



ENVELOPE ENGINEERING

LAND
STRUCTURE
MANAGE

46 & 48 HOSPITAL ROAD BLENHEIM

INFRASTRUCTURE REPORT

DOCUMENT CONTROL RECORD

CLIENT	Hapai Development Limited Partnership
PROJECT	46 & 48 Hospital Rd, Blenheim
PROJECT NO.	1888-01
DOCUMENT TYPE	Infrastructure Report
DATE ISSUED	December 2022
ADDRESS FOR SERVICE	Envelope Engineering Limited Level 1, 125 Vincent Street Auckland 1010
CONTACT	Alan Blyde, Director s 9(2)(a) s 9(2)(a)

ISSUE AND REVISION RECORD

DATE OF ISSUE	19/12/2022
STATUS	Final
ORIGINATOR	 Taher Tejani – Civil Engineer
REVIEWED	 Laurent Marechal CPEng – Senior Civil Engineer/Project Lead
APPROVED FOR ISSUE	 Laurent Marechal CPEng – Senior Civil Engineer/Project Lead



CONTENTS

1.0	INTRODUCTION	1
1.1	GENERAL	1
1.2	PROPOSED DEVELOPMENT	2
2.0	EARTHWORKS	3
2.1	PROPOSED EARTHWORKS	3
2.2	EROSION AND SEDIMENT CONTROL	3
3.0	ROADS & ACCESS	6
3.1	EXISTING ROADING	6
3.2	PROPOSED ROADING AND ACCESS	7
4.0	WASTEWATER	7
4.1	EXISTING WASTEWATER SUPPLY	7
4.2	PROPOSED WASTEWATER SUPPLY	7
5.0	STORMWATER	7
5.1	EXISTING STORMWATER	7
5.2	PROPOSED STORMWATER	7
6.0	WATER RETICULATION	8
6.1	EXISTING WATER SUPPLY	8
6.2	PROPOSED WATER SUPPLY	8
7.0	UTILITY SERVICES	8
7.1	POWER	8
7.2	TELECOMMUNICATION	8
8.0	CONCLUSIONS	9
9.0	LIMITATIONS	9

APPENDICES

APPENDIX 1	SURVEY PLAN
APPENDIX 2	DESIGN DRAWINGS
APPENDIX 3	CALCULATIONS, SUPPORTING INFORMATION AND CORRESPONDENCE



1.0 INTRODUCTION

1.1 GENERAL

The proposed development site is located 46 and 48 Hospital Road, Witherlea, Blenheim. The existing titles are as follows and identified as Lot 9 DP 527731, and Lot 10 DP 527731. Figure 1 shows the location of the proposed development site. The approximate area of the site is 4.497 Ha.

The site is relatively flat with an overall gentle slope (0.45%) to the northeast. A site topographical survey was carried out (Refer to site survey plan in Appendix 1).

The site area is currently unused and is part of the existing Wairau Hospital grounds. Lot 9 contains an existing single storey standalone dwelling which is accessed from a private driveway on Hospital Road. The site is covered with significant established bush. The following interests are registered on the titles of the site.

- A right to drain sewage over part of the adjacent Lot 9 (42 Hospital Rd)
- A right to emit noise easement in favour of Lot 10 and other Hospital land over Lot 9



Figure 1: LOCALITY PLAN



1.2 PROPOSED DEVELOPMENT

The site is subject to the Urban Residential 2 Zone.

Figure 2 below illustrates the latest proposed site development layout for 105 lots which has been prepared by Reset Urban Design. Proposed lot sizes range from 83m² to 430m². Larger lot sizes are proposed along the eastern and southern boundaries which abut existing residential housing of similar size.

Internal roading is generally intended to be vested as public roads and designed to council standards. There are 7 proposed shared private accessways. The development includes 105 fee-simple lots.



Figure 2: PROPOSED DEVELOPMENT SITE



2.0 EARTHWORKS

2.1 PROPOSED EARTHWORKS

Earthworks are proposed for the development to provide building platforms, access and suitable services. An earthworks area of approximately 4.49 ha is required for the formation of road reserves, building platforms and the levelling within the site. It is anticipated that there will be approximately 2786m³ of cut and 4536m³ of fill for the entire site. Structural fill will be necessary to construct the proposed Building Blocks.

Batter within the development will be at a grade of 3H:1V with no temporary batters greater than 2H:1V allowed unless specifically advised by the Geotechnical engineer. All cut faces would be covered with polythene sheeting and cut off drains provided around the perimeter to divert stormwater drainage away from the batter.

During the earthworks operations, the placement of fill within the development shall be observed by a suitably experienced geotechnical engineer. On completion of the earthworks a Geotechnical Completion Report will be prepared by the appointed Geotechnical engineer. This report will certify the adequacy of the fill placement and also make recommendations of bearing strengths for foundation design purposes and pavement subgrade strength.

Ground deemed unsuitable for earth working (typically soil containing organic material (including topsoil) or silty ground with a high moisture content or uncontrolled fill material) will be either used for landscaping purposes or removed from site to an approved local location as per the project Geotechnical Engineer's recommendations.

The construction will be programmed as far as possible so that road works would be carried out during the summer earthwork's season.

The proposed earthworks and sediment control measures are shown on Plan 230 included in Appendix 2.

The extent/location of any earthworks will be confirmed with the Contractor to help minimise the amount of area open and susceptible to erosion, and to ensure these areas are workable and will not interfere with access or other construction activities.

2.2 EROSION AND SEDIMENT CONTROL

All works associated with the proposed earthworks are to be carried out in a manner that minimises any possible adverse effects on the environment.

The main objective of sediment and erosion control is to reduce the rate of erosion and minimise the amount of sediment discharged from bare earth surfaces while providing practical measures to reduce the total amount of sediment leaving the site.

The principles of **Erosion and Sediment control** that will be applied include:

- Completing all works within the minimum time practicable
- Segmentation of catchments to limit the extent of impact
- Stabilisation of exposed areas as soon as practicable
- Perimeter controls for the diversion of clean water.

Erosion and Sediment Control measures are proposed for the site taking account of the guidelines from Auckland Council Guideline Document (GD05) 'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region' dated June 2016.

The sediment and erosion control plans are included in Appendix 2.

2.2.1 EROSION CONTROL

To avoid erosion and sediment-laden stormwater generation on the site, the following erosion control measures will be implemented:

- The access road will be metaled to minimise dirt tracking to the road.



- Temporary **cleanwater diversion channels** and **runoff diversion channels** will be used across the extent of the earthworks area to minimise the erosion effects of rainfall and surface water scouring and to control the movement of silt to the proposed bunds.
- Stormwater flow management will be reviewed as works progress and applicable methods applied as required in consultation with the Supervising Engineer and Council staff. It is fully expected that the locations of diversion channels/ bunds and contour drains will be fluid and will be dictated by the onsite conditions and levels, as work progresses.

2.2.2 SEDIMENT CONTROL

Sediment Retention Ponds (SRP) with a rainfall activated chemical dosing system will detain runoff flows so that deposition of transported sediment can occur through settlement. Due to the detention provided, SRPs also attenuate flows thereby reducing downstream channel erosion effects.

Silt fences will be constructed to contain material within the earthworks area if required. They are applicable where catchments are small and where it is difficult due to topography to gradually fall to the decanting earth bund (DEB) or SRP.

Drawing 240 & 250 illustrate the proposed preliminary locations of all sediment control devices and the standard details for each of these devices. The calculations are appended in Appendix 3. Due to the unknown nature of the final staging of the works by the contractor and the methodology of construction, a comprehensive Earthworks and Construction Management Plan will be prepared and submitted by the Contractor and reviewed by Envelope before construction commences on site.

2.2.3 SITE STABILISATION

The standard of compaction and method of determination will be set out in NZS4431 and NZS4402. Where this is not applicable the requirements will be specified by the Geotechnical Engineer.

The Contractor will be required to arrange regular control tests to ensure that adequate compaction has been attained over the entire area where fill materials are placed. The frequency of testing will conform with NZS4431 and control testing in accordance with NZS4402.

On completion of subgrade formation, an inspection will be carried out by the Supervising Engineer and Geotechnical Engineer to determine compliance for shape, grade, strength and uniformity.

Site stabilisation will be via grass seed/hydroseeding and carried out in accordance with the methodology provided below on topsoiled areas to be landscaped.

For Roding and Platform areas, stabilisation will be either by metal aggregate or temporarily with straw mulch.

2.2.4 SIZING OF SEDIMENT RETENTION POND (SRP)

Size of SRP -

- Sized in accordance with GD05's 3% for SRP 1 catchment to volume ratio criteria, the SRP should achieve a sediment removal efficiency of approximately 95%.
- The contributing catchment to SRP is approximately 4.9 ha. For the sizing calculations, refer to Appendix 3.



2.2.5 MAINTENANCE OF ESC DEVICES

We propose the following schedule for the setup and monitoring of ESC devices across the site:

MONITORING TYPE	MONITORING BY	FREQUENCY	RECORDING
Set-up of site ESC	Engineer	Prior to commencement of earthworks.	Engineer's written site inspection record.
Daily Inspection	Contractor	At the start and end of each working day.	Contractor's site diary to be retained on site and reviewed at weekly meetings.
Routine Weekly Inspection	Engineer/Contractor	Weekly (prior to site meeting).	Engineer/Contractor's written meeting minutes.
During heavy rain events	Contractor	During or immediately after heavy rain events.	Contractor's inspection record to be provided to the Engineer within 24 hours of the rainfall event.
Prior to removal of ESC devices.	Engineer	Prior to removal of any ESC device.	Engineer's written site inspection record.

The Engineer will inspect ESC devices and certify that they have been correctly installed prior to the commencement of earthworks on-site.

2.2.6 EARTHWORKS METHODOLOGY/ SEQUENCE OF WORKS

The proposed earthworks methodology is detailed below.

INITIAL SEDIMENT AND EROSION CONTROL SITE PREPARATION WORKS

- Before the commencement of bulk earthworks, earth bunds/silt fences will be installed throughout the site. The locations of these are shown on drawing 240. The bunds will be constructed in accordance with the detail provided on drawing 250 and construction details provided in GD05.
- To prevent site access points from becoming sediment sources and to assist in minimising dust generation, a stabilised construction entranceway will be constructed in accordance with the construction details provided in GD05. This will generally be provided by a metalled hardstand/ manoeuvring area at the boundary of the exposed earthworks areas which allows vehicles entering the earthworks zone or leaving site to be cleaned of mud and debris.

DURING BULK EARTHWORKS

The earthworks will involve:

1. Installation of sediment and erosion control measures, which for this site will be runoff diversion channels along the low side of the site, stabilised construction entrances and cleanwater diversion channels around the earthwork areas;
2. Stripping of topsoil and spreading in selected parts of the site;
3. Bulk earthworks cut-to-fill will occur including "mucking out" of low lying saturated ground area and weaker ground with high moisture and organics content.
4. Site remediation works if recommended in the Geotechnical Report
5. Infill or borrow cut material will be assessed for suitability before placement by the Geotechnical Engineer and will generally involve conditioning for handling and compaction.
6. Excess material from the bulk earthworks will be removed from site along with surplus excavation from services trenches and buildings foundations
7. Construct retaining walls along the boundary with associated drainage works



8. Trimming and subgrade formation of the proposed carpark and accessway;
9. The proposed erosion and sediment control methodology for this site is dynamic in nature and will be amended throughout the construction phase to ensure best practice outcome is achieved.
10. All stormwater pipe work will be installed and silt fences and stormwater inlet protection will be placed around the new intakes across the site.

UPON COMPLETION OF BULK EARTHWORKS

- Upon completion of bulk earthworks interim site stabilisation of exposed surfaces will be applied. This will be undertaken within one month of completion of these areas and will take the form of grass seeding. Building construction is expected to take place immediately however if not interim stabilisation of building platforms will also be undertaken by application of metal.
- The sediment & erosion control measures installed for bulk earthworks will remain in place wherever possible so that safeguard measures will continue to function as general civil works continue, i.e. installation of drainage and utility services and ongoing road construction. Where the sediment and erosion control measures have been removed, specific additional localised measures may be instructed to protected work areas affected by civil works. These might include silt fences, silt socks and additional DEB's. All are measures which would have been already used on the site during bulk earthworks stage.

3.0 ROADS & ACCESS

3.1 EXISTING ROADING

The proposed development site is part of the Wairau Hospital site and is shown in relation to the local road network in Figure 3 below.

The subject site is surrounded by residential zones, with neighbourhood business at the intersection of Hospital and Taylor Pass Road and the intersection of Wither Road and Taylor pass Road. To the west of the subject site there is an industrial area and a recreational area. In the immediate vicinity of the subject site, there is Wairau Hospital, places of worship, a cemetery, a retirement village, and the Marlborough Museum. All the streets surrounding the site have a posted speed limit of 50km/h. All road classifications are from NZTA One Road Network Classification.



Figure 3: EXISTING ROADING INFRASTRUCTURE



3.2 PROPOSED ROADING AND ACCESS

There is an existing vehicle entrance for 48 Hospital Road. This vehicle crossing will be relocated to westwards to create a new entrance for the development. The proposed two-lane road carriageway is 6.4 metres wide. The road reserve is 15m in total width, with concrete footpaths, parking bays and grassed/planted berms. Seven private accessways are proposed, the widths vary from 6.0m to 6.2m.

4.0 WASTEWATER

4.1 EXISTING WASTEWATER SUPPLY

There is an existing public 225mm diameter wastewater pipe located in Hospital Road as shown on the Marlborough District Council Smart Maps.

4.2 PROPOSED WASTEWATER SUPPLY

In January 2022 Brett Walker (Infrastructure Project Engineer for Marlborough District Council) was contacted to assess the wastewater and water supply reticulation capacity.

MDC has undertaken wastewater modelling and have determined that they have existing capacity to accommodate the proposed residential of 105 lots. Please refer to the correspondence in Appendix 2.

The proposed solution for wastewater reticulation would be to discharge to the existing network by gravity.

The MDC Code of Practice requires a minimum grade 0.50% for 150mm wastewater pipes, and 0.33% for 225mm pipes. DN 100 property connections are proposed for each lot and as per the COP, a minimum grade of 1.25% is required.

Design wastewater flows calculated in accordance with the Marlborough Addendum to Code of practise for subdivision and land development are noted in the table below:

Table 3: WASTEWATER CAPACITY REQUIREMENTS FOR PROPOSED DEVELOPMENT

NUMBER OF LOTS	POPULATION PER LOT	ANNUAL DRY WEATHER FLOW (LITRES/SECOND)	PEAK DRY WEATHER FLOW (LITRES/SECOND)	PEAK WET WEATHER FLOW (LITRES/SECOND)
105	3.5	1.06	2.66	5.66

From the calculation above, a collecting main with a size of DN150 would be capable of servicing the development of 105 lots (proposed capacity 22.1 l/s) with respect to wastewater and at minimum grades specified above. Refer to Appendix 2 for the proposed wastewater network.

5.0 STORMWATER

5.1 EXISTING STORMWATER

Based on current information, there is no stormwater network in the vicinity of the site. There is a stormwater system to the east of the site at the Howick Road Hospital Road intersection.

Council Operations and Maintenance team have provided local insight with respect to flooding in the area. Discussions have confirmed there are no significant flooding issues present in the area. There have been instances of blocked sumps on Hospital Road (near the Emergency Department entrance). This is likely due to a lack of maintenance and associated soakage pit.

5.2 PROPOSED STORMWATER

Given that there is no existing stormwater infrastructure available and suitable for this development, it is proposed that soakage is the system to be utilised for onsite stormwater management, disposal, and discharge.

Soakage should be designed for a 50-year rainfall event. Some initial soakage testing has been undertaken on site by Initia Ltd which provided positive results, however further detailed soakage



investigations will be required as the proposal proceeds, and the design is developed further. Based on the testing undertaken, soakage rates ranging from 648 to 1320 mm/hr have been calculated.

Further liaison was undertaken to ensure the design met MDC's requirements. Based on information provided by Brett Walker from MDC, the 50-year ARI storm intensity from NIWA HIRDS v4 RCP 6.0 2081-2100 was utilised for different storm intervals up to the 24-hour, to determine the critical time period and storage required for preliminary soakage sizing. The modified soakpit design based on the design provided by MDC, will be used for stormwater management within the public road reserve. Relevant correspondence and details for the soakage pit has been provided within Appendix 3.

Stormwater runoff from the road reserve catchment will be collected via suitable catchpits and diverted into individual soakpits sized for the relevant catchment. If required the catchpits will be fitted with a suitable catchpit insert like Hynds Enviropod (or similar approved) to ensure all gross pollutants are removed. Additionally, a catchpit connection will be via a syphon action to ensure further reduction in contaminants reaching the soakpit. Minimum clearances from proposed services and any wastewater network will be maintained to ensure adverse environmental effects are avoided.

Individual soakage pits are proposed on each lot which is accessed via the public road reserve for onsite SW management and disposal associated with roof and internal lot runoff. Stormwater management requirements of the Jointly owned access Lots and of the Lots being accessed off the JOALs will be via a common soakage pit situated within the respective JOAL. If the soakage area within the JOAL is not adequate to serve the catchment while meeting adequate clearances, then individual soakage pits to be proposed within each Lot, subject to Detailed design. Further soakage testing will be required at the proposed development site to confirm soakage rates and complete detailed design and confirm feasibility of soakage as the method of management.

Preliminary design and location of the soakpits are shown within Plan 400 included in Appendix 2 with supporting calculations included in Appendix 3.

6.0 WATER RETICULATION

6.1 EXISTING WATER SUPPLY

There is an existing network of public water pipes within Hospital Road as shown on the Marlborough District Council Smart Maps. The water pipes are 50mm diameter PE, 100mm diameter Cast Iron and 225mm diameter PVC.

6.2 PROPOSED WATER SUPPLY

MDC has undertaken water supply modelling and have determined that they have existing capacity to accommodate the proposed development of 105 lots.

As per NZS4404 a 150 Ø principal main is required to service this development. This will be supplemented with ring 50Ø rider mains and one 100 Ø ring main.

Each new lot will have a 20mm connection to a Toby. Fire hydrants will be installed on the new DN150 principal main and 100 Ø larger rider main to ensure that firefighting water supply meets the FW2 requirements of SNZ PAS 4509:2008.

7.0 UTILITY SERVICES

7.1 POWER

We have discussed the proposed development with Marlborough Lines. They have confirmed that there is capacity to service the development.

7.2 TELECOMMUNICATION

We are initiating discussions with Chorus and Transpower regarding providing fibre telecommunications to the development. There is existing fibre infrastructure in the area. On this basis we believe the development can be adequately serviced from a telecommunications perspective.



8.0 CONCLUSIONS

Based on the above summary of our assessments, we conclude that there are minimal **Infrastructure Servicing** related issues with respect to implementing the 105 lot residential development at the proposed site.

MDC have confirmed that the water supply and wastewater capacity can cater for a residential development of 105 lots.

9.0 LIMITATIONS

This report is for the use by Hapai Development Limited Partnership 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 Envelope Engineering Limited. No responsibility is accepted by Envelope Engineering 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



Notes:
Levels around stockpiles may not be a true representation of existing ground level

Datum Notes:
Levels are in terms of B.B.C. (Pre-Earthquake)
Origin of Level:
Name: SS III Maxwell/Hospital (APMU)
mE: 801077.012
mE: 411678.534
RL: 17.835 Nelson V.D 1955 + 12.192 (07/07/1993)
RL: 30.027 (B.B.C)

Coordinates are in terms of geodetic datum, Marlborough 2000
Origin of coordinates:
Name: SS III Maxwell/Hospital (APMU)
mE: 801077.012
mE: 411678.534

A	ISSUED FOR INFORMATION	02/08/22	BJ
REV	REVISION DETAILS	DATE	BY



89 Middle Renwick Road
P.O. Box 704
Blenheim, New Zealand
Ph 03 579 2006
office@ayson.co.nz
www.ayson.co.nz

RESOURCE MANAGEMENT + LAND DEVELOPMENT + SUBDIVISION

CLIENT
New Ground Capital

DESIGNED	BJ 02/08/22
DRAWN	MR 02/08/22
CHECKED	MR 02/08/22
SCALE	A1 1:500 A3 1:1000

PROJECT	Site Survey
LOCATION	48 Hospital Road

TITLE
Site Survey Plan

JOB NUMBER	15564
SHEET	TP01
ISSUE	A



Hospital Road



Ayson
Survey+
Resource Management + Land Development + Subdivision

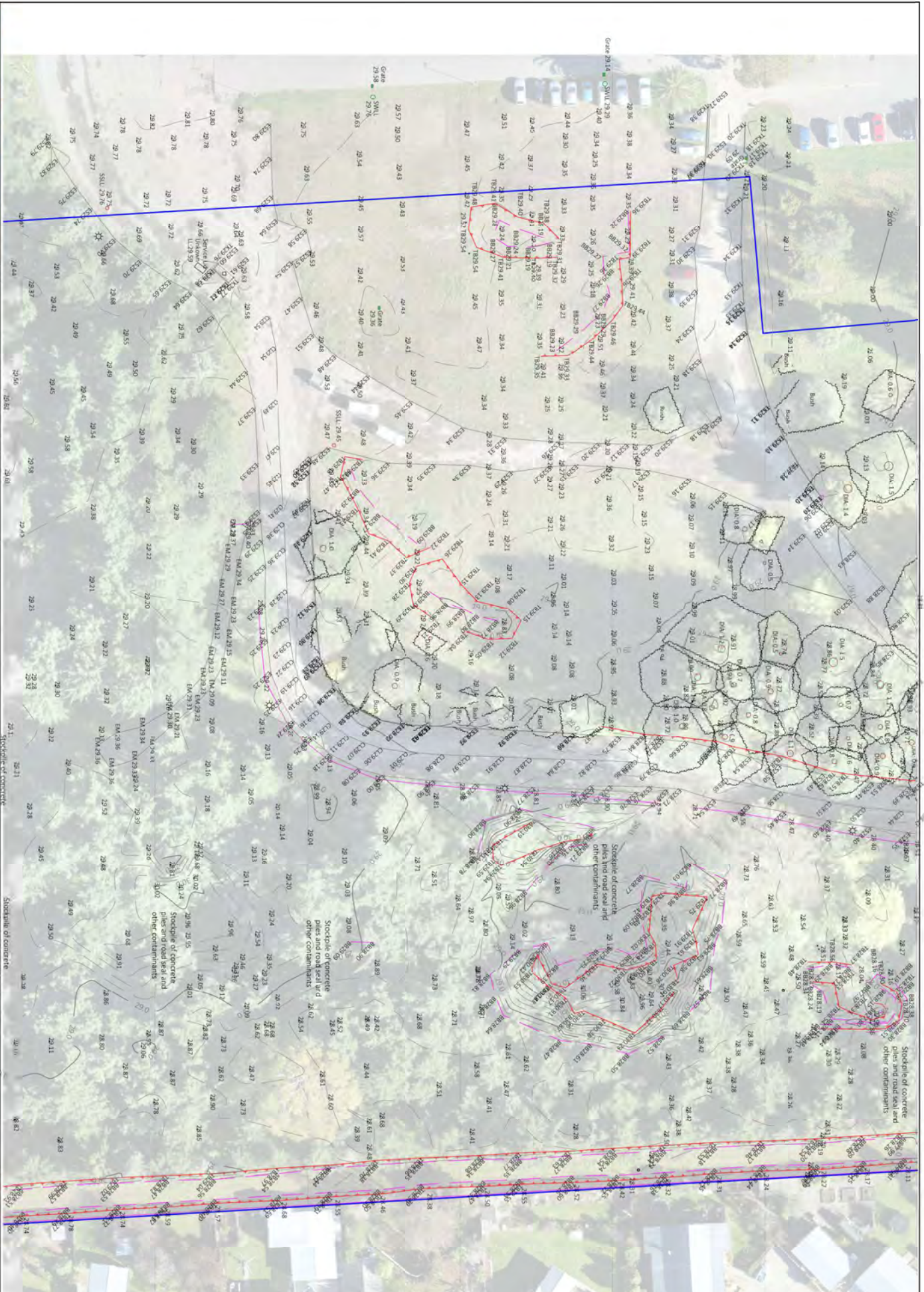
300 Maitland Avenue, Broomfield, VIC 3083
Ph: 03 9379 2000
www.ayson.co.nz

PROJECT: New Ground Capital
DATE: 02/08/22
SCALE: A3 1:1000

CLIENT: New Ground Capital
PROJECT: 48 Hospital Road
SITE: 15564

DATE: 02/08/22
SCALE: A3 1:1000

15564
TP02
A





AYSON
Survey+
www.ayson.co.nz

100 Maitahi Avenue, Auckland
PO Box 916
Auckland, New Zealand
Ph 011 751 2000
office@ayson.co.nz
www.ayson.co.nz

REVISION HISTORY

REV	DESCRIPTION	DATE
1	ISSUED FOR TENDERS	15/03/22
2	REVISED PER COMMENTS	15/03/22

PROJECT INFORMATION

DESCRIPTION	DATE
ISSUED	02/08/22
CHANGED	02/08/22
SCALE	A1 1:300
REV	A3 1:600

CLIENT

New Ground Capital

PROJECT

Site Survey

LOCATION

48 Hospital Road

TITLE

Site Survey Plan

JOB NUMBER

15564

SHEET

TP03

ISSUE

A



89 Middle Newwick Road
P.O. Box 704
Hetherington, New Zealand
Ph 03 579 2906
office@ayson.co.nz
www.ayson.co.nz

[illegible]

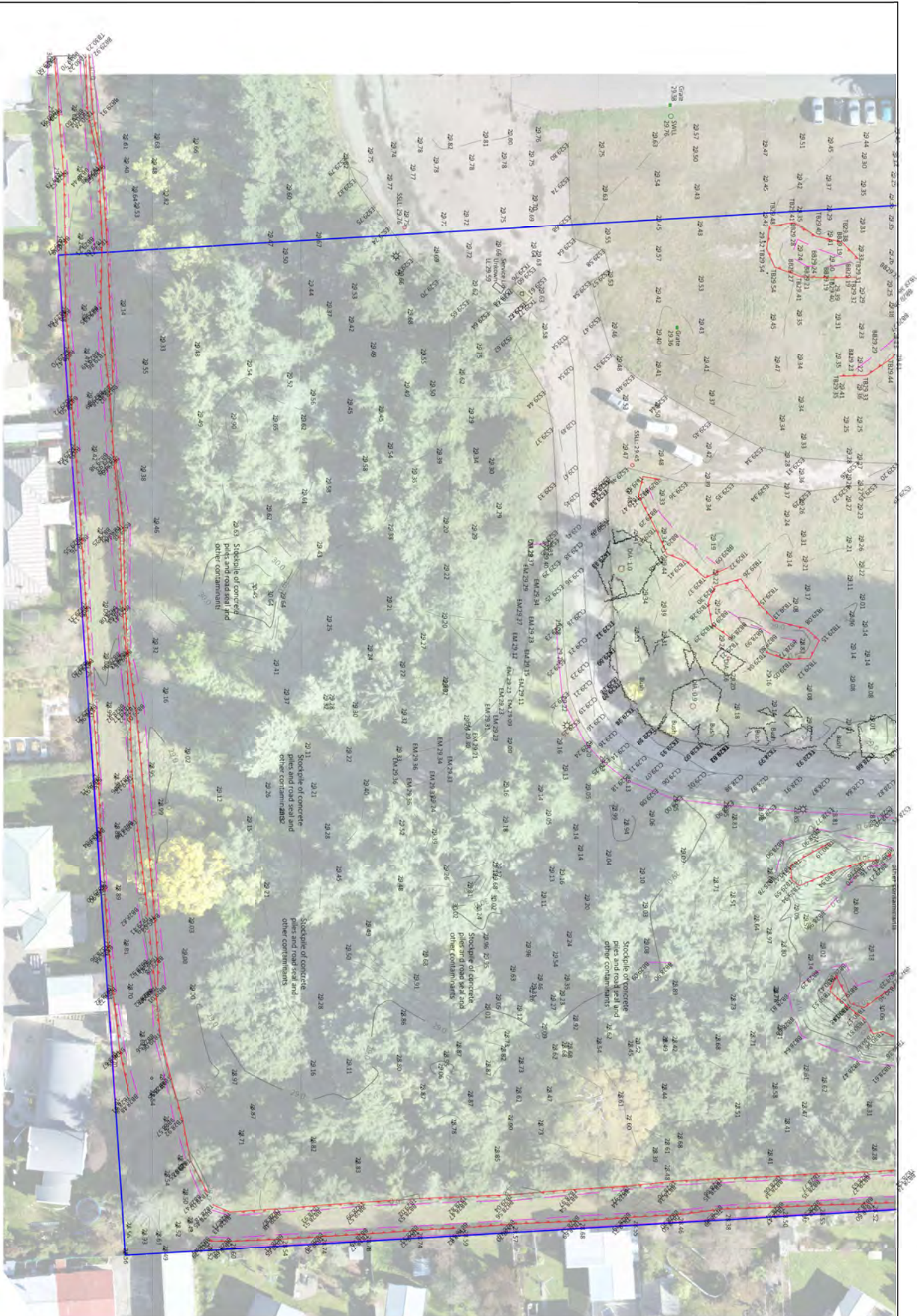
DESIGNED	
DRAWN	BJ 02/08/22
CHECKED	MR 02/08/22
SCALE	
A1	1:300
A3	1:600

CLIENT New Ground Capital

Site Survey
LOCATION
48 Hospital Road

Site Survey Plan

15564	
SHEET	IS
TP04	



APPENDIX 2 DESIGN DRAWINGS

CLIENT:
HAPAI DEVELOPMENT LP

PROJECT:
WAIRAU HOSPITAL
48 HOSPITAL ROAD
BLENHEIM

PLAN SET:
CIVIL DRAWINGS

ISSUE:
FOR RESOURCE CONSENT

DATE:
20 DECEMBER 2022

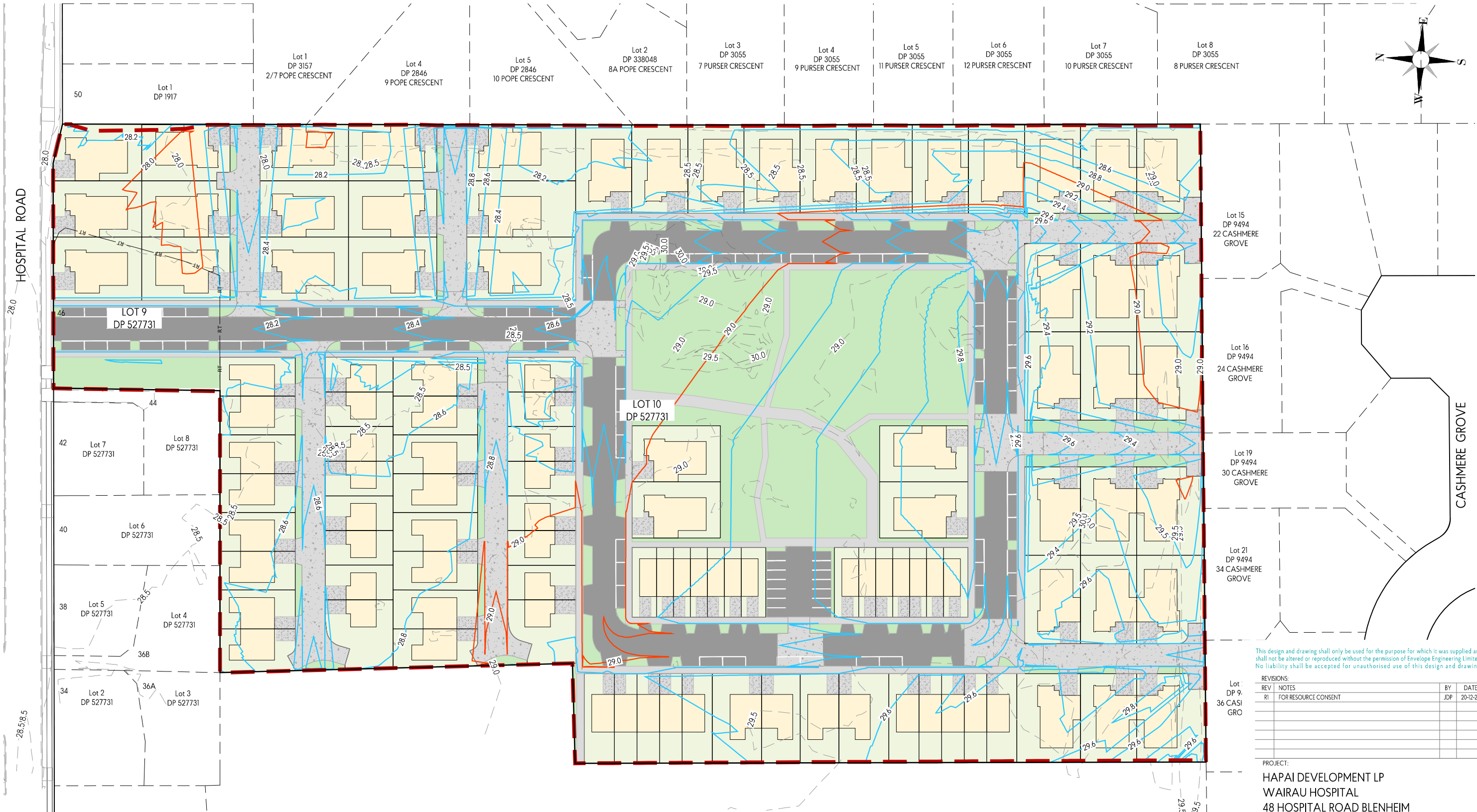
REFERENCE:
1888-01

DRAWING INDEX		
DRAWING	REVISION	TITLE
1888-01-200	RI	EXISTING CONTOURS PLAN
1888-01-210	RI	PROPOSED CONTOURS PLAN
1888-01-230	RI	PROPOSED EARTHWORKS PLAN
1888-01-240	RI	PROPOSED EROSION & SEDIMENT CONTROL PLAN
1888-01-250	RI	PROPOSED EROSION & SEDIMENT CONTROL STANDARD DETAILS - SHEET 1
1888-01-251	RI	PROPOSED EROSION & SEDIMENT CONTROL STANDARD DETAILS - SHEET 2
1888-01-300	RI	PROPOSED ROADING LAYOUT PLAN
1888-01-330	RI	PROPOSED ROAD LONG SECTIONS - SHEET 1
1888-01-331	RI	PROPOSED ROAD LONG SECTIONS - SHEET 2
1888-01-332	RI	PROPOSED ROAD LONG SECTIONS - SHEET 3
1888-01-333	RI	PROPOSED ROAD LONG SECTIONS - SHEET 4
1888-01-400	RI	PROPOSED DRAINAGE LAYOUT PLAN
1888-01-500	RI	PROPOSED WATER SUPPLY & SERVICES LAYOUT PLAN



LOCATION PLAN
SCALE 1:2000





LEGEND:

PROPOSED CONTOURS
SHOWN AT 0.2m INTERVALS

EXISTING CONTOURS (UNDER DESIGN)
SHOWN AT 0.5m INTERVALS

NOTES:

- PROPOSED CONTOURS SHOWN ARE FINISHED GROUND LEVELS.
- EXISTING CONTOURS ARE FROM SITE SURVEY CARRIED OUT IN APRIL 2022 BY AYSON SURVEY.
- LEVELS ARE IN TERMS OF BBC (PRE-EARTHQUAKE).

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REVISIONS:		BY	DATE
REV	NOTES		
R1	FOR RESOURCE CONSENT	JDP	20-12-22

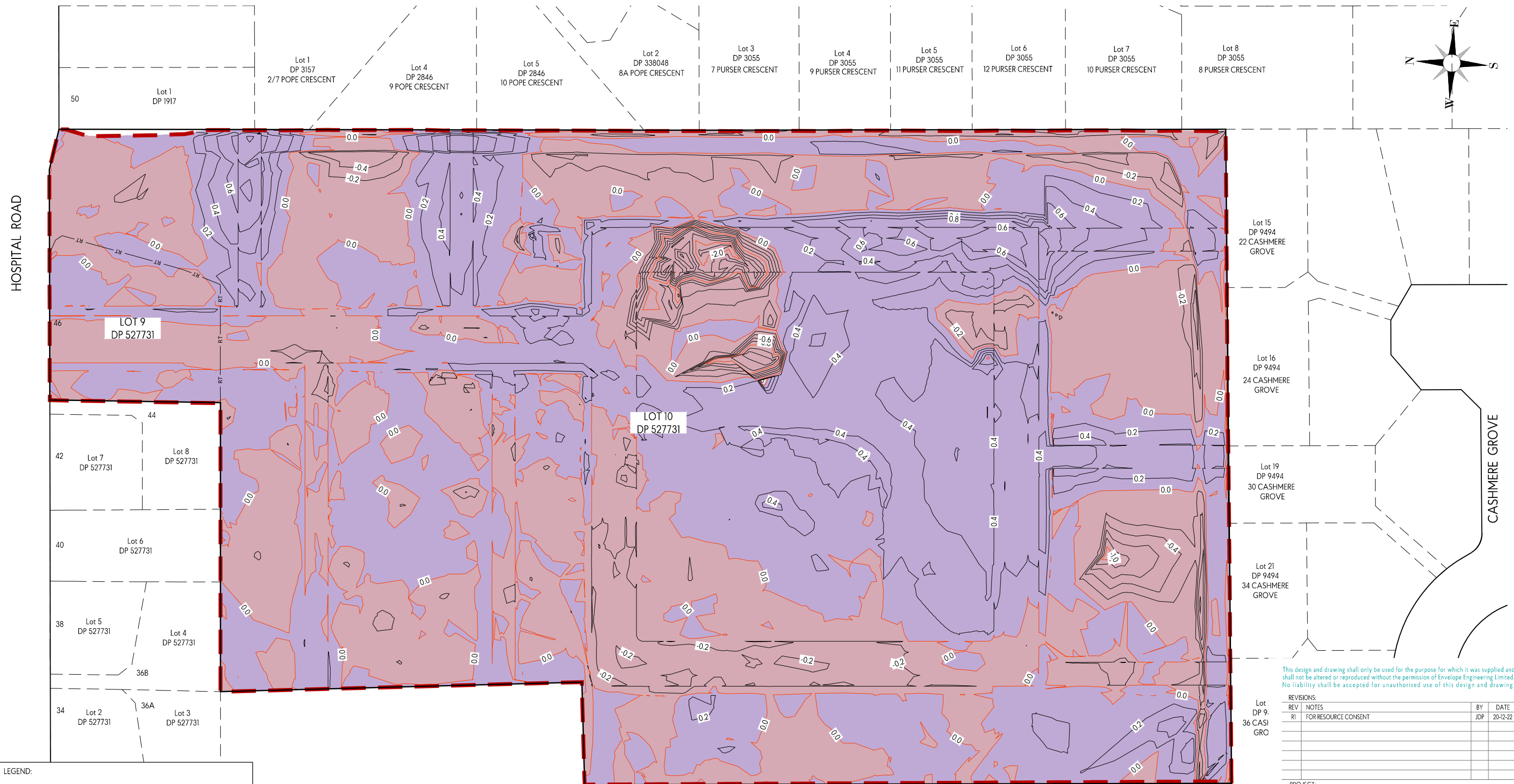
PROJECT:
HAPAI DEVELOPMENT LP
WAIRAU HOSPITAL
48 HOSPITAL ROAD BLENHEIM

TITLE:

PROPOSED CONTOURS PLAN

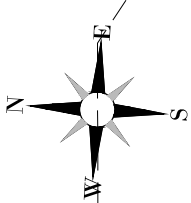
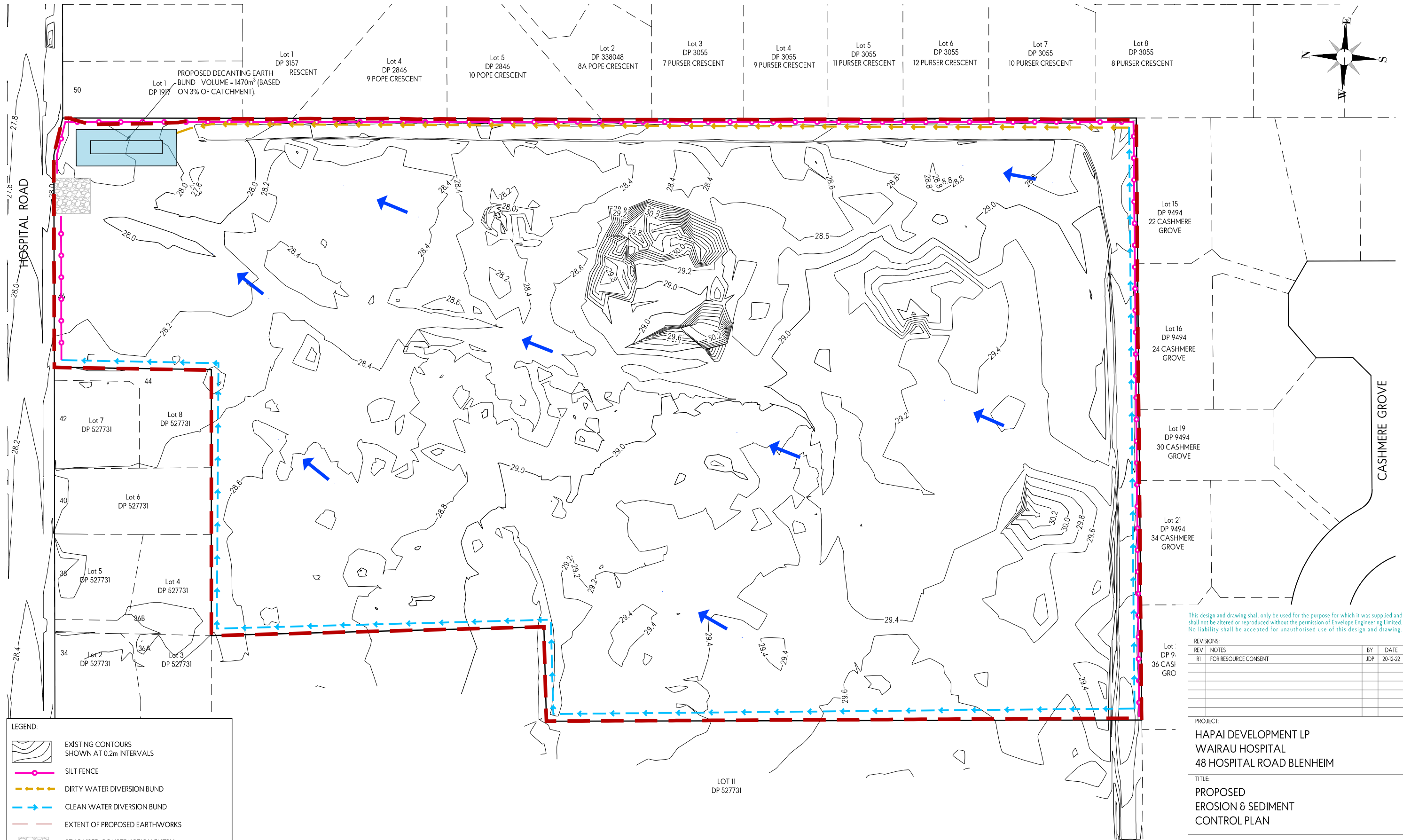


DESIGNED: JDP	DRAWN: MJP	REVISION:
CHECKED: LGM	PLOT DATE: 19-12-2022	1888-01
SCALE A1: 1:500	SCALE A3: 1:1000	210
STATUS: RESOURCE CONSENT	PROJECT No:	R1
DRAWING No:		

[illegible]

PROPOSED EARTHWORKS PLAN

DESIGNED: JDP DRAWN: MJP
CHECKED: LGM PLOT DATE: 19-12-2022
SCALE A1: 1:500 SCALE A3: 1:1000
STATUS: RESOURCE CONSENT
PROJECT No: DRAWING No: REVISION:
1888-01 230 R1



LEGEND:

- EXISTING CONTOURS SHOWN AT 0.2m INTERVALS
- SILT FENCE
- DIRTY WATER DIVERSION BUND
- CLEAN WATER DIVERSION BUND
- EXTENT OF PROPOSED EARTHWORKS
- STABILISED CONSTRUCTION ENTRY
- FLOW DIRECTION

NOTES:

- EXISTING CONTOURS ARE FROM SITE SURVEY CARRIED OUT IN APRIL 2022 BY AYSON SURVEY.
- EROSION AND SEDIMENT CONTROL PLAN TO BE IMPLEMENTED AS PER THE MARLBOROUGH DISTRICT COUNCIL EROSION & SEDIMENT CONTROL GUIDELINES.

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

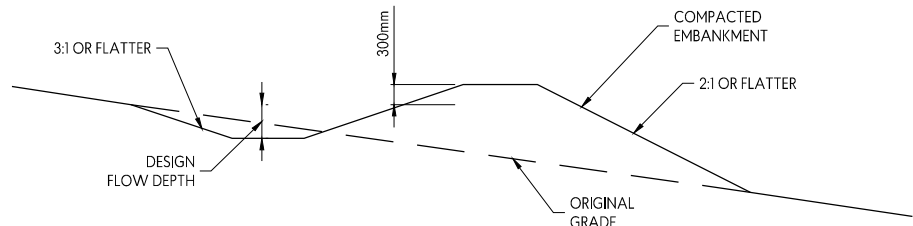
REVISIONS:		BY	DATE
REV	NOTES		
R1	FOR RESOURCE CONSENT	JDP	20-12-22

PROJECT:
HAPAI DEVELOPMENT LP
WAIRAU HOSPITAL
48 HOSPITAL ROAD BLENHEIM

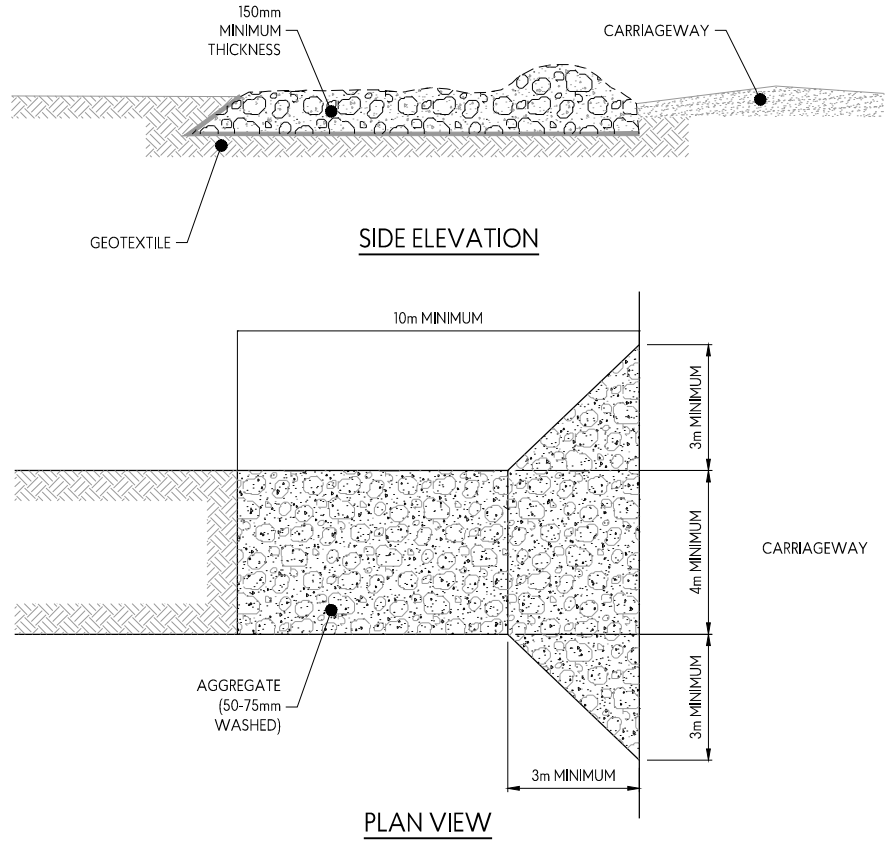
TITLE:
PROPOSED
EROSION & SEDIMENT
CONTROL PLAN



DESIGNED: JDP	DRAWN: MJP	
CHECKED: LGM	PLOT DATE: 19-12-2022	
SCALE A1: 1:500	SCALE A3: 1:1000	
STATUS: RESOURCE CONSENT		
PROJECT No: 1888-01	DRAWING No: 240	REVISION: R1



RUNOFF DIVERSION BUND - CROSS SECTION



STABILISED CONSTRUCTION ENTRANCE

STABILISED CONSTRUCTION ENTRANCE - SPECIFICATIONS:

APPLICATION

USE A STABILISED CONSTRUCTION ENTRANCE AT ALL POINTS OF CONSTRUCTION SITE INGRESS AND EGRESS WITH A CONSTRUCTION PLAN LIMITING TRAFFIC TO THESE ENTRANCES ONLY. THEY ARE PARTICULARLY USEFUL ON SMALL CONSTRUCTION SITES BUT CAN BE UTILISED FOR ALL PROJECTS.

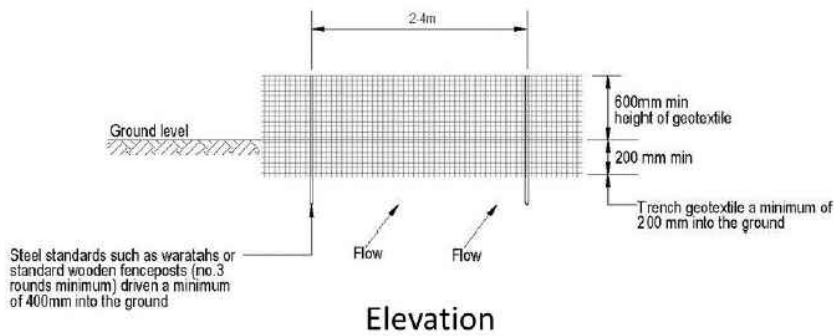
DESIGN:

1. CLEAR THE ENTRANCE AND EXIT AREA OF ALL VEGETATION, ROOTS AND OTHER UNSUITABLE MATERIAL AND PROPERLY GRADE IT.
2. PROVIDE DRAINAGE TO CARRY RUNOFF FROM THE STABILISED CONSTRUCTION ENTRANCE TO A SEDIMENT CONTROL MEASURE.
3. PLACE AGGREGATE TO THE SPECIFICATIONS BELOW AND SMOOTH IT. STABILISED CONSTRUCTION ENTRANCE AGGREGATE SPECIFICATIONS:

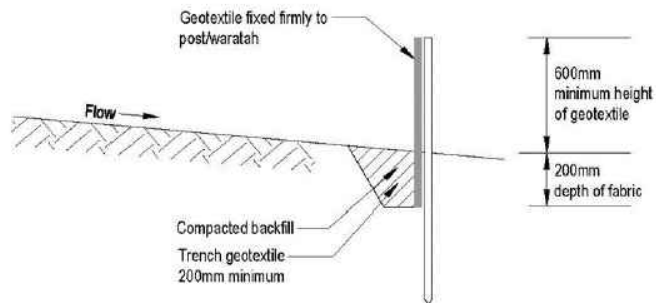
AGGREGATE SIZE	5-75mm WASHED AGGREGATE
THICKNESS	150mm MINIMUM
LENGTH	10m MINIMUM
WIDTH	4m MINIMUM

MAINTENANCE

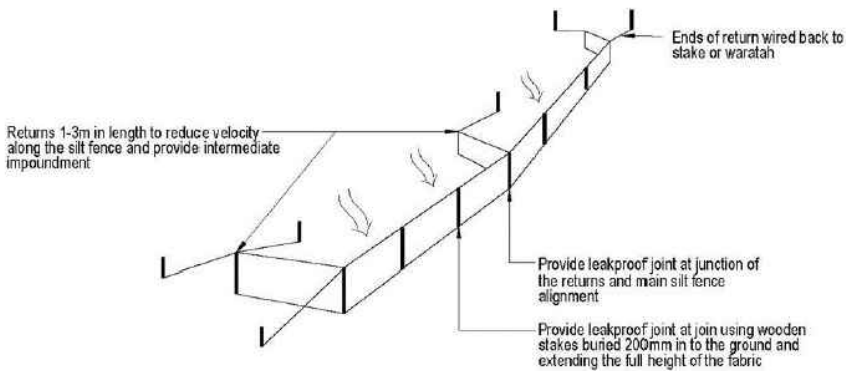
1. MAINTAIN THE STABILISED CONSTRUCTION ENTRANCE IN A CONDITION TO PREVENT SEDIMENT FROM LEAVING THE CONSTRUCTION SITE. AFTER EACH RAINFALL INSPECT ANY STRUCTURE USED TO TRAP SEDIMENT FROM THE STABILISED CONSTRUCTION ENTRANCE AND CLEAN OUT AS NECESSARY.
2. WHEN WHEEL WASHING IS ALSO REQUIRED, ENSURE THIS IS DONE ON AN AREA STABILISED WITH AGGREGATE WHICH DRAINS TO AN APPROVED SEDIMENT RETENTION FACILITY.



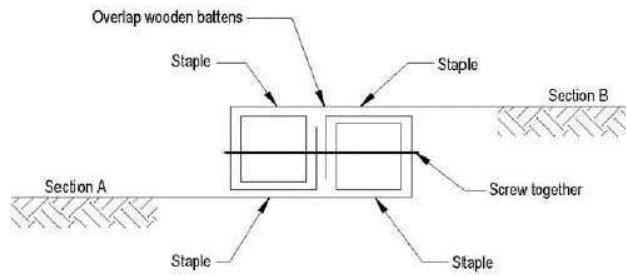
Elevation



Cross-section



Silt fence with returns and support wire



Standard fabric joint

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REVISIONS:		BY	DATE
REV	NOTES		
R1	FOR RESOURCE CONSENT	JDP	20-12-22

PROJECT:
HAPAI DEVELOPMENT LP
WAIRAU HOSPITAL
48 HOSPITAL ROAD BLENHEIM

TITLE:
PROPOSED EROSION & SEDIMENT
CONTROL STANDARD DETAILS
SHEET 1 OF 2

ENVELOPE
W W W . E N V E L O P E . E N G . C O . N Z

DESIGNED: JDP
CHECKED: LGM
SCALE A1: NOT TO SCALE
STATUS: RESOURCE CONSENT
PROJECT No: 1888-01

DRAWN: MJP
PLOT DATE: 19-12-2022
SCALE A3: NOT TO SCALE
DRAWING No: 250

REVISION: R1

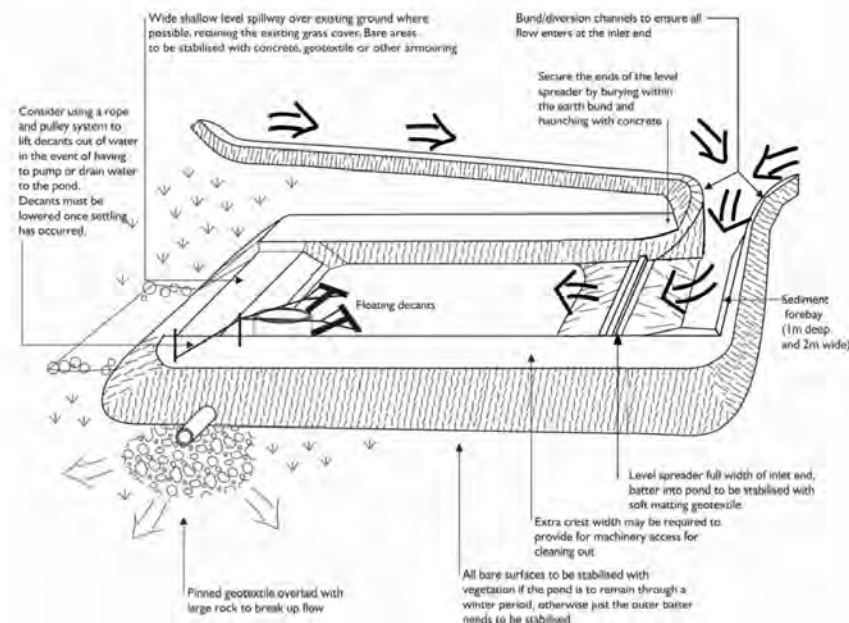


Figure 65: Schematic of a sediment retention pond

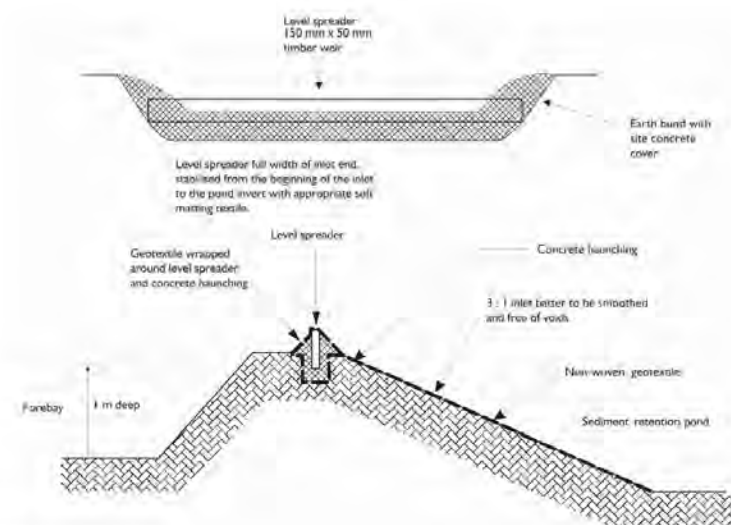


Figure 70: Level spreader

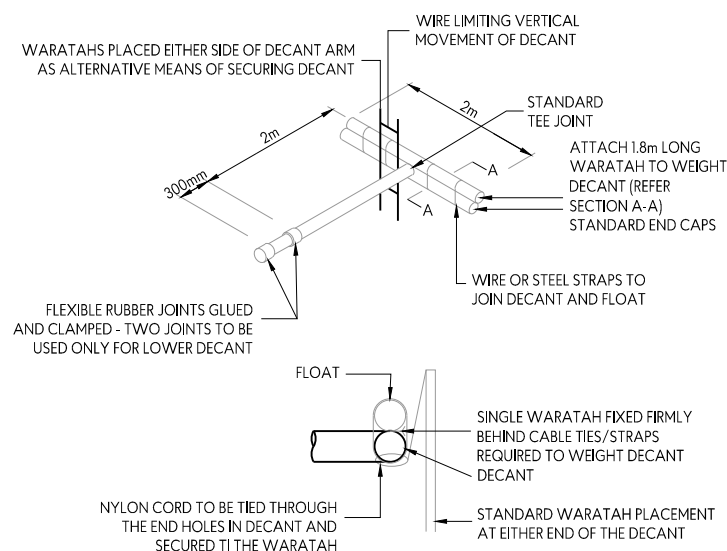


Figure 72: Sediment retention pond for <1.5 ha catchment

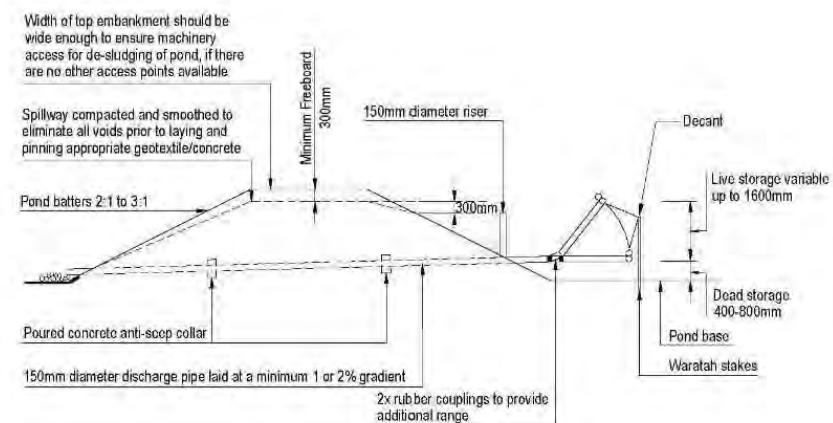


Figure 73: Sediment retention pond for 1.5 to 3 ha catchment

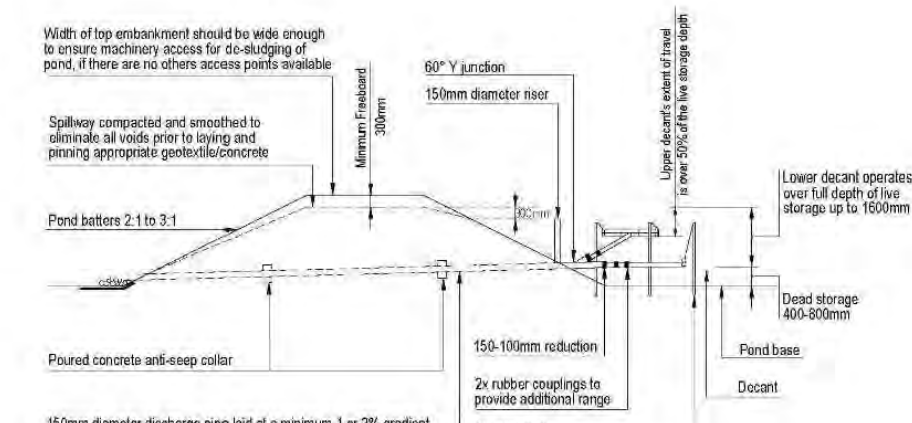
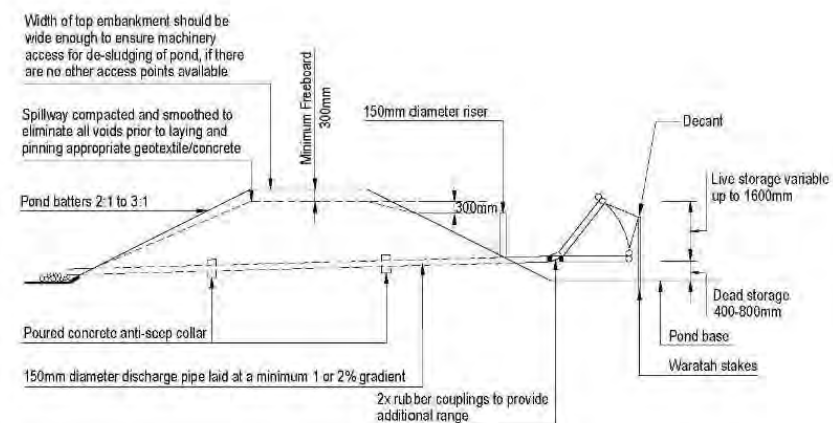


Figure 73: Sediment retention pond for 1.5 to 3 ha catchment

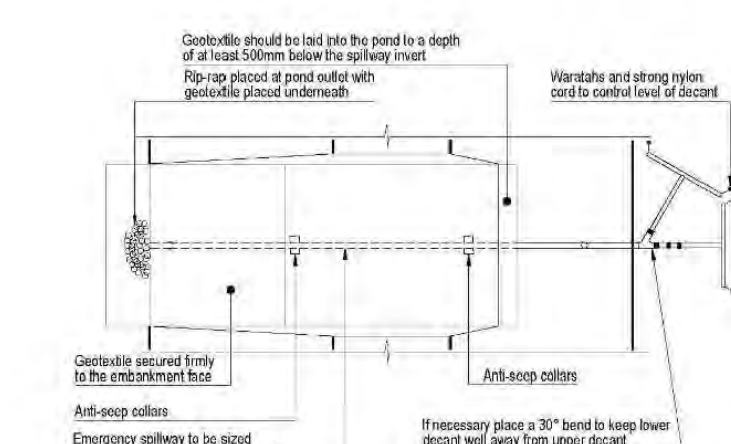
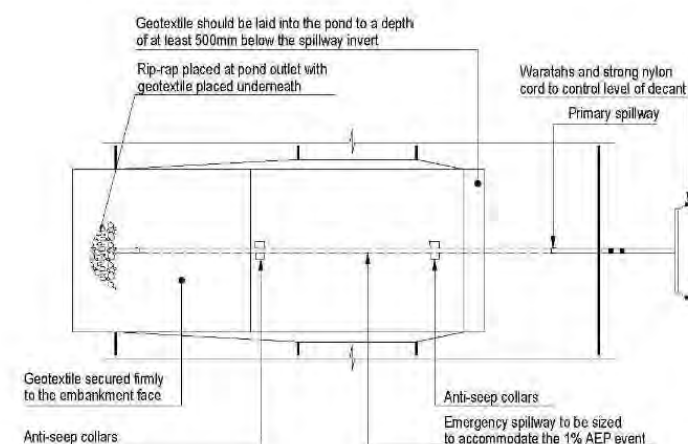
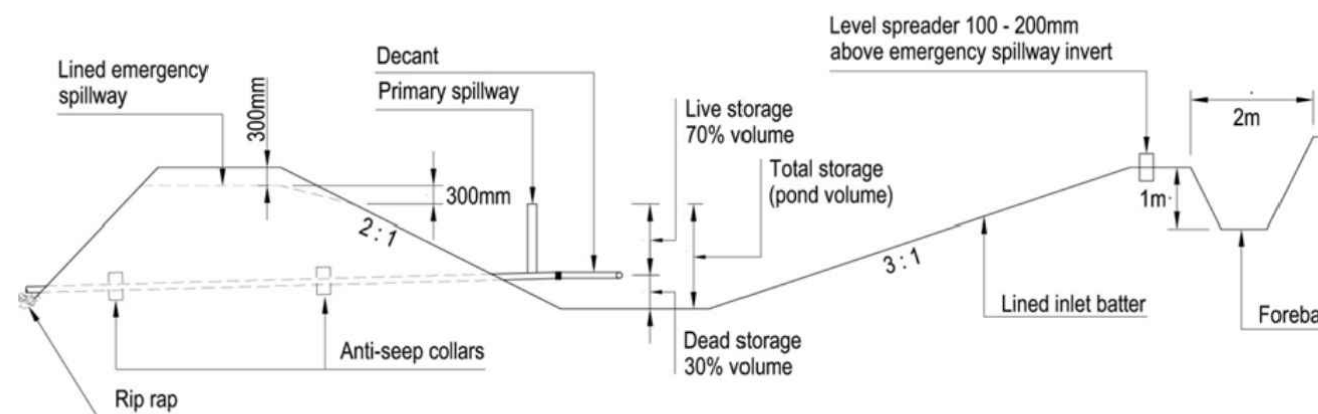


Figure 73: Sediment retention pond for 1.5 to 3 ha catchment



SRP Cross-Section

SECTION A-A
SEDIMENT RETENTION POND - DECANT DETAIL

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REV	NOTES	BY	DATE
R1	FOR RESOURCE CONSENT	JDP	20-12-22

PROJECT:
HAPAI DEVELOPMENT LP
WAIKATO HOSPITAL
48 HOSPITAL ROAD BLENHEIM

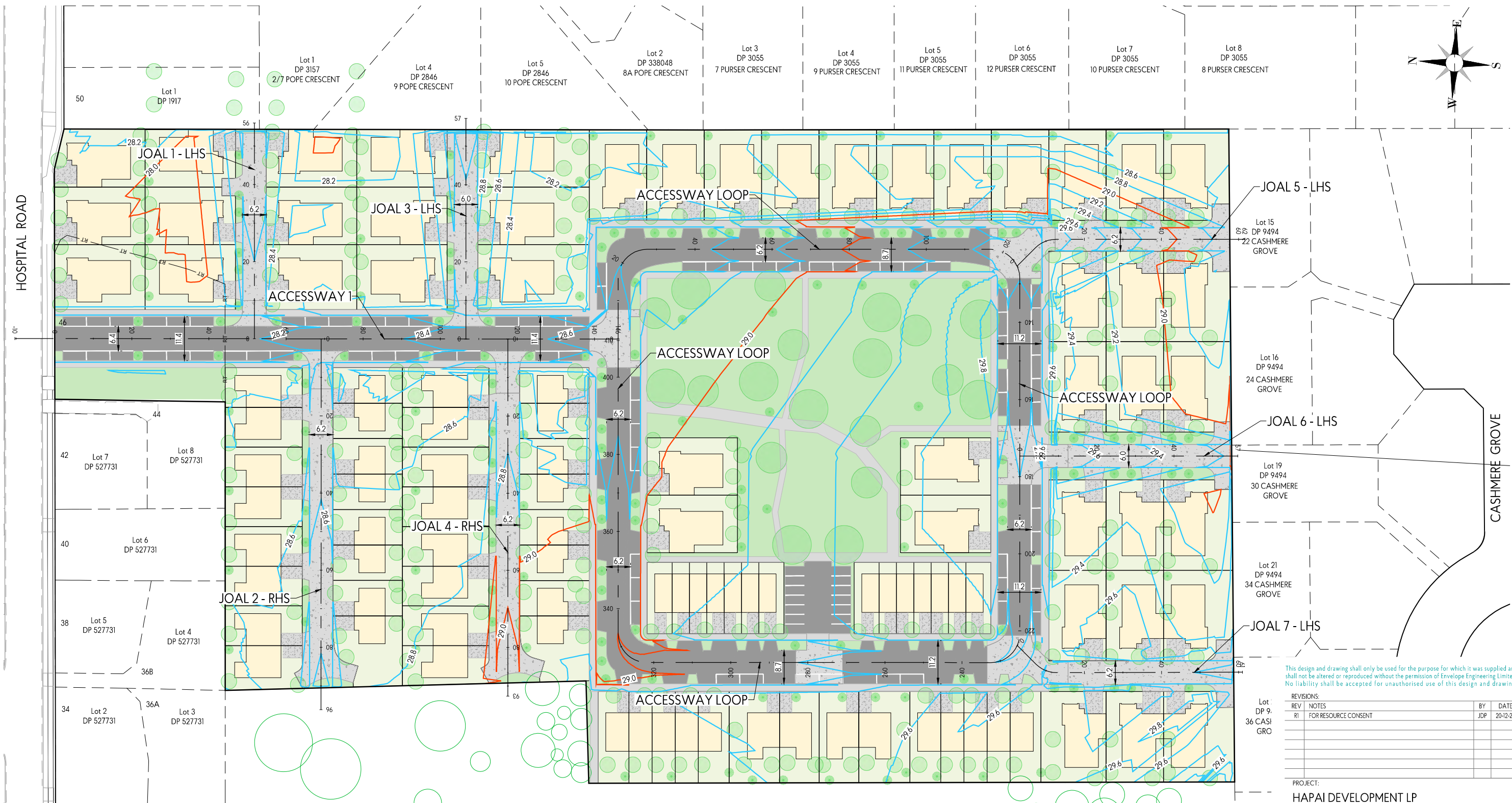
TITLE:
PROPOSED EROSION & SEDIMENT
CONTROL STANDARD DETAILS
SHEET 2 OF 2

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: JDP
CHECKED: LGM
SCALE A1: NOT TO SCALE
STATUS: RESOURCE CONSENT
PROJECT No: 1888-01

DRAWN: MJP
PLOT DATE: 19-12-2022
SCALE A3: NOT TO SCALE
DRAWING No: 251

REVISION:
R1



LEGEND:

- PROPOSED CONTOURS SHOWN AT 0.2m INTERVALS
- PROPOSED ASPHALT
- PROPOSED BERM/LANDSCAPED AREA
- PROPOSED CONCRETE

NOTES:

- PROPOSED CONTOURS SHOWN ARE FINISHED GROUND LEVELS.
- SEE SHEETS 330-333 FOR ROAD LONG SECTIONS.

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REVISIONS:		BY	DATE
REV	NOTES		
R1	FOR RESOURCE CONSENT	JDP	20-12-22

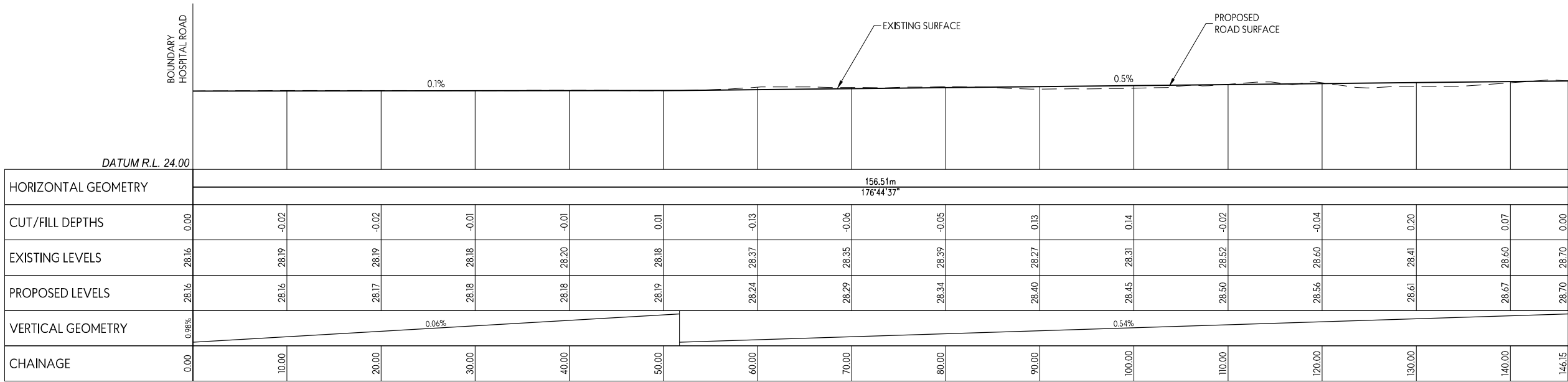
PROJECT:
HAPAI DEVELOPMENT LP
WAIRAU HOSPITAL
48 HOSPITAL ROAD BLENHEIM

TITLE:

PROPOSED ROADING LAYOUT PLAN



DESIGNED: JDP	DRAWN: MJP	
CHECKED: LGM	PLOT DATE: 19-12-2022	
SCALE A1: 1:500	SCALE A3: 1:1000	
STATUS: RESOURCE CONSENT		
PROJECT No: 1888-01	DRAWING No: 300	REVISION: R1



ACCESSWAY 1
LONGSECTION BETWEEN 0.00 AND 146.15

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REVISIONS:			
REV	NOTES	BY	DATE
R1	FOR RESOURCE CONSENT	JDP	20-12-22

PROJECT:
HAPAI DEVELOPMENT LP
WAIRAU HOSPITAL
48 HOSPITAL ROAD BLENHEIM

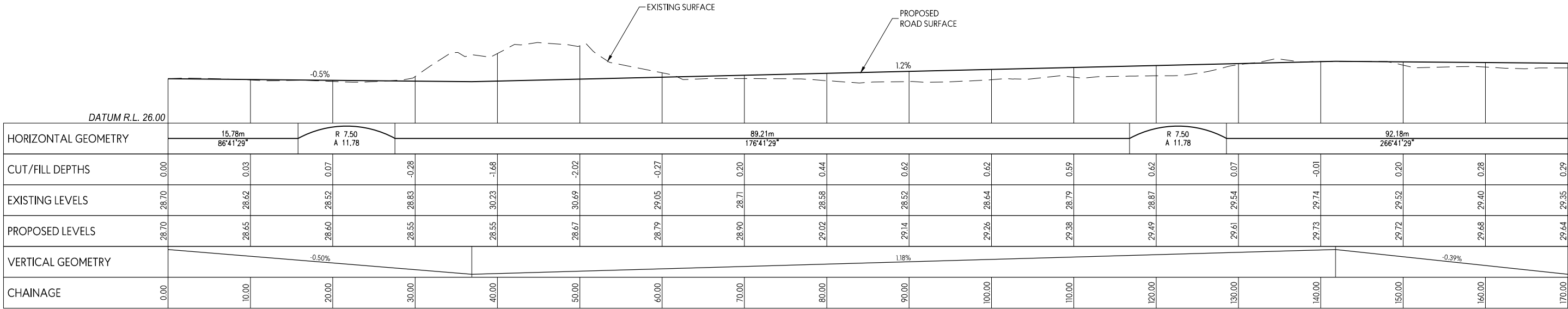
TITLE:
PROPOSED ROAD
LONG SECTIONS
SHEET 1 OF 4



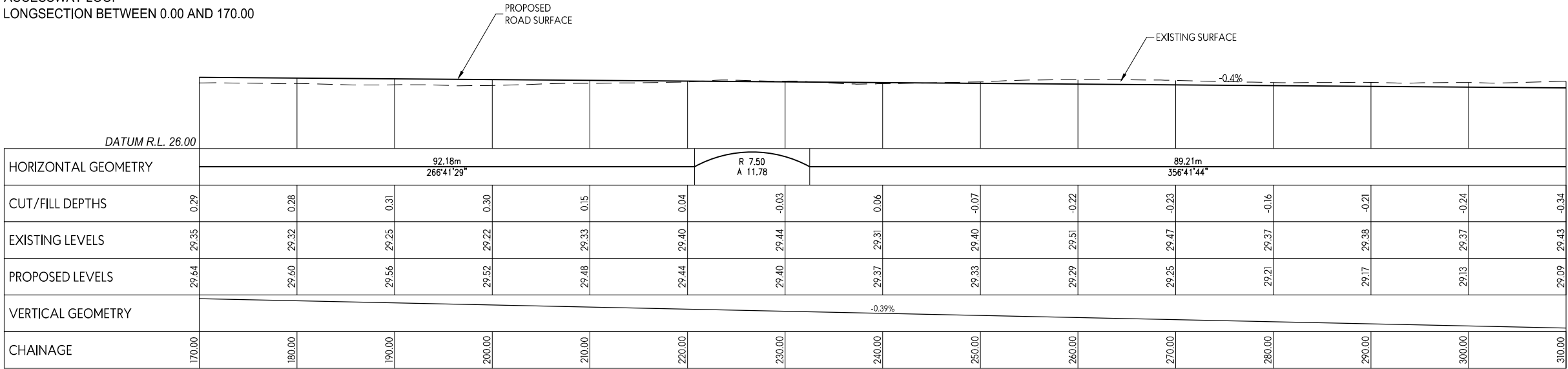
DESIGNED: JDP	DRAWN: MJP
CHECKED: LGM	PLOT DATE: 19-12-2022
SCALE A1: 1:250 HZ 1:125 VERT	SCALE A3: 1:500 HZ 1:250 VERT
STATUS: RESOURCE CONSENT	
PROJECT No: 1888-01	DRAWING No: 330
	REVISION: R1

NOTES:

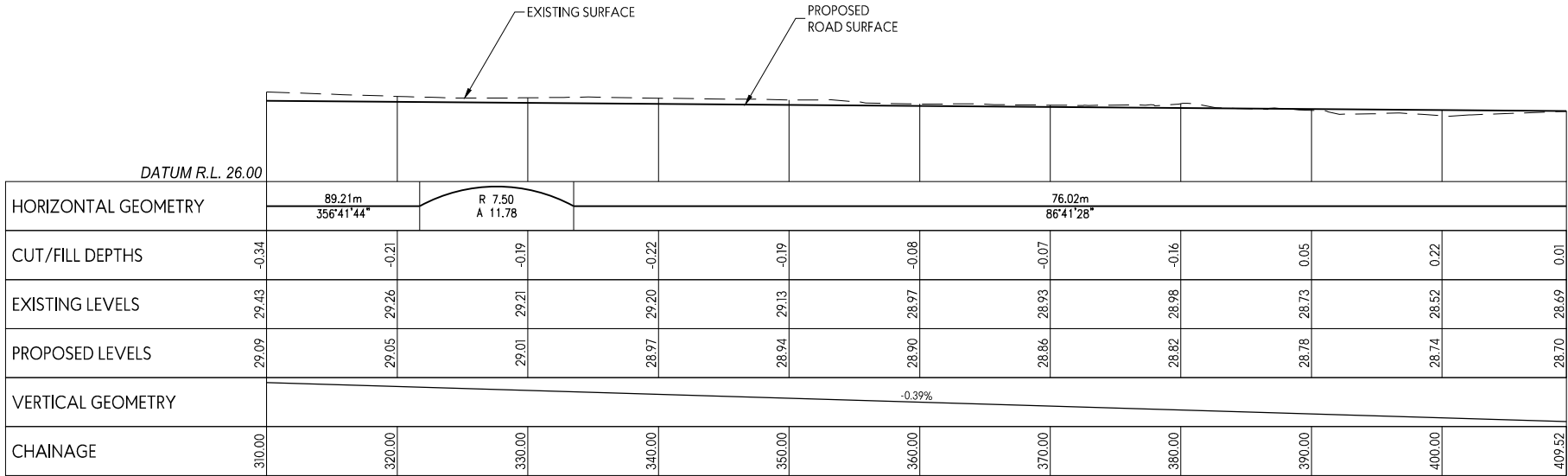
1. REFER TO DRAWING 300 FOR PROPOSED ROADING LAYOUT PLAN.



ACCESSWAY LOOP
LONGSECTION BETWEEN 0.00 AND 170.00



ACCESSWAY LOOP
LONGSECTION BETWEEN 170.00 AND 310.00



ACCESSWAY LOOP
LONGSECTION BETWEEN 310.00 AND 409.52

NOTES:

1. REFER TO DRAWING 300 FOR PROPOSED ROADING LAYOUT PLAN.

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

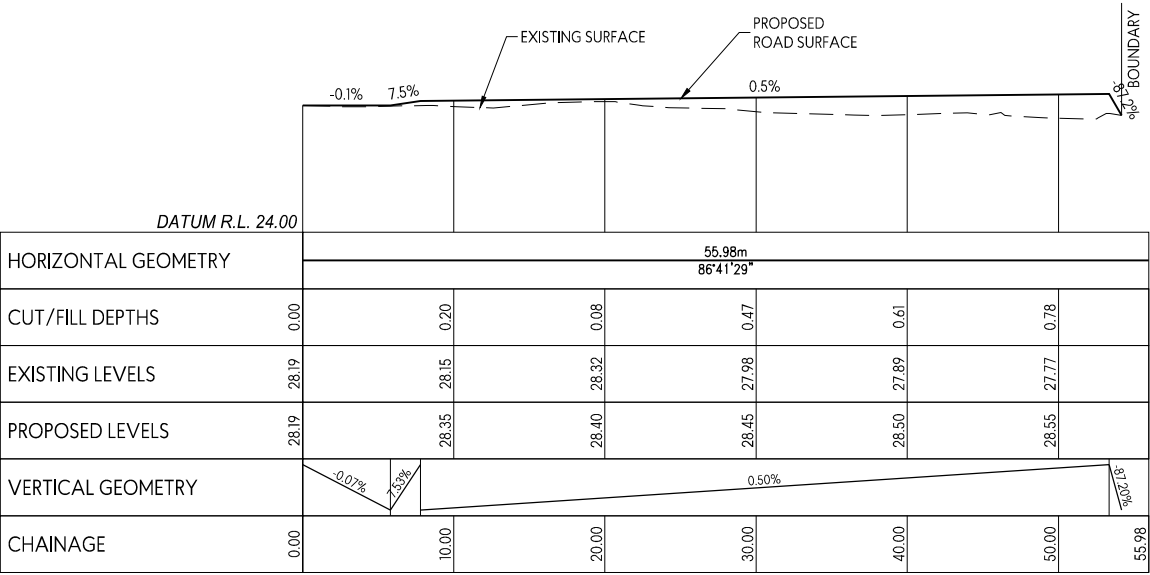
REVISIONS:			
REV	NOTES	BY	DATE
R1	FOR RESOURCE CONSENT	JDP	20-12-22

PROJECT:
HAPAI DEVELOPMENT LP
WAIRAU HOSPITAL
48 HOSPITAL ROAD BLENHEIM

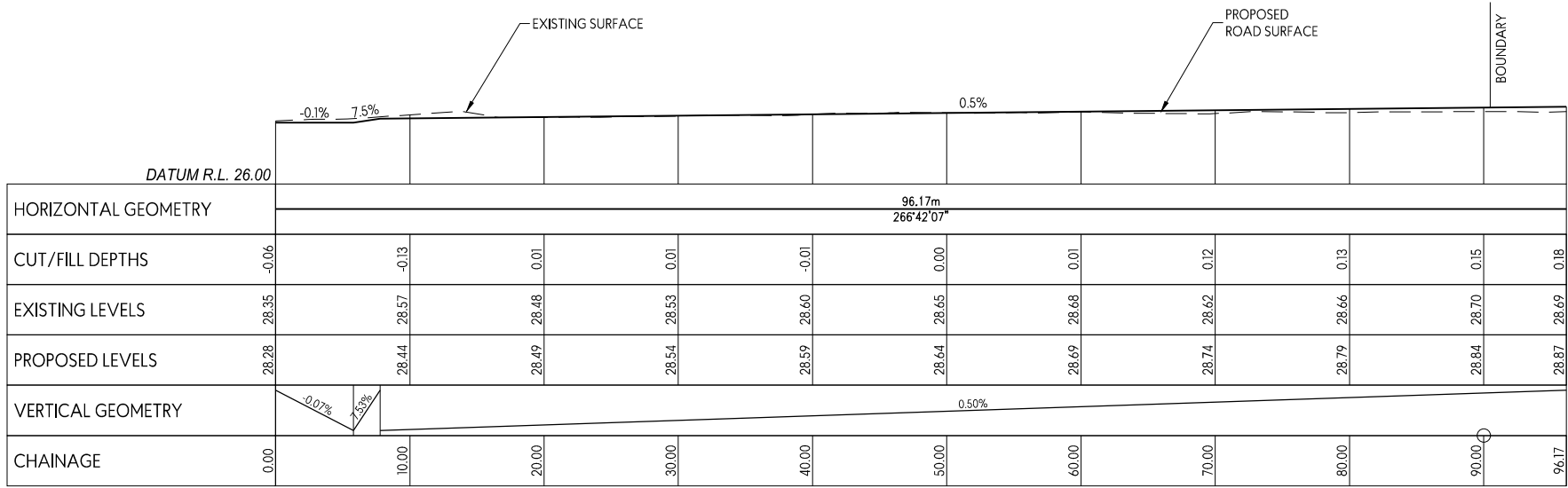
TITLE:
PROPOSED ROAD
LONG SECTIONS
SHEET 2 OF 4



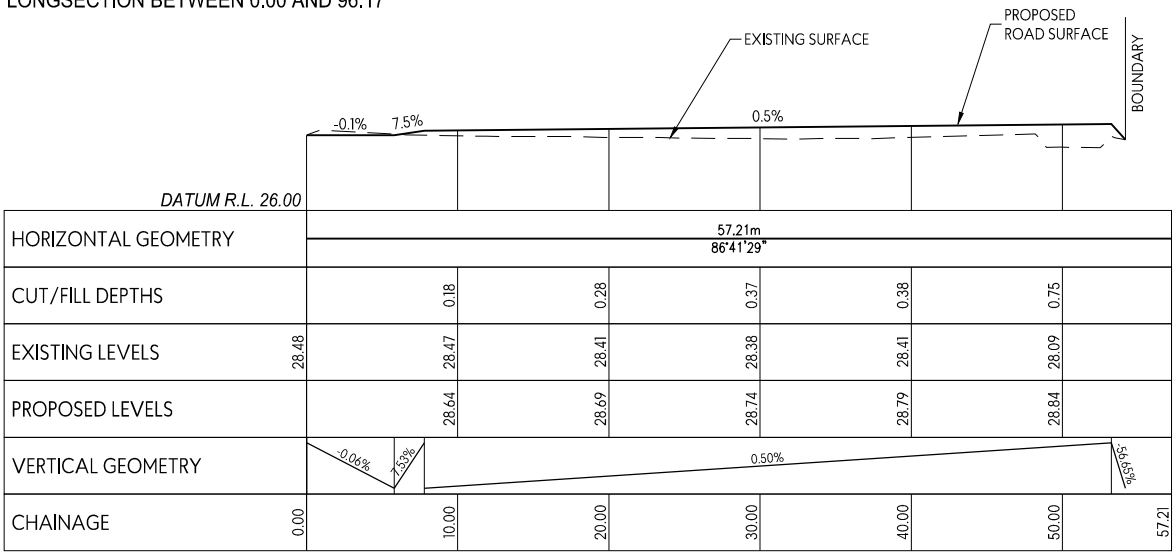
DESIGNED: JDP	DRAWN: MJP
CHECKED: LGM	PLOT DATE: 19-12-2022
SCALE A1: 1:250 HZ 1:125 VERT	SCALE A3: 1:500 HZ 1:250 VERT
STATUS: RESOURCE CONSENT	
PROJECT No: 1888-01	DRAWING No: 331
	REVISION: R1



JOAL 1 - LHS
LONGSECTION BETWEEN 0.00 AND 55.98



JOAL 2 - RHS
LONGSECTION BETWEEN 0.00 AND 96.17



JOAL 3 - LHS
LONGSECTION BETWEEN 0.00 AND 57.21

NOTES:

1. REFER TO DRAWING 300 FOR PROPOSED ROADING LAYOUT PLAN.

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

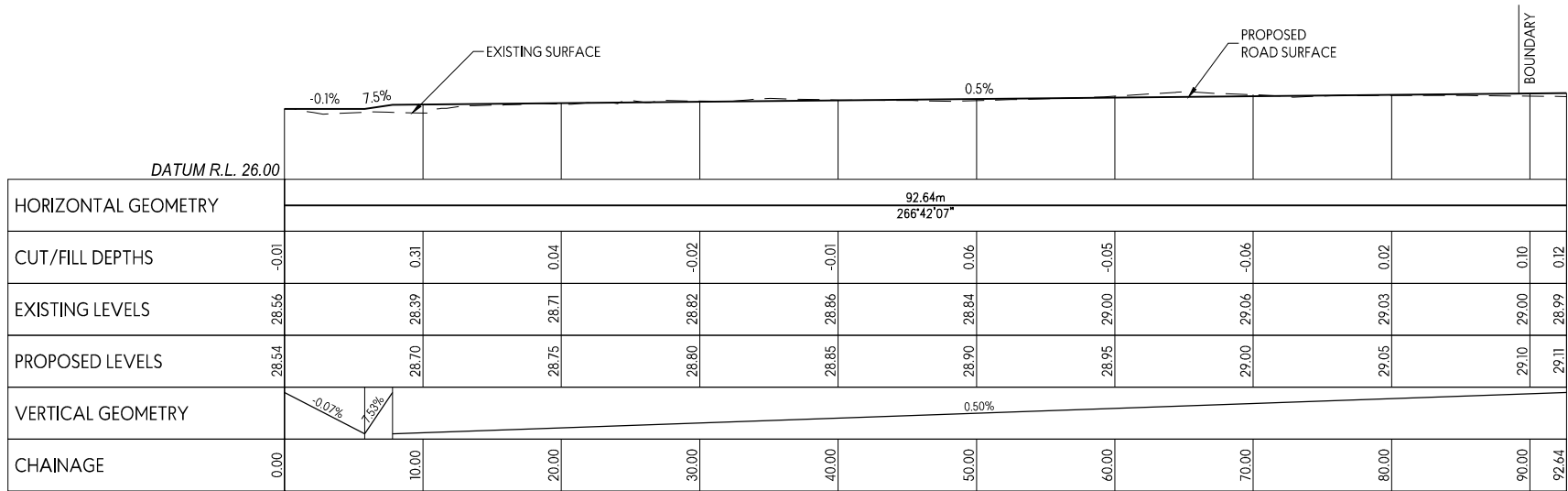
REVISIONS:			
REV	NOTES	BY	DATE
R1	FOR RESOURCE CONSENT	JDP	20-12-22

PROJECT:
HAPAI DEVELOPMENT LP
WAIRAU HOSPITAL
48 HOSPITAL ROAD BLENHEIM

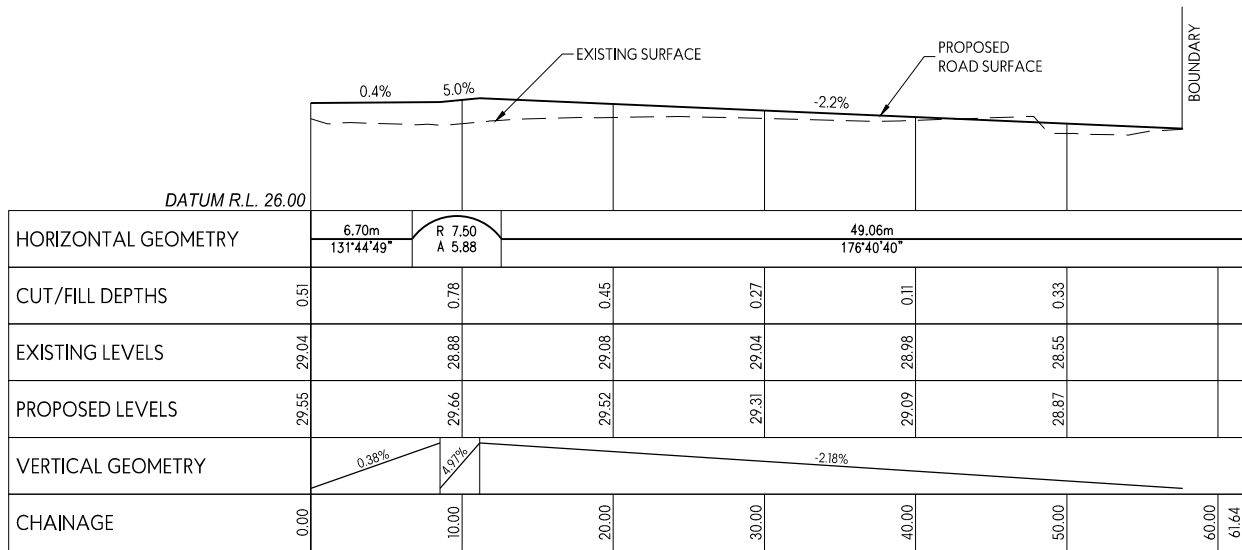
TITLE:
PROPOSED ROAD
LONG SECTIONS
SHEET 3 OF 4



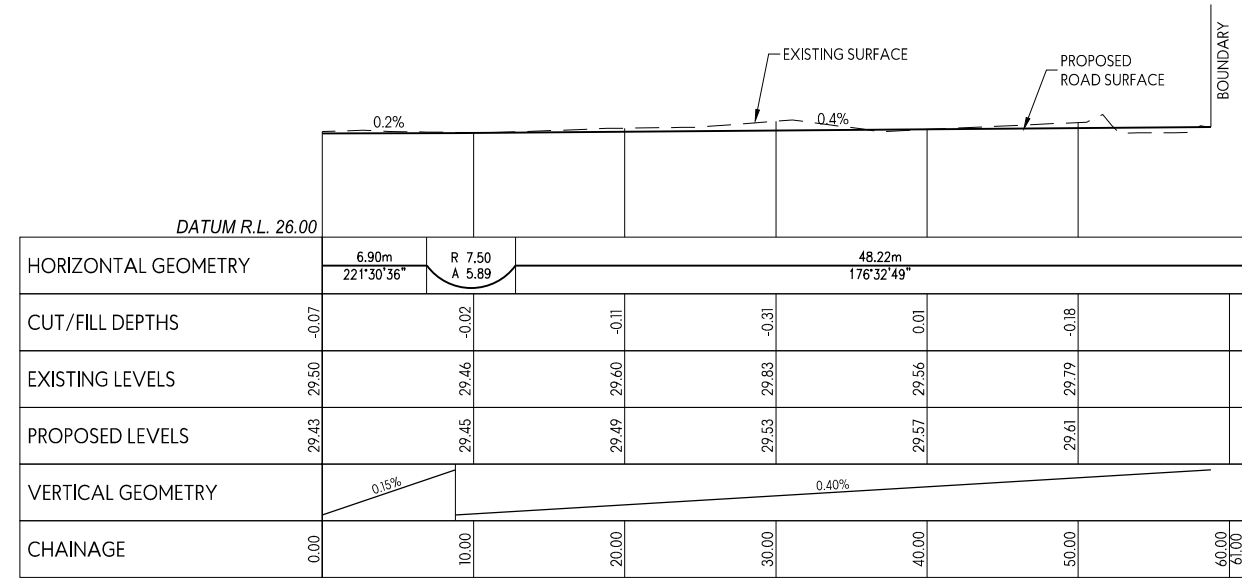
DESIGNED: JDP	DRAWN: MJP
CHECKED: LGM	PLOT DATE: 19-12-2022
SCALE A1: 1:250 HZ 1:125 VERT	SCALE A3: 1:500 HZ 1:250 VERT
STATUS: RESOURCE CONSENT	
PROJECT No: 1888-01	DRAWING No: 332
	REVISION: R1



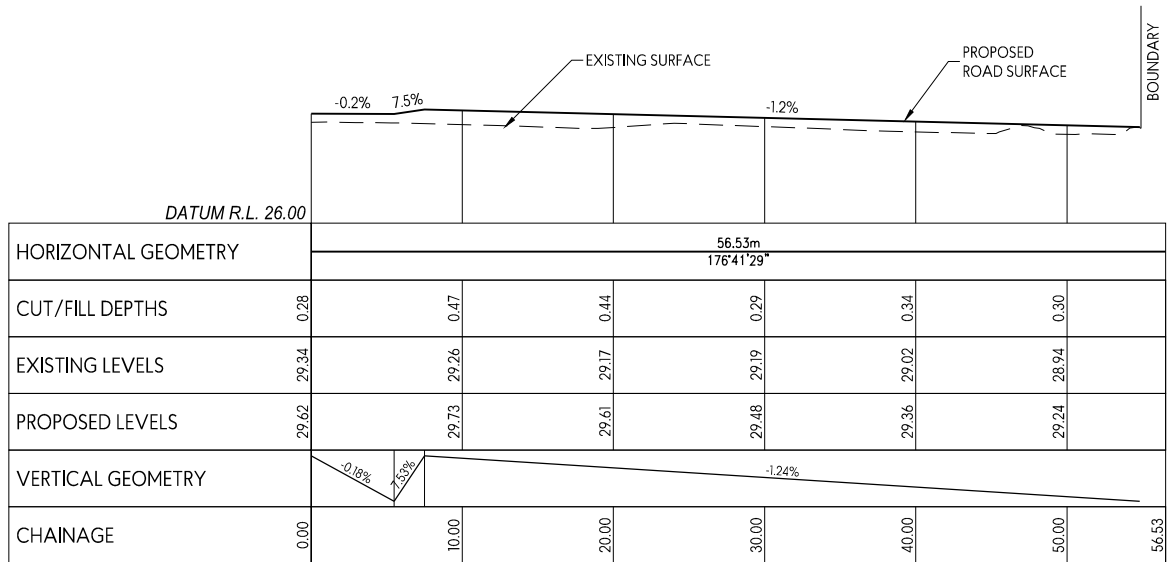
JOAL 4 - RHS
LONGSECTION BETWEEN 0.00 AND 92.64



JOAL 5 - LHS
LONGSECTION BETWEEN 0.00 AND 61.64



JOAL 7 - LHS
LONGSECTION BETWEEN 0.00 AND 61.00



JOAL 6 - LHS
LONGSECTION BETWEEN 0.00 AND 56.53

NOTES:

1. REFER TO DRAWING 300 FOR PROPOSED ROADING LAYOUT PLAN.

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

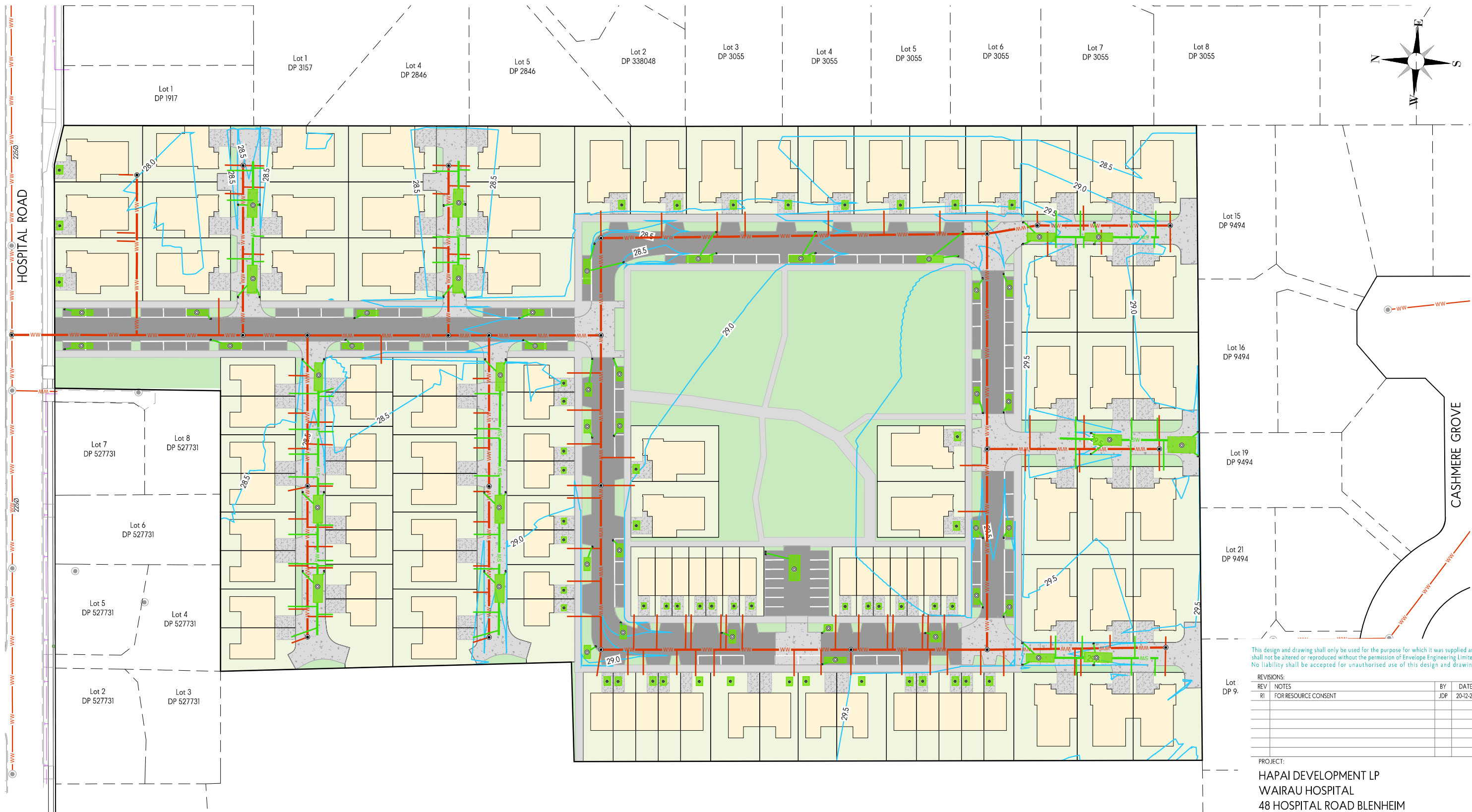
REVISIONS:			
REV	NOTES	BY	DATE
R1	FOR RESOURCE CONSENT	JDP	20-12-22

PROJECT:
HAPAI DEVELOPMENT LP
WAIRAU HOSPITAL
48 HOSPITAL ROAD BLENHEIM

TITLE:
PROPOSED ROAD
LONG SECTIONS
SHEET 4 OF 4



DESIGNED: JDP DRAWN: MJP
CHECKED: LGM PLOT DATE: 19-12-2022
SCALE A1: 1:250 HZ 1:125 VERT SCALE A3: 1:500 HZ 1:250 VERT
STATUS: RESOURCE CONSENT
PROJECT No: 1888-01 DRAWING No: 333 REVISION: R1



- NOTES:
1. ALL PUBLIC WORKS AND MATERIALS TO RELEVANT COUNCIL STANDARDS.
 2. ALL TRENCHES UNDER DRIVEWAYS TO BE BACKFILLED WITH GAP65 HARDFILL
 3. ALL PRIVATE WORKS TO BE COMPLETED IN ACCORDANCE WITH RELEVANT BUILDING CODE STANDARDS
 4. ALL MANHOLES TO BE DN1050 UNLESS OTHERWISE SHOWN
 5. ALL PUBLIC STORMWATER PIPE TO BE DN150 RCRRJ AND PRIVATE STORMWATER CONNECTIONS TO BE DN100 uPVC UNLESS OTHERWISE SHOWN
 6. ALL PUBLIC WASTEWATER PIPE TO BE DN150 uPVC SNI6 AND PRIVATE WASTEWATER LATERALS TO BE DN100 uPVC UNLESS OTHERWISE SHOWN

- LEGEND:
- PROPOSED STORMWATER
 - PROPOSED STORMWATER CONNECTION
 - PROPOSED CATCHPIT
 - PROPOSED STORMWATER SOAKPIT
 - PROPOSED WASTEWATER
 - PROPOSED WASTEWATER CONNECTION
 - EXISTING WASTEWATER

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

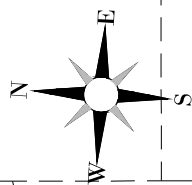
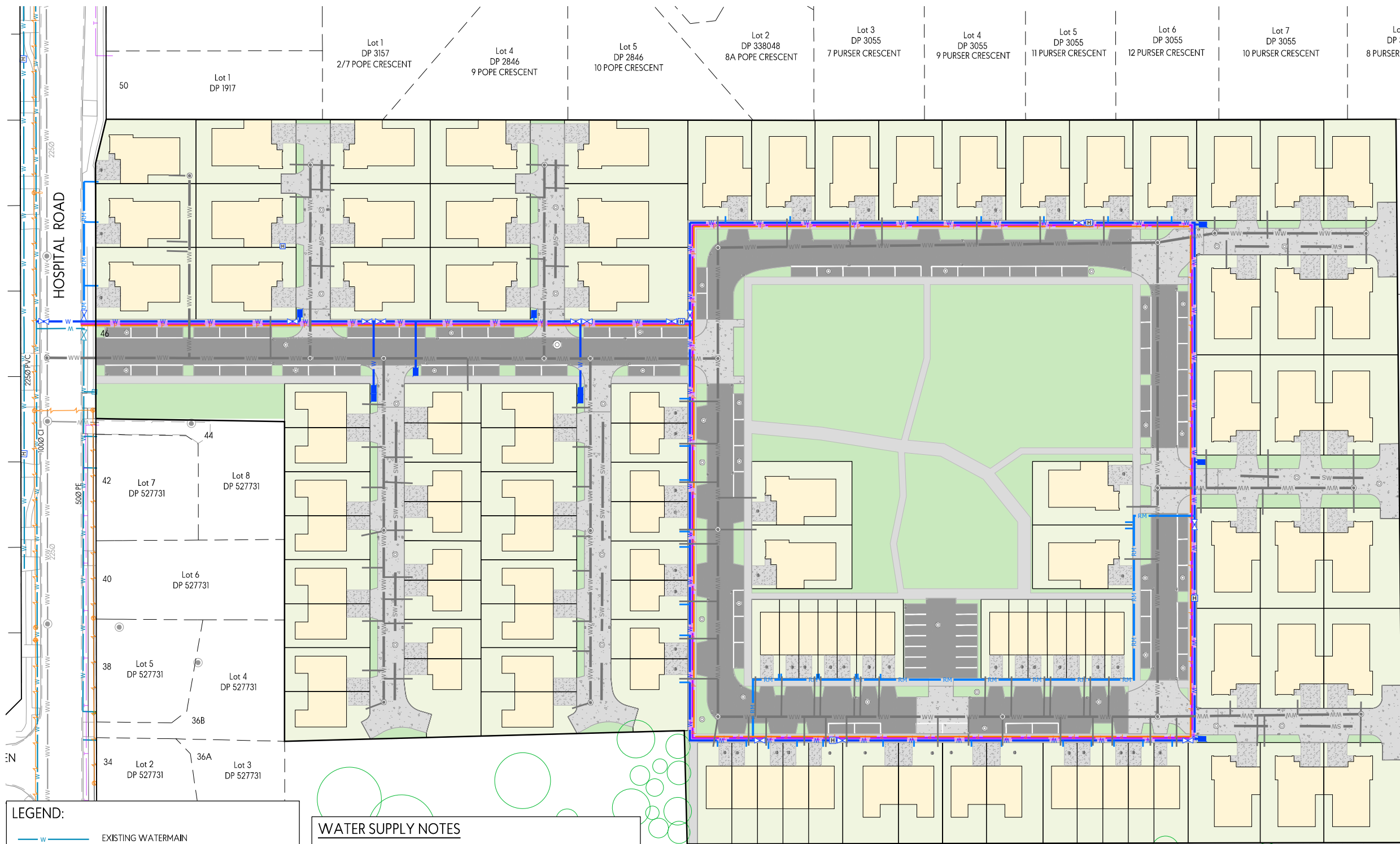
REVISIONS:			
REV	NOTES	BY	DATE
R1	FOR RESOURCE CONSENT	JDP	20-12-22

PROJECT:
HAPAI DEVELOPMENT LP
WAIRAU HOSPITAL
48 HOSPITAL ROAD BLENHEIM

TITLE:
PROPOSED
DRAINAGE
LAYOUT PLAN

ENVELOPE
W W W . E N V E L O P E . E N G . C O . N Z

DESIGNED: JDP	DRAWN: MJP	REVISION: R1
CHECKED: LGM	PLOT DATE: 19-12-2022	
SCALE A1: 1:500	SCALE A3: 1:1000	
STATUS: RESOURCE CONSENT		
PROJECT No: 1888-01	DRAWING No: 400	



LEGEND:

- W — EXISTING WATERMAIN
- RM — PROPOSED 63 OD PE100 RIDERMAIN
- W — PROPOSED DNI50 PVC-U SERIES 1 WATERMAIN
- PROPOSED COMMON SERVICES TRENCH
- ⋈ — PROPOSED VALVE
- H — PROPOSED HYDRANT
- — PROPOSED METER BANK
- PROPOSED 20mm WATER CONNECTION
- W — EXISTING WATER TOBY
- P — PROPOSED POWER
- T — PROPOSED TELECOMMUNICATIONS
- EXISTING STREETLIGHT
- ⊙ — EXISTING POWER POLE
- EXISTING OVERHEAD POWER
- T — EXISTING TELECOMMUNICATIONS

- WATER SUPPLY NOTES**
- ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH MALBOROUGH DISTRICT COUNCIL CODE OF PRACTICE FOR WATER SERVICES.
 - ALL WATER PIPE MATERIAL TO BE PE100 SDR11 PN12.
 - ALL BEDDING AND SURROUND FOR PIPES TO BE IN ACCORDANCE WITH MALBOROUGH DISTRICT COUNCIL CODE OF PRACTICE.
 - TOBIES TO BE POSITIONED 400mm OUT FROM BOUNDARY UNLESS SHOWN OTHERWISE
 - SERVICE PIPES TO BE LAID PERPENDICULAR TO MAIN AND RIDER MAIN WHERE PRACTICABLE.
 - ALL SERVICE CONNECTIONS ARE 25mmØ OD PE100 PN16 & MANIFOLD TO BE INSTALLED IN SEAL ADJACENT TO AND AS CLOSE AS PRACTICABLE TO KERB.
 - DETECTOR TAPE SHALL BE LAID ABOVE ALL WATER PIPES.
 - ALL CONCRETE TO BE 20MPa AT 28 DAYS.
 - EACH MANIFOLD TO HAVE A UNIT IDENTIFICATION TAG CLEARLY SHOWING WHICH PROPERTY IS SERVICED BY THE MANIFOLD FIXED WITH CHAIN WITHIN MANIFOLD BOX.
 - AN APPROVED WATER METER TO BE INSTALLED IN EACH MANIFOLD FOR EACH NEW WATER CONNECTION.

- STANDARD NOTES**
- POWER, GAS AND TELECOMMUNICATIONS SERVICE TRENCH TO GENERALLY FOLLOW WATERMAIN LOCATIONS.
 - THESE UTILITIES WILL BE SHOWN UPON RECEIVING THEIR SPECIFIC UTILITY DESIGN PLANS AND INCORPORATED INTO ENVELOPE'S PLAN SET.

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REVISIONS:			
REV	NOTES	BY	DATE
R1	FOR RESOURCE CONSENT	JDP	20-12-22

PROJECT:
HAPAI DEVELOPMENT LP
WAIRAU HOSPITAL
48 HOSPITAL ROAD BLENHEIM

TITLE:
PROPOSED
WATER SUPPLY & SERVICES
LAYOUT PLAN



DESIGNED: JDP	DRAWN: MJP	REVISION:
CHECKED: LGM	PLOT DATE: 19-12-2022	
SCALE A1: 1:500	SCALE A3: 1:1000	
STATUS: RESOURCE CONSENT		
PROJECT No: 1888-01	DRAWING No: 500	R1

APPENDIX 3 CALCULATIONS, SUPPORTING INFORMATION AND CORRESPONDENCE

Egmont Dixon
Level 4 – NEC House
40 Taranaki Street
Wellington 6011

Our Reference: P-001166
10 March 2022

Attention: Gemma Andrews

Soakage Testing – Former Hospital Site, Blenheim

1. Introduction

This letter has been prepared to provide a summary of soakage conditions at the former Wairau Hospital site on Hospital Road, Blenheim. It presents the investigations undertaken and the results of the soakage tests carried out.

This report should be read in conjunction with the Initia Geotechnical Due Diligence Report for the subject site, dated 28 October 2021¹. This letter report outlines the published geology and the subsurface conditions encountered in the previous ground investigation. It also discusses the key geotechnical hazards and geotechnical considerations for the proposed development.

2. Site Description and Proposed Development

The site is located adjacent to the existing Wairau Hospital and is legally described as Lot 10 DP 527731, covering an approximate area of 4.3 hectares. The site is generally flat (approximately RL 16 m) and is largely undeveloped. Most of the site is covered by vegetation or grassed area with some paved access routes through the site. The Taylor River is located approximately 900 m west of the site.

Based on readily available historical aerial photography a building occupied the centre of the site from at least 1938 until the main structure was demolished, at some time between 2004 and 2007. A smaller structure remained and was demolished between 2007 and 2010. Earthworks appear to have been completed throughout 2010, where the buildings had previously been located. Refer to Figure 1 and Figure 2 which show the location of the historical structures and the extent of the earthworks.

We understand that it is proposed to use the site for a range of residential dwellings to suit the needs of the local community.

We understand that all stormwater is to be collected from the development and discharged back into the ground. To design the soakage system, an assessment of soakage rates for the soils at the site is required.

¹ Initia Letter Report. Geotechnical Due Diligence – Former Hospital Site, Blenheim. Ref P-001166. Dated 28 October 2021



Figure 1: Historical aerial photograph (sourced from Google Earth, 2003)



Figure 2: Historical aerial photograph (sourced from Google Earth, 2010)

3. Geotechnical Investigations

4 No. test pits were carried out on 23 February 2022 for the purpose of soakage testing. The test pits were excavated by Findlater Construction using an 8 tonne excavator and overseen by an Initial Engineering Geologist. The termination depths of the test pits ranged from 1.1 m to 1.3 m deep. These were terminated at a depth suitable for soakage testing within the natural gravels.

The location of all investigations is shown on the geotechnical investigation location plan (Figure 1166-001 in Appendix A). Test pit logs are attached in Appendix B, and the details are summarised in Table 0-1 below. All soils were logged in accordance with the New Zealand Geotechnical Society (NZGS) guidelines.

Table 0-1: Test Pit Investigation Summary

Test Pit ID	Coordinates (NZTM) ¹		Elevation ² (mRL)	Termination Depth (m BGL)
	Easting (mE)	Northing (mN)		
SP01	1678953.00	5401288.00	17	1.2
SP02a	1679046.00	5401220.00	16.9	1.1
SP02b	1679046.00	5401220.00	16.9	1.6
SP03	1679087.00	5401422.00	15.7	1.3
SP04	1678979.00	5401397.00	16.3	1.3

4. Soakage testing

After excavation to the depths outlined in Table 3-1 above, each test pit was filled using a water truck for soakage testing, targeting the natural gravels. The water truck had capacity to pump at approximately 800 L/s. The details of each test are attached in Appendix C.

In the case of SP1, SP3, and SP4, the truck could not pump fast enough to fill the pits. Pumping was stopped once the water level had stabilised and would not rise, despite continued filling. Once filling had stopped, each pit was fully drained within 5 minutes (SP1 = 5min, SP3 = 4 min, and SP4 = 3 min). Each pit took between 3000 and 4000 L (SP1 & SP3 = 4000 L, SP4 = 3000 L) of water.

An initial soakage test was carried out on SP2 at a depth of 1.1 m. The top 600m of this pit comprised fill containing sandy gravelly silt, with some bricks and brick fragments, and sandy gravel, with some charcoal. The pit was filled to the top of the natural gravel deposits (approximately 0.55 m depth). The pit was fully drained within 12 minutes, taking a total of 1000 L.

SP2 was extended deeper to 1.6 m (1 m into the gravel layer), and a second test was carried out, again filling to the top of the natural gravel deposits (approximately 0.9 m). On the second test the pit also drained within 12 minutes. Taking a total of 3500 L. The difference in soakage rate is likely due to a higher fines content within the top 0.5 m of the natural gravels.

The above results do not provide enough data to produce a complete soakage curve, however they indicate that all soakage pits tested would provide sufficient soakage capacity for the proposed development. For best results soakage should be targeted at least 1.0 m below the natural ground (i.e. not including fill). Water flowed away very quickly where the pits extended at least 1.0 m into the natural gravels.



5. Conclusions

Soakage testing has been carried out at the former Wairau Hospital site on Hospital Road, Blenheim. Testing was done in 4 soakage pits across the site. The results indicate that all soakage pits tested should provide sufficient soakage capacity for the proposed development. For best results soakage should be targeted at least 1.0 m below the natural ground (i.e. not including fill).

We understand that this data will now be used by the civil designer to design a soakage system appropriately sized for the development.

6. Applicability

This letter has been prepared for Egmont Dixon, with respect to the brief provided to us. The advice and recommendations presented in this report should not be applied to any other project or used in any other context without prior written approval from Initia Limited.

Yours sincerely,



Andy Pomfret
Senior Geotechnical Engineer, Director

Attached:

- Appendix A: Site investigation plan
- Appendix B: Soakage pit logs
- Appendix C: Soakage testing results

Appendix A: Site investigation plan



NOT FOR CONSTRUCTION				
THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED AS APPROVED				
APPROVED:				
DATE:				
A	INVESTIGATION LOCATION (02/03/2022)	GG	Scale AS SHOWN Original Size A3	
Rev	Revision Description	Designed	Drawn	Checked

Unit 6, Level 1, 114 St Georges Bay Road Parnell, Auckland, 1052		EGMONT DIXON		FORMER WAIRAU HOSPITAL REDEVELOPMENT, BLENHEIM	
Phone: +64 09 977 0460 Email: enquiries@initia.co.nz		GEOTECHNICAL INVESTIGATION LOCATION PLAN		Initial Project ref: P001166	
				Figure Number 1166-001	Revision A

Appendix B: Soakage pit logs

 INITIA GEOTECHNICAL SPECIALISTS		TEST PIT LOG					HOLE NO.: SP2		
		CLIENT: Egmont Dixon PROJECT: Former Hospital, Blenheim		SITE LOCATION: Hospital Road, Witherlea, Blenheim 7201		Project Ref.: P-001166			
CO-ORDINATES: 1679046.0mE, 5401220.0mN Co-ordinate system: NZTM Location method: GPSH		ELEVATION: 16.9m Datum: NZVD 2016 Level method: CONTOUR		CONTRACTOR: Findlater Constructi MACHINE: 8tn Excavator OPERATOR: Kris		START DATE: 23/02/2022 END DATE: 23/02/2022 LOGGED BY: APK CHECKED BY: MDH			
MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)		SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa) Vane:		WATER	
					2 4 6 8 10 12 14 16 18	50 100 150 200	Values		
Fill SILT; dark brown. Stiff; low plasticity; moist. Sandy gravelly SILT, with some bricks and brick fragments; grey and brown. Stiff; low plasticity; moist.			0.2						Groundwater Not Encountered
Holocene River Deposits Sandy GRAVEL, with some charcoal; red, black and brown. Moist; loosely packed. Sandy cobbly GRAVEL; grey and brown . Moist; cobbles, up to 200mm; loosely packed.			0.4						
EOH: 1.60m			0.6						
			0.8						
			1.0						
			1.2						
			1.4						
			1.6						
			1.8						
			2.0						
			2.2						
			2.4						
			2.6						
			2.8						
			3.0						
			3.2						
			3.4						
			3.6						
			3.8						
			4.0						
			4.2						
			4.4						
			4.6						
			4.8						
		REMARKS Hole terminated at target depth for soakage testing.							
		WATER ☐ Standing Water Level ☐ Out flow ☐ In flow							
		INVESTIGATION TYPE ☐ Hand Auger ☒ Test Pit							

 INITIA GEOTECHNICAL SPECIALISTS		TEST PIT LOG					HOLE NO.: SP3	
		CLIENT: Egmont Dixon PROJECT: Former Hospital, Blenheim		SITE LOCATION: Hospital Road, Witherlea, Blenheim 7201		Project Ref.: P-001166		
CO-ORDINATES: 1679087.0mE, 5401422.0mN Co-ordinate system: NZTM Location method: GPSH		ELEVATION: 15.7m Datum: NZVD 2016 Level method: CONTOUR		CONTRACTOR: Findlater Constructi MACHINE: 8tn Excavator OPERATOR: Kris		START DATE: 23/02/2022 END DATE: 23/02/2022 LOGGED BY: APK CHECKED BY: MDH		
MATERIAL DESCRIPTION (See Classification & Symbolology sheet for details)		SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa) Vane:		WATER
					2 4 6 8 10 12 14 16 18	50 100 150 200	Values	
Topsoil	SILT, with some rootlets and clay and sand, with trace gravel; dark brown. Very stiff; moist.		0.2					
Holocene River Deposits	Sandy cobbly GRAVEL, with some roots and rootlets; brown and grey. Moist; cobbles, up to 200mm; tightly packed.		0.4					
	EOH: 1.30m		0.6					
			0.8					
			1.0					
			1.2					
			1.4					
			1.6					
			1.8					
			2.0					
			2.2					
			2.4					
			2.6					
			2.8					
			3.0					
			3.2					
			3.4					
			3.6					
			3.8					
			4.0					
			4.2					
			4.4					
			4.6					
			4.8					
					REMARKS			
					Hole terminated at target depth for soakage testing.			
WATER ☐ Standing Water Level ☐ Out flow ☐ In flow					INVESTIGATION TYPE ☐ Hand Auger ☒ Test Pit			

 INITIA GEOTECHNICAL SPECIALISTS		TEST PIT LOG										HOLE NO.: SP4										
		CLIENT: Egmont Dixon PROJECT: Former Hospital, Blenheim				SITE LOCATION: Hospital Road, Witherlea, Blenheim 7201						Project Ref.: P-001166										
		CO-ORDINATES: 1678979.0mE, 5401397.0mN Co-ordinate system: NZTM Location method: GPSH				ELEVATION: 16.3m Datum: NZVD 2016 Level method: CONTOUR		CONTRACTOR: Findlater Constructi MACHINE: 8tn Excavator OPERATOR: Kris		START DATE: 23/02/2022 END DATE: 23/02/2022 LOGGED BY: APK CHECKED BY: MDH												
MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)				SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)						VANE SHEAR STRENGTH (kPa) Vane:				WATER					
To ps oil				Clayey SILT, with some gravel; brown . Very stiff; low plasticity; moist.																		Groundwater Not Encountered
Holocene River Deposits				Sandy cobbly GRAVEL; brown and grey. Moist; cobbles, up to 200mm; tightly packed.																		
EOH: 1.30m																						

Appendix C: Soakage testing results

P-001166 - Former Hospital, Blenheim - Soakage Testing Results

23/02/2022

Pit size and filling details					
	SP1	SP2a	SP2b	SP3	SP4
Depth	1.2	1.1	1.6	1.3	1.3
Width	1.2	1.3	1.3	1.4	1.3
Length	1.8	1.7	1.7	1.7	1.6
Filling remarks (Truck pumped at approximately 800L/min)	5 min to fill to 0.55m Could not fill past this point	2 min to fill to 0.55m	4 min to fill to 0.9 m	5 min to fill to 0.45 Could not fill past this point	4 min to fill to 0.4 Could not fill past this point
Total Liters	4000	1000	3500	4000	3000

Tests					
Time (min)	SP1	SP2a	SP2b	SP3	SP4
0	0.55	0.55	0.9	0.45	0.4
1	0.4	0.45	0.7	0.26	0.1
2	0.25	0.375	0.6	0.14	0
3	0.15	0.325	0.5	0.03	
4	0.05	0.275	0.43	0	
5	0	0.225	0.36		
6		0.2	0.31		
7		0.175	0.26		
8		0.15	0.19		
9		0.12	0.14		
10		0.07	0.09		
11		0.03	0.04		
12		0	0		

Title Project Location: Job Number Date Calculated by Reviewed by	Soakage Calculation Wairau Hospital, Blenheim 1888-01 15/12/2022 Taher Tejani Laurent Marechal
--	--



Soakage Pit Calculation - SP1

Lot		Road Catchment		Enter the average drop in level over 110 mm							
Land size		250		Unfactored Soakage Rate = 1320 mm/hr							
Roof Area		0		Factored Soakage Rate (n=2) = 660 mm/hr							
Drive Area		250									
Patio & Paths		0									
Lawn/garden		0									
Impermeable area		250									
% Impermeable		100.00%									
Run-off Coefficient C=0.25 for lawn areas C=0.9 for impermeable areas	C=	0.90		10 minute	20 minute	30 minute	1 hr	2 hr	6 hr	12 hr	24 hr
Time Period, x (hr)				0.17	0.33	0.50	1.00	2.00	6.00	12.00	24.00
Intensity (mm/hr) 10% AEP, xth time period	I=			86	58.2	47	33.1	23.4	13.2	8.87	5.74
Site Area (Ha)	A=	0.025									
run-off discharged from catchment to soak pit in x hours (m3) $R_c = 10 \cdot C \cdot I \cdot A$	$R_c =$			3.23	4.32	5.29	7.45	10.53	17.82	23.95	31.00
Area of base of pit (m2)	$A_{tank} =$	6.00									
Soakage Rate (mm/hr) with permeability reduction factor of 0.5	$S_r =$	660									
Volume disposed of by soakage in x hours - $V_{soak} = (A_{sp} \cdot S_r) / 1000$	$V_{soak} =$			0.66	1.31	1.98	3.96	7.92	23.76	47.52	95.04
Storage Required - xth Hour Event				2.57	3.01	3.31	3.49	2.61	0.00	0.00	0.00
Volume of storage required $= R_c - V_{soak}$	$V_{stor} =$	3.49									

Indicates critical time period and storage

Therefore use

- 1050mm dia perforated manhole 1.5m deep 1.73 m3
- Area*Depth(d)*0.38 (Rock/gravel filled) 2.93 m3

Total Volume Provided = 4.66
Time to empty after rain event 0.9 hours

Depth of MH = 2 m

assumes pit 1.5m deep with
0.5m topsoil/pavement on above

Check greater than V_{stor}
Check less than 24 hours

Title Project Location: Job Number Date Calculated by Reviewed by	Soakage Calculation Wairau Hospital, Blenheim 1888-01 15/12/2022 Taher Tejani Laurent Marechal
--	--



Soakage Pit Calculation - SP2

Lot		Road Catchment		Enter the average drop in level over 54 mm							
Land size		200		Unfactored Soakage Rate = 648 mm/hr							
Roof Area		0		Factored Soakage Rate (n=2) = 324 mm/hr							
Drive Area		200									
Patio & Paths		0									
Lawn/garden		0									
Impermeable area		200									
% Impermeable		100.00%									
Run-off Coefficient C=0.25 for lawn areas C=0.9 for impermeable areas	C=	0.90		10 minute	20 minute	30 minute	1 hr	2 hr	6 hr	12 hr	24 hr
Time Period, x (hr)				0.17	0.33	0.50	1.00	2.00	6.00	12.00	24.00
Intensity (mm/hr) 10% AEP, xth time period	I=			86	58.2	47	33.1	23.4	13.2	8.87	5.74
Site Area (Ha)	A=	0.02									
run-off discharged from catchment to soak pit in x hours (m3) $R_c = 10 \cdot C \cdot I \cdot A$	$R_c =$			2.59	3.46	4.23	5.96	8.42	14.26	19.16	24.80
Area of base of pit (m2)	$A_{tank} =$	6.00									
Soakage Rate (mm/hr) with permeability reduction factor of 0.5	$S_r =$	324									
Volume disposed of by soakage in x hours - $V_{soak} = (A_{sp} \cdot S_r) / 1000$	$V_{soak} =$			0.32	0.64	0.97	1.94	3.89	11.66	23.33	46.66
Storage Required - xth Hour Event				2.26	2.82	3.26	4.01	4.54	2.59	0.00	0.00
Volume of storage required $= R_c - V_{soak}$	$V_{stor} =$	4.54									

Indicates critical time period and storage

Therefore use

- 1050mm dia perforated manhole 1.5m deep 1.73 m3
- Area*Depth(d)*0.38 (Rock/gravel filled) 2.93 m3

Total Volume Provided = 4.66
Time to empty after rain event 2.3 hours

Depth of MH = 2 m

assumes pit 1.5m deep with
0.5m topsoil/pavement on above

Check greater than V_{stor}
Check less than 24 hours

Title Project Location: Job Number Date Calculated by Reviewed by	Soakage Calculation Wairau Hospital, Blenheim 1888-01 15/12/2022 Taher Tejani Laurent Marechal
--	--



Soakage Pit Calculation - SP2

Lot		Road Catchment		Enter the average drop in level over 54 mm							
Land size		250		Unfactored Soakage Rate = 648 mm/hr							
Roof Area		0		Factored Soakage Rate (n=2) = 324 mm/hr							
Drive Area		250									
Patio & Paths		0									
Lawn/garden		0									
Impermeable area		250									
% Impermeable		100.00%									
Run-off Coefficient C=0.25 for lawn areas C=0.9 for impermeable areas	C=	0.90		10 minute	20 minute	30 minute	1 hr	2 hr	6 hr	12 hr	24 hr
Time Period, x (hr)				0.17	0.33	0.50	1.00	2.00	6.00	12.00	24.00
Intensity (mm/hr) 10% AEP, xth time period	I=			86	58.2	47	33.1	23.4	13.2	8.87	5.74
Site Area (Ha)	A=	0.025									
run-off discharged from catchment to soak pit in x hours (m3) $R_c = 10 \cdot C \cdot I \cdot A$	$R_c =$			3.23	4.32	5.29	7.45	10.53	17.82	23.95	31.00
Area of base of pit (m2)	$A_{tank} =$	8.00									
Soakage Rate (mm/hr) with permeability reduction factor of 0.5	$S_r =$	324									
Volume disposed of by soakage in x hours - $V_{soak} = (A_{sp} \cdot S_r) / 1000$	$V_{soak} =$			0.43	0.86	1.30	2.59	5.18	15.55	31.10	62.21
Storage Required - xth Hour Event				2.80	3.47	3.99	4.86	5.35	2.27	0.00	0.00
Volume of storage required $= R_c - V_{soak}$	$V_{stor} =$	5.35									

Indicates critical time period and storage

Therefore use

- 1050mm dia perforated manhole 1.5m deep
- Area*Depth(d)*0.38 (Rock/gravel filled)

1.73	m3
4.07	m3

Depth of MH = 2 m

assumes pit 1.5m deep with
0.5m topsoil/pavement on above

Total Volume Provided =
Time to empty after rain event

5.80	
2.1	hours

Check greater than V_{stor}
Check less than 24 hours

Title Project Location: Job Number Date Calculated by Reviewed by	Soakage Calculation Wairau Hospital, Blenheim 1888-01 15/12/2022 Taher Tejani Laurent Marechal
--	--



Soakage Pit Calculation - SP3

Lot		Road Catchment		Enter the average drop in level over 90 mm							
Land size		315		Unfactored Soakage Rate = 1080 mm/hr							
Roof Area		0		Factored Soakage Rate (n=2) = 540 mm/hr							
Drive Area		315									
Patio & Paths		0									
Lawn/garden		0									
Impermeable area		315									
% Impermeable		100.00%									
Run-off Coefficient C=0.25 for lawn areas C=0.9 for impermeable areas	C=	0.90		10 minute	20 minute	30 minute	1 hr	2 hr	6 hr	12 hr	24 hr
Time Period, x (hr)				0.17	0.33	0.50	1.00	2.00	6.00	12.00	24.00
Intensity (mm/hr) 10% AEP, xth time period	I=			86	58.2	47	33.1	23.4	13.2	8.87	5.74
Site Area (Ha)	A=	0.0315									
run-off discharged from catchment to soak pit in x hours (m3) $R_c = 10 \cdot C \cdot I \cdot A$	$R_c =$			4.07	5.44	6.66	9.38	13.27	22.45	30.18	39.05
Area of base of pit (m2)	$A_{tank} =$	7.50									
Soakage Rate (mm/hr) with permeability reduction factor of 0.5	$S_r =$	540									
Volume disposed of by soakage in x hours - $V_{soak} = (A_{sp} \cdot S_r) / 1000$	$V_{soak} =$			0.68	1.34	2.03	4.05	8.10	24.30	48.60	97.20
Storage Required - xth Hour Event				3.40	4.11	4.64	5.33	5.17	0.00	0.00	0.00
Volume of storage required $= R_c - V_{soak}$	$V_{stor} =$	5.33									

Indicates critical time period and storage

Therefore use

- 1050mm dia perforated manhole 1.5m deep 1.73 m3
- Area*Depth(d)*0.38 (Rock/gravel filled) 3.78 m3

Depth of MH = 2 m

assumes pit 1.5m deep with 0.5m topsoil/pavement on above

Total Volume Provided = 5.51
Time to empty after rain event 1.3 hours

Check greater than V_{stor}
Check less than 24 hours

Laurent Marechal

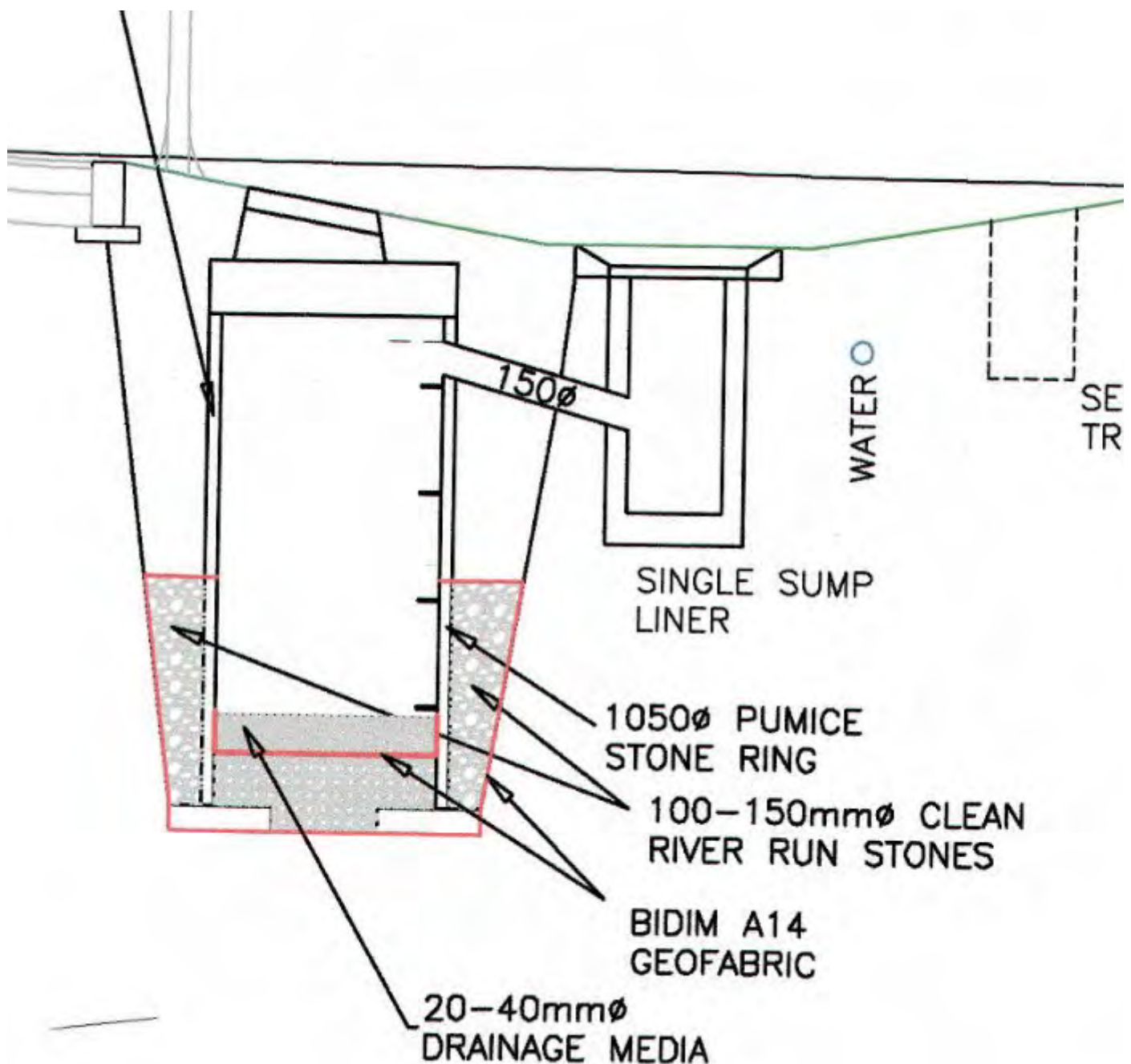
From: Brett Walker-5194 s 9(2)(a)
Sent: Friday, 16 December 2022 10:28 am
To: Laurent Marechal
Subject: RE: Wairau, Blenheim

Hi Laurent,

The following is an example of a recent soakpit installation.

This example was taking discharge from a swale. Your proposal will likely be taking discharge from a kerb and channel so the setup will look a bit different.

- The reverse grade on the pipeline ensures that anything floating on the surface stays within the sump



SEDIMENT RETENTION POND SRP 1

PROJECT No : 1888-01 BY : JDP DATE : 19/12/2022 CHECKED : LGM

SITE DESCRIPTION : Wairau Hospital

CONTRIBUTING CATCHMENT 4.9 ha
 WORKING AREA : 4.9 ha
 AVERAGE SITE SLOPE : 5 % Three slopes used; 1:6, 1:148 and 1:36. Average taken
 SITE LENGTH : 350 m

Minimum Sediment Pond Size

The size of the pond, in m³, is 3 % of the total contributing catchment, in m².

Pond volume = 1470 m³

Proposed Sediment Pond

Length/Width ratio = 3 :1 16
 Pond Dimensions =

	Width	Length
@ av depth	15.3	45.9
@ spillway MH level	21.3	51.9
@ Floor level	9.3	39.9

	Width	Length
Crest	25.4	56.0
Floor	9.3	40

(This is the height of the dam above the outlet manhole including freeboard and 1%AEP spillway)

Surface Area = 1105 m²
 Pond Depth = 2 m
 Side Slopes = 1vt : 3 hz

Pond Volume = 1477 m³ Av depth(spillway level * floor level)/2 Spreaders Flow Rate l/s 14.7 Number 4

Spillway Design

- Design for 1% AEP rainfall

The Peak Flow is calculated using the Rational Method: Q = 2.78CIA

• Runoff coefficient, C

Working Area C = 0.6 Remaining Area C = 0.6

Cave = 0.6

• Rainfall Intensity, I

Mannings, n = 0.022
 tc = 11.0 minutes (From "A Guideline and Procedure for Hydrological Design of Urban Stormwater Systems")

Calculate I from 1% AEP From NIWA HIRDS
 I = 89 mm/hr

1% AEP flow = 0.73 m³/s

Spillway Detail

Use Q = CLH^{3/2} to calculate the spillway height (H)

Spillway width, L = 3 m
 Free board = 0.3 m
 C = 1.6 (Assume broad crested weir)

Spillway Height = 0.58 m (This is the height of the flow above the outlet manhole including freeboard)

PROJECT: Wairau Hospit: **Blenheim** 1888-01
DATE: 19-Dec
CALCS BY: LM



Using 'Malborough City Council - Development Subdivision'

Max.Design Flow Q =	PWWF			
ADWF (litres/s/p) =	0.00289	(Residential)	Area	0.413
Peaking Factor =	2.50		Direct Inflow	0
PWWF (litres/s/p) =	3.01	(Residential)	Infiltration	3.00

ha

k - pvc	0.0006
k - con.	0.0015
g	9.8
v	1E-06

Basic Person:

Residential	Unit=	3.5	persons/unit
Commercial	Unit=		persons/m2

Zone	
Min Area	

Proposed Development At:

	site	Residential	Commercial
Unit		105	
Area (ha)			

up. 1	Residential	Commercial
	0	

up. 2	Residential	Commercial
	0	

Flow (litres/sec):

	Site (total)	Residential	Commercial
ADWF	1.06	1.06	
PDWF	2.66	2.66	
PWWF	5.66	5.66	

up. 1	Residential	Commercial
0.00	0.00	
0.00	0.00	
0.00	0.00	

up. 2	Residential	Commercial
0.00	0.00	
0.00	0.00	
0.00	0.00	

Assumed 1km of u/s network contributing to infiltration as no available information on existing infrastructure.

Laurent Marechal

From: Brett Walker-5194 s 9(2)(a)
Sent: Monday, 31 January 2022 10:02 am
To: Laurent Marechal
Subject: FW: Wairau Hospital land Development - Sewer and Water Capacity Modelling for development of 100 Lots - BWa1

Pn539907#04
Hi Laurent,

Council confirm that the current Wastewater and Water systems with some already anticipated upgrades have the capacity to service your proposed Development of the Wairau Hospital land.

The following is understood;

- Area of Land to be Developed does not exceed 4.5 Ha,
- The proposal is for 100 Lots @ an estimated 3.5 people per Lot.

Water

- Council's water supply along Hospital Road has the capacity to satisfy residential development of this property for up to 100 dwellings / Lots.
- The Development Contributions will be applied in accordance with the Development Contribution Policy.
- There will not be any special upgrades or levies applicable in addition to the std payment of Development contributions.
- All costs associated with installation of infrastructure to service the proposed development will be at cost to the Developer.
- Council's Level of service;
 - o Assuming the proposal is a residential subdivision, - the design of mains within the development area must be designed to ensure minimal head loss. Water mains must be installed at a minimum size of 150mm diameter.
 - o This will allow provision for a minimum of 300kPa at each Lot / road boundary for domestic supply under normal peak Hour operating conditions.
 - o To provide 100kPa at the Council owned water main within the Development for a Fire supply of 25l/s.
- Services within the Development must be designed and installed in accordance with Councils Code of Practice for Subdivision and Land Development to the approval of Council. (Water mains to a minimum size of 150mm diameter)

Waste water

- Council's wastewater system along Hospital Road has the capacity to satisfy residential development of this property for up to 100 dwellings / Lots.
- The Development Contributions will be applied in accordance with the Development Contribution Policy.
- There will not be any special upgrades or levies applicable in addition to the std payment of Development contributions.
- All costs associated with installation of infrastructure to service the proposed development will be at cost to the Developer.
- Services within the Development must be designed and installed in accordance with Councils Code of Practice for Subdivision and Land Development to the approval of Council.

Please communicate with A&SServices@marlborough.govt.nz for further information about the actual detail associated with each point of connection if you have not already done so.

Please also note that we will be back in touch with reference to the 150 Lot proposal.
I am awaiting some more information from our modellers with respect to timing.

Regards

BRETT WALKER

INFRASTRUCTURAL PROJECTS ENGINEER

Tel: (03) 5207400

Fax: (03) 578 6866

s 9(2)(a)

s 9(2)(a)