication of a site layout with disposal (land application) locations.

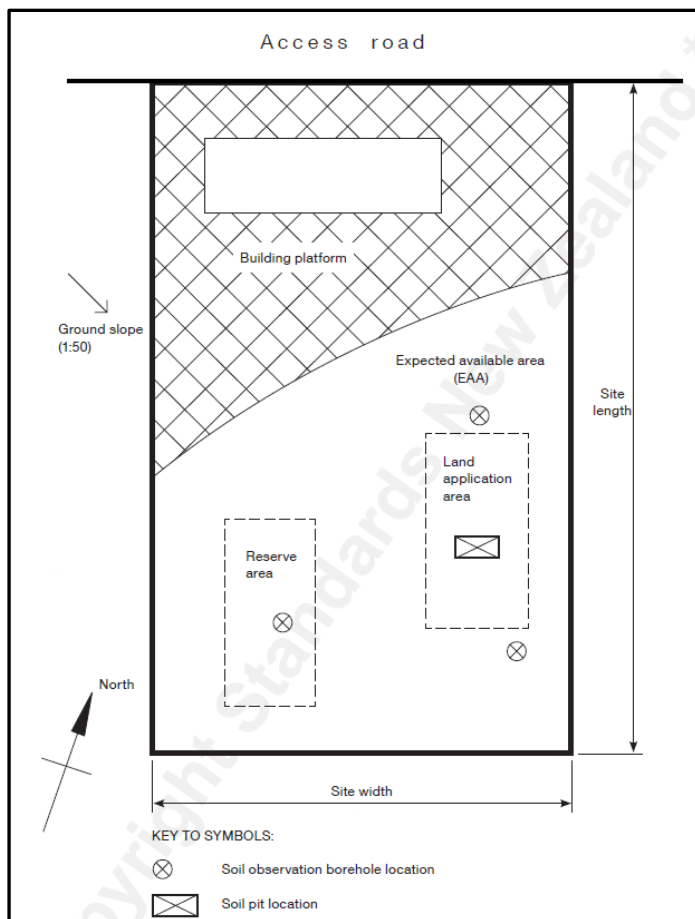


Figure 5 Site Layout example (ASNZS 1547:2012)

5.7 SUMMARY

On-lot wastewater treatment and disposal is a viable option for addressing the wastewater management needs of the development, however, the area requirements for the disposal systems (allowing for reserve areas and setbacks) mean that careful consideration of building size and placement will be required for lots smaller than 5,000m².

6.0 CONCLUSION

This report has identified suitable 3-waters infrastructure solutions for the proposed development that are technically feasible and comply with the District and Regional Council

requirements. This report also demonstrates that these options are also feasible for reduced lot size options.

From a technical, 3-waters infrastructure, perspective there is no reason why the proposed development could not proceed.

Prepared By: Matthew Farrell
Senior Civil Engineer

Date: 26 August 2020

Signed:



Reviewed By: Scott King
Engineering Manager

Date: 26 August 2020

Signed:



7.0 LIMITATIONS

7.1 GENERAL

This report is for the use by Bowrock Properties Limited only, and should not be used or relied upon by any other person or entity or for any other project.

This report has been prepared for the particular project described to us and its extent is limited to the scope of work agreed between the client and Harrison Grierson Consultants Limited. No responsibility is accepted by Harrison Grierson Consultants Limited or its directors, servants, agents, staff or employees for the accuracy of information provided by third parties and/or the use of any part of this report in any other context or for any other purposes.

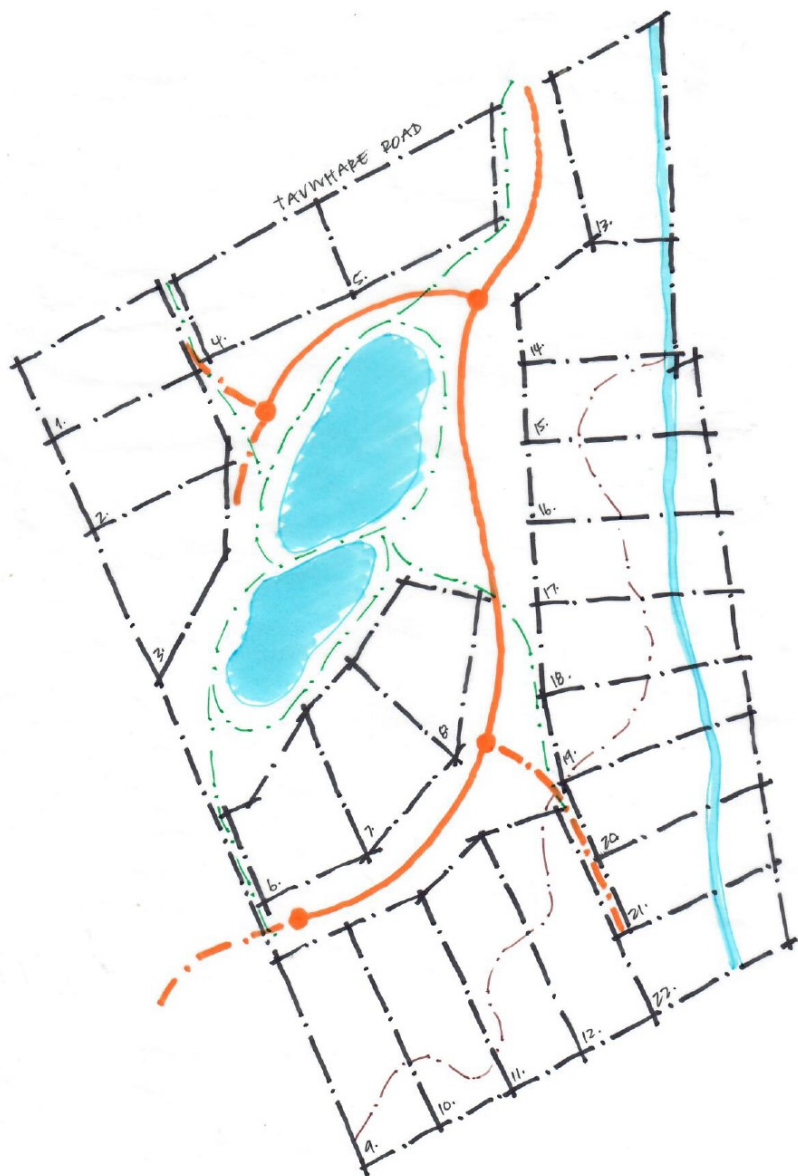


APPENDICES



APPENDIX 1

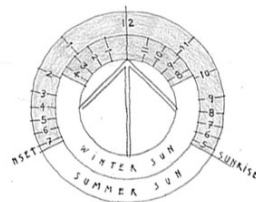
CONCEPT LOT LAYOUTS



TYPICAL SUBDIVISION (5000SQM LOTS)



ALTERNATIVE SUBDIVISION (1250SQM LOTS)



07-079

PROPOSED TAUWHARE SUBDIVISION
FOR BOWROCK PROPERTIES LIMITED

1110 TAUWHARE ROAD, TAUWHARE

16 APRIL 2020

PA
UA

pauaarchitects.co.nz

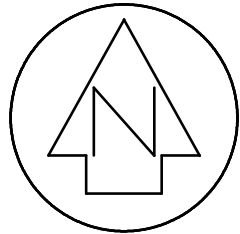
3 Anzac Parade, Hamilton

office@PAUAarchitects.co.nz

T 07 839 6521

APPENDIX 2

TOPOGRAPHIC SURVEY



TAUWHARE ROAD

DPS 81580¹

DPS 81580²

DPS 81580³²

DP 325499³

SWAMP AREA

TRACK

SWAMP AREA

SWAMP AREA

DP 325499²

DPS 62711⁴

DPS 62711²

DP 319630²

CONTOUR INCREMENTS ARE
0.4M

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TELEPHONE 07 827 5071 FACSIMILE 07 827 5062 EMAIL cogs@xtra.co.nz

REF: -

TOPOGRAPHICAL SURVEY OF
LOT 3 DP 325499 - TAUWHARE RD

PREPARED FOR: SHASKEY

SCALE: 1:1500

DATE: SEPT 2006

ORIGINAL PLAN SIZE: A2

NOTE: BOUNDARIES AND DIMENSIONS AND
AREAS ARE APPROXIMATE AND SUBJECT
TO ALTERATION BY APPROVAL OR SURVEY

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