

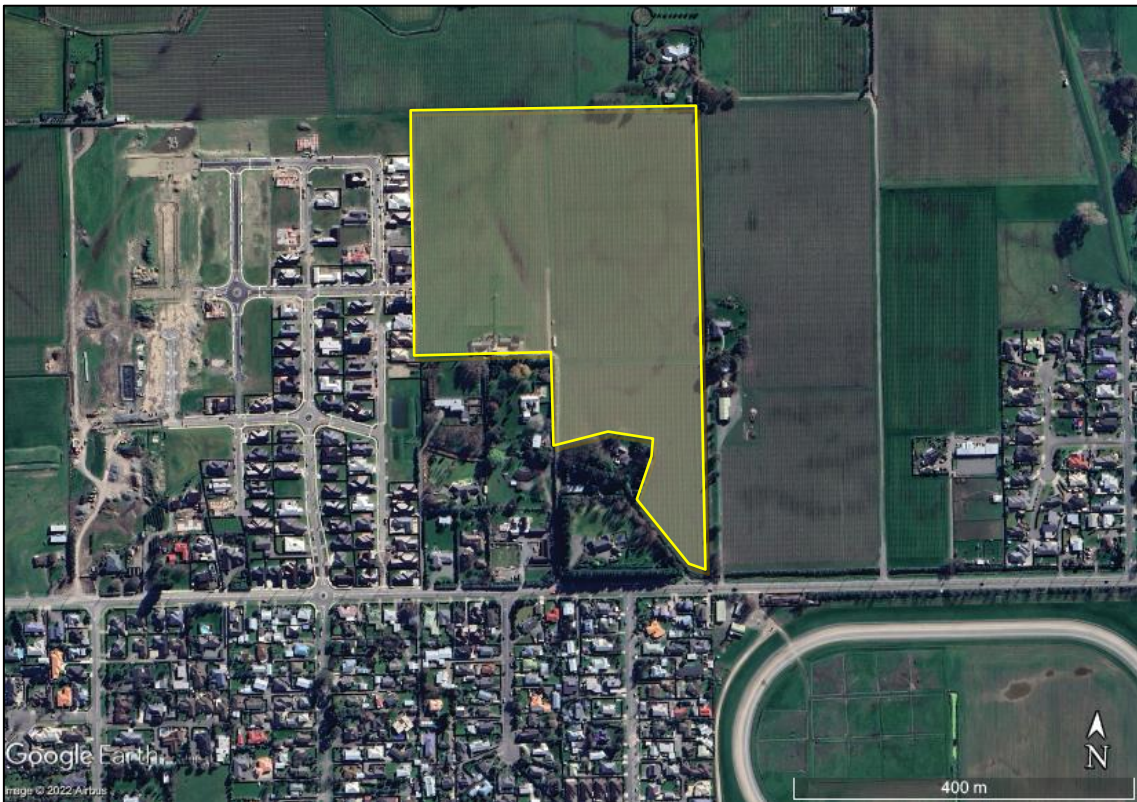


KEREPI
Connecting Communities

Kerepi Ltd

Kerepi Plan Change

Three Waters Services Scoping Report



December 2022

MARLBOROUGH MANAGEMENT SERVICES LTD



Kerepi Ltd

Kerepi Plan Change

Three Waters Services Scoping Report

December 2022

MARLBOROUGH MANAGEMENT SERVICES LTD



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TABLE OF CONTENTS

1.	<i>Terms of Reference</i>	1
2.	<i>Proposed Plan Change Location</i>	1
3.	<i>Description of the Site</i>	1
4.	<i>Water Supply</i>	2
4.1.	<i>Demand from Proposed Land to be Rezoned</i>	2
4.2.	<i>Connection to Existing Services</i>	3
4.3.	<i>Proposed Internal Services</i>	3
5.	<i>Foul Sewer</i>	4
5.1.	<i>Demand from Proposed Land to be Rezoned</i>	4
5.2.	<i>Connection to Existing Services</i>	4
5.3.	<i>Proposed Internal Services</i>	5
5.3.1.	<i>Gravity Sewer Option</i>	5
5.3.2.	<i>Pressure Sewer Option</i>	5
6.	<i>Stormwater</i>	6
6.1.	<i>Hydrology and Stormwater Quantum</i>	6
6.2.	<i>Stormwater Quality</i>	6
6.3.	<i>Connection to Existing Services</i>	6
6.4.	<i>Proposed Internal Services</i>	6
7.	<i>Secondary Overland Flood Paths and Associated Earthworks</i>	7
8.	<i>Summary / Conclusion</i>	7
9.	<i>Applicability</i>	8
	<i>Appendix A – Aysons Survey + Site Survey Drawing</i>	
	<i>Appendix B – Kerepi Concept Master Plan</i>	
	<i>Appendix C – Concept Services Development Plan</i>	
	<i>Appendix D – Spreadsheet Detailing Sewer Design Flows</i>	

1. Terms of Reference

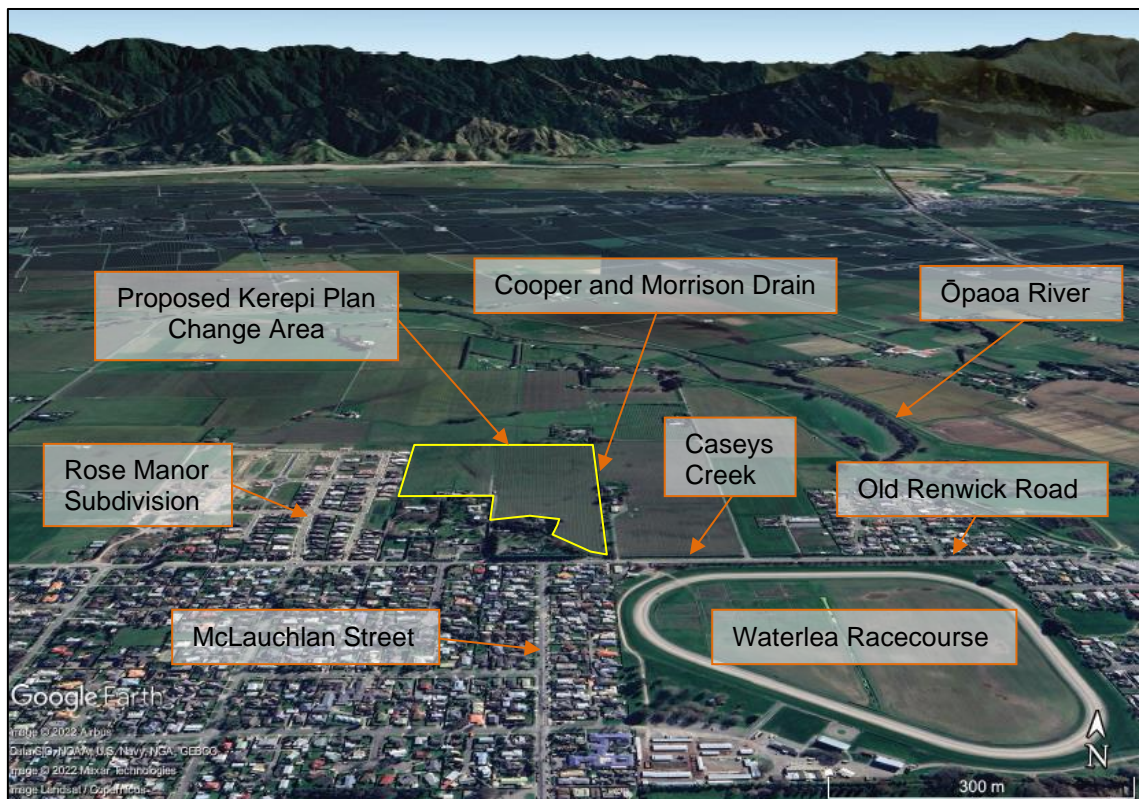
Marlborough Management Services Ltd has been engaged by Kerepi Ltd to prepare a scoping report covering the three waters infrastructure services related to a proposed plan change for residential development of Kerepi Ltd's Old Renwick Road property in Blenheim.

2. Proposed Plan Change Location

The subject land for this scoping report is located at 46 Old Renwick Road, Blenheim with the legal description of the land being Lot 2 DP578788.

The land covers an area of 12.04ha and is zoned Rural Three under the Wairau Awatere Resource Management Plan (WARMP) and Rural Environment Zone under the proposed Marlborough Environment Plan (MEP).

Refer to the locality plan below showing the location of the subject property relative to the surrounding features.



Locality Photo Looking North

The land to the west of the subject land is zoned Urban Residential 2 under both the WARMP and the MEP and is known as the Rose Manor subdivision which provides access to the subject area via Oakley Avenue.

The properties to the north, south and east are all zoned Rural Three under the WARMP and Rural Environment Zone under the MEP.

The subject land is bounded to the south and east by Marlborough District Council drainage assets, being Caseys Creek and the Cooper and Morrison Drain respectively.

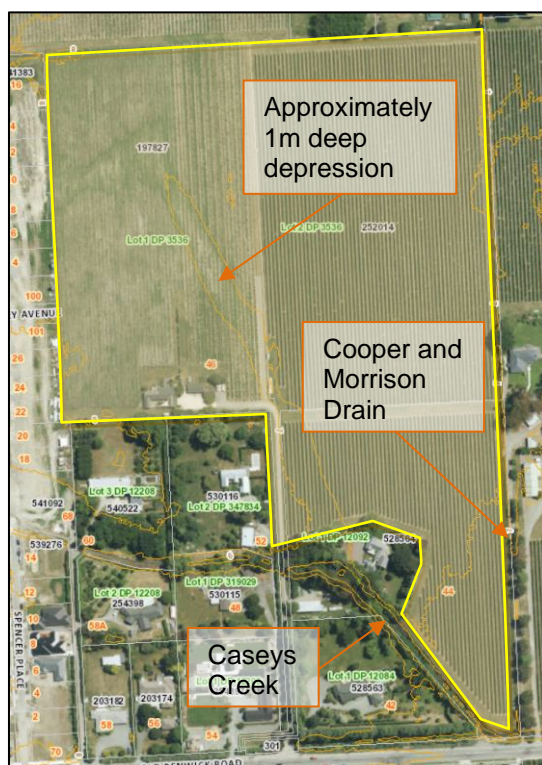
The subject land is bounded in the south-eastern corner by Old Renwick Road which is classified as a Secondary Arterial Road in the WARMP, with a posted speed limit of 50km/hr.

3. Description of the Site

The majority of the land has been developed as a vineyard, with the exception a single dwelling that exists adjacent to the southern boundary.

The landform in the location of the subject site is relatively flat with a ground level variation of approximately 1m diagonally across the site from the north-western corner to the south-eastern corner.

There is an old Caseys Creek side channel evident as a minor south to north depression through the subject area which can be seen on the Marlborough District Council (MDC) Smartmaps contour plan below and the Aysons Survey + Site Survey Drawing attached as Appendix A.



MDC Smartmaps Plan showing 1m Contours

4. Water Supply

4.1. Demand from Proposed Land to be Rezoned

The proposed rezoning of the subject land from rural to residential, based on the current Kerepi Concept Master Plan (refer Appendix B) will add the following number of residential allotments to the Blenheim area:

600m² to 700m² lots – 83

300m² to 400m² lots – 19

200m² to 299m² lots – 76

150m² to 199m² lots – 10

Total lots – 188

For the purpose of this report and as advised by the Kerepi Ltd, it is assumed that all of the 188 lots will have dwellings with 3 bedrooms and an average of 2.4 people per dwelling (based on Marlborough Growth Strategy and StatsNZ Census), giving the total number of persons to be 451 (rounded to nearest integer).

MDC A&S staff have advised that the Peak Daily Potable Water Demand for Blenheim is 270 litres/person/day and the Peaking Factor to obtain the Peak Hourly Potable Water Demand is 5, giving Peak Daily and Peak Hourly Potable Water Demands for the proposed plan change area of 121,770 litres/day and 7.05 litres/second respectively.

MDC A&S staff have further advised that the Average Daily Residential Irrigation Water Demand for Blenheim is 3,325 litres/section/day, which is based on an average garden area of 400m², giving an Average Daily Residential Irrigation Water Demand per square metre of 8.3 litres.

We have considered the garden areas for the selection of allotments noted above and have determined these on average to be as follows:

600m² to 700m² lots – 83 – 400m² – 33,200m²

300m² to 400m² lots – 19 – 200m² – 3,800m²

200m² to 299m² lots – 76 – 100m² – 7,600m²

150m² to 199m² lots – 10 – 50m² – 500m²

Total Garden Area – 45,100m²

Using this Total Garden Area of 45,100m² and the Average Daily Residential Irrigation Water Demand of 8.3 litres/m², the total Average Daily Residential Irrigation Water Demand has been calculated to be 374,330 litres/day or 374m³/day.

Assuming that this irrigation demand is applied over half the day, then the Residential Irrigation Water Demand has been calculated to be 8.66 litres/second.

Adding this Residential Irrigation Water Demand of 8.66 litres/second to the Peak Hourly Potable Water Demand of 7.05 litres/second, gives a design peak water demand of 15.71 litres/second.

4.2. Connection to Existing Services

The nearest existing watermains to the proposed plan change area are:

- a 200mm diameter watermain in Oakley Drive which has been extended to the boundary of the subject site; and,
- a 200mm diameter watermain which runs from the west along on the northern side of Old Renwick Road and stops at McLauchlan Street.

MDC Assets and Services (A&S) staff have however advised that the sections of the existing 100mm diameter watermain in McLauchlan Street watermain will need to be upgraded to 200mm, 250mm and 300mm diameter watermains to provide adequate flow at sufficient pressure at the intersection of McLauchlan Street and Old Renwick road for the land proposed to be rezoned.

MDC A&S staff have confirmed that this upgrade is currently planned to be completed within the next 3 years.

4.3. Proposed Internal Services

From the existing watermains described in Section 4.1 above, it is proposed to install a new internal water reticulation consisting of:

- 200mm diameter ring watermain connecting the Oakley Road watermain to and extension of the 200mm diameter watermain in Old Renwick Road;
- 150mm submains within the collector roads within the subject land; and,
- 100mm watermains within all minor roads.

From these larger mains, 50mm diameter rider mains will be installed along all roads on the opposite side of the new mains and 20mm lateral connections will be provided to all proposed allotments.

The internal water supply network will include adequate isolation valves to allow servicing of the reticulation and standard fire hydrants designed to meet the firefighting requirements for residential development.

Assuming that the overall water supply into the land proposed to be rezoned is evenly fed from both ends of the 200mm ringmain connection through the subject land, then the velocities in the main during the 15.71 litres/second design demand will only be 0.25 metres/second, which should not result in unacceptable losses in pressure during these peaks.

A Concept Development Plan showing the proposed watermains is attached as Appendix C1.

5. Foul Sewer

5.1. Demand from Proposed Land to be Rezoned

As noted in Section 4.1, for the purpose of this report, it is assumed that the land proposed to be rezoned will create a sewer load from an additional 451 persons.

Based on this, and in accordance with *NZS 4404:210 Land Development and Subdivision Infrastructure* the Average Dry Weather Flow has been calculated to be 451×250 litres/day = 112,750 litres/day, or 1.305 litres/second.

Multiplying this 1.305 litres/second Average Dry Weather Flow with a Dry Weather Diurnal Peak Factor of 2.5 and a Dilution/Infiltration factor of 3 for wet weather gives a Peak Wet Weather Flow of $1,305 \times 2.5 \times 3 = 9.787$ litres/second.

MDC A&S staff have advised that they determine the design sewer demand using a different per hectare system, based on the existing Blenheim sewer modelling, as follows:

Average Dry Weather Flow per Hectare is number of Persons per Hectare being 451 persons divided by 12.04ha multiplied by the Dry Weather Flow per Person of 270 litres/person/day, which is 10,113.8 litres/day/hectare, or 0.117 litres/second/ha.

Multiplying this Average Dry Weather Flow per Hectare of 0.117 litres/second/hectare with an Average Dry Peak Factor of 2.3, then gives the Peak Dry Weather Flow per Hectare of 0.269 litres/second/hectare.

To this Peak Dry Weather Flow per Hectare of 0.269 litres/second/hectare a Sewer Base Flow of 0.02 litres/second/hectare and a Sewer Infiltration Flow of 0.18 litres/second/hectare are added to give the Peak Wet Weather Flow of 0.469 litres/second/hectare.

Multiplying this Peak Wet Weather Flow of 0.469 litres/second/hectare with the 12.04 hectare proposed plan Change area, gives a Peak Wet Weather Flow of 5.65 litres/second.

This is quite a lot less than Peak Wet Weather Flow of 9.575 litres/second based on NZS 4404:2010.

As the MDC A&S Peak Wet Weather Flow is based on actual Blenheim data, their Peak Wet Weather Flow 5.65 litres/second has been adopted for this report.

5.2. Connection to Existing Services

Although there are existing sewer reticulation systems within Rose Manor and McLauchlan Street, MDC's A&S staff have advised that there is insufficient capacity in these gravity systems to receive the additional sewer load from the proposed plan change, without upgrading.

However, following the recently completed Blenheim Sewer Upgrade project, which included the upgrading of the McLauchlan Street sewer pumping station, we have been advised that the sewer system downstream of this pump station, will be able to receive the additional sewer load from the proposed plan change.

Kerepi Ltd have therefore approached the Waterlea Park Charitable Trust with a view of getting a sewer easement along their western boundary from Old Renwick Road to the Racecourse access from McLauchlan Street, with the view of installing a new sewer outfall pressure main from the proposed plan change area to Council's McLauchlan Street sewer pumping station.

Based on the Peak Wet Weather Flow, from the proposed Kerepi land to be rezoned, of 5.65 litres/second and assuming a further factor of 2 for the sewer pump station design, a pump and rising main design flow of 11.30 litres per second has been determined.

Assuming a flow velocity of 1.0 metre/second in the downstream rising main would require a pumping main with an internal diameter of 120mm, and hence a 150mm rising main is proposed.

The negotiations between Kerepi Ltd and the Waterlea Park Charitable Trust regarding the sewer easement are still ongoing and although likely to be successful this is not entirely guaranteed. If for some reason the easement is not agreed to, then an alternative route for the pumping main from Old Renwick Road to the McLauchlan Street pump Station will be required down McLauchlan Street. This option is not preferred.

MDC's A&S staff support this proposed sewer outfall pressure main and have requested that this main be increased in size to provide capacity for possible future land of 18.156 hectare

to be rezoned between Kerepi and Clearwater Place, refer to as Balance East Land from here on.

Assuming 10 lots/hectare for this land and 2.4 persons/lot, the rising main flow for this Balance East area using the MDC A&S per hectare system, has been calculated to be 13.53 litres/second.

Again, assuming a flow velocity of 1.0metre/second in the combined downstream rising main with a total design flow of 24.83 litres/second, would require a pumping main with an internal diameter of 178mm, and hence a 200mm rising main is proposed for the combined flow.

MDC propose that the sewer outfall pressure main be treated as an MDC upgrade and that a flow proportional zone levy be applied to the whole area to recover these costs. Using the rising main design flows of 11.30 litres/second and 13.53 litres/second for the Kerepi and Balance East areas, the costs should be proportioned 45.5% and 54.5% respectively.

A spreadsheet detailing the sewer design flows is attached as Appendix D.

5.3. Proposed Internal Services

Due to the flat nature of the site, the relatively high groundwater table in winter and the liquefaction potential identified by Fraser Thomas in their September 2022 Geotechnical Investigation Report for the Rezoning Submission of 46 Old Renwick Road, Blenheim, two options for the internal sewer system exist, being either a standard gravity or small-bore pressure system.

5.3.1. Gravity Sewer Option

MDC A&S staff have advised that, to minimise long term groundwater infiltration problems, the maximum acceptable depth for gravity sewer mains and laterals would be 2.5m from natural ground.

To achieve this, a standard gravity sewer system for the land proposed to be rezoned would need to include two separate sewer pumping stations.

From these pumping stations, a new 150mm gravity sewer reticulation system will be installed throughout the development with manholes at all changes of direction and grades and at all mainline junctions.

New 100mm underground lateral connections will be provided off this reticulation system to all proposed allotments.

The internal gravity sewer system will consist of 150mm uPVC SN8 mains with precast concrete sewer manholes and 100mm SN8 uPVC lateral to all new allotments.

The pumping station wet wells, manholes and buried pipelines will be designed with flanged bases and backfilled with adequate granular backfill to protect them from "flotation" during liquefaction.

5.3.2. Pressure Sewer Option

A possible alternate small diameter pressure sewer reticulation system would consist of a shallow pressure sewer reticulation receiving pumped sewage from individual grinder pump chambers for each allotment created, similar to the systems installed in Grovetown and David/Severne Street areas in Marlborough.

Such a pressure sewer system is more resilient to liquefaction induced ground movement but introduces many additional grinder pump installations for Council to maintain, particularly with a reasonable number of smaller lots proposed.

During discussions with MDC A&S staff it was indicated the MDC's preference is for a standard gravity sewer system, rather than a small bore pressure sewer system.

A Concept Development Plan showing the proposed sewer system is attached as Appendix C2.

6. Stormwater

6.1. Hydrology and Stormwater Quantum

The stormwater from the proposed development will be discharged into Caseys Creek, which runs along the southeastern boundary of the land to be rezoned, or into the north-south Cooper and Morrison Drain which runs the full length of the eastern boundary.

The internal piped stormwater reticulation will be designed in accordance with Council's "Procedures for Reviewing Blenheim Stormwater Capacity and Providing for New Areas" prepared by Brin Williman in July 2015.

Under these Procedures, the proposed development land is deemed Alluvial Floodplain land in the Wairua/Ōpaoa Rivers with a slope of typically 1 in 400 resulting in the stormwater piped system being designed to a Design Peak Rainfall of 21mm per hour (approximate 5-year ARI) with a 30-minute time of concentration and a run-off coefficient of 0.525 (determined as an average of the 50% and 55% for UR1 and UR2 developments).

As noted in Section 5.2 above, the roading network will also be designed to provide a secondary overflow path for run-off from storm event exceeding the pipe design, while maintaining emergency access and without flooding private properties.

MDC's A&S staff have advised that, due to the subject land being zoned rural, the upgrade of Caseys Creek completed in 2020 had been designed for Plan Changes 64, 65 and 67 only and for the balance of the creeks' catchment remaining rural.

Hence, if this balance rural land, which includes the Kerepi land was to be developed, the design of the internal stormwater system would require both retention storage and stormwater treatment, to restrict the post development residential stormwater run-off to be no greater than the pre-development (current) rural run-off.

6.2. Stormwater Quality

The proposed development will change the nature of the stormwater run-off from rural to residential with the associated increase of water-borne contaminants from residential roads etc.

To mitigate the discharge of these contaminants into the downstream aquatic environment, it is proposed to develop a first flush filtration/treatment basin between the downstream end of the piped reticulation and the Caseys Creek.

MDC's A&S staff have advised that the first flush pond should be designed based on the hydrograph template provided in Council's Stormwater Procedures Manual with the first 15mm of rainfall being captured.

6.3. Connection to Existing Services

Preliminary design undertaken has indicated that a pond system will be required which includes a first flush treatment pond with a volume in the order of 865m³ and a separate retention/attenuation pond with a volume of 3,265m³ will be required to achieve this for the proposed plan change area, which can be seen from the design hydrograph attached as Appendix C.

Based on a pond water depth of 1.2m allowing for 30mm freeboard and a floor level 400mm above the floor of Casey's Creek, and 1 in 4 pond side slopes, an area in the order of 4,000m² will be required to provide the combined retention and first flush treatment pond volume of 4,128m³.

The nearest downstream receiving environments for the discharge of stormwater from the proposed plan change area are:

- Caseys Creek in the south-eastern corner; and,
- Cooper and Morrison Drain along the eastern boundary of the subject property.

However, due to the limited depth of the Cooper and Morrison Drain, the discharge of all of the stormwater runoff from the ponds will be to Caseys Creek.

6.4. Proposed Internal Services

From the ponds described above, it is proposed to install a new internal stormwater water reticulation system consisting of:

- gravity mains with manholes at all changes in pipe sizes, grades and changes of direction and at all mainline junctions;
- 225mm lateral pipe connections to all road sumps; and,
- 100mm lateral pipe connections to all proposed allotments.

A Concept Development Plan showing the proposed stormwater reticulation and ponds is attached as Appendix C3.

7. Secondary Overland Flood Paths and Associated Earthworks

To comply with the NZ Building Code, the internal stormwater collection and piped reticulation system will need to be designed to cope with a Q₁₀ rainfall event with a secondary overland flood system (following the internal roading system) providing for the flood flows in excess of the Q₁₀ flows.

The minimum accepted road gradient is 1 in 250 (0.4%) and if this gradient was applied upslope from the south-eastern corner of the property beside Caseys Creek across the 610m diagonal length across the site would result in an increase in level from the to the back of the property of nearly 2.44m.

However, there is currently only a 1.0m rise diagonally across the property which would suggest the property would need to be filled to a maximum of 1.44m in the north-western corner, which is neither economic nor practical with respect to adjacent properties.

To avoid this depth of fill, the roads will be designed as a series of sags and crests with an increasing elevation with the water ponding in the sags to remain within the road reserve and not flood the allotments to be created. This design philosophy allows the effective road gradient to be reduced from 1 in 250 to 1 in 1,000 and has been used, and accepted by Council, in the design of the roading and stormwater systems in both the Rose Manor and Wai iti developments, where similar flat land exists.

This design philosophy will avoid the need for filling to achieve a 1 in 250 slope across the whole property. However, as noted in Section 3 of this report, there is an old Caseys Creek side channel evident as a 0.8m deep south to north depression through the subject area, which will require to be filled.

Material for this engineered fill will be sourced from the excavation of the first flush treatment and retention ponds, the excavation for road formation and surplus silt material from service trenches.

8. Summary / Conclusion

In summary:

- An adequate water supply can be provided to the proposed plan change area by installing a 200mm diameter watermain through the area connected to existing 200mm diameter watermain in both Od Renwick Road to the south and Oakley Avenue to the west.
- Current advice from Council is that there is adequate spare capacity in Council's sewer infrastructure downstream of the McLauchlan Street pump station for the proposed plan change area.

However, a new pumping main from two proposed pump stations within the proposed plan change area will be required to be installed all the way to the McLauchlan Street pump station, either in a proposed easement through the Waterlea Racecourse, or alternatively down McLauchlan Street.

- Storage retention will be required to ensure post-development residential stormwater run-off is no greater than the pre-development rural run-off and first flush stormwater treatment will be required to control the discharge of waterborne contaminants from residential streets into the downstream aquatic environment. Retention and treatment are proposed to be provided in the form of ponds and preliminary design has indicated that a total volume of 4,130m³, of which 865m³ is for treatment will be required. The material excavated to form these ponds can be used as fill.

Based on the above I believe that, with appropriate engineering design, development of the Kerepi Ltd land at 46 Old Renwick Road, Blenheim as an urban residential subdivision is feasible.

I trust this provides the information you require, but if there are any questions relating to this report, do not hesitate to contact the undersigned.

9. Applicability

This report has been prepared for the benefit of Kerepi Ltd with respect to the particular brief given to us and it may not be relied upon by any other party, other than the Marlborough District Council, in other contexts or for any other purpose without our prior review and arrangement.

MARLBOROUGH MANAGEMENT SERVICES LTD

Report prepared by:



T H Smit

BSc Eng (Civil) Hons, CPEng, CMEngNZ

8 December 2022

Appendix A – Aysons Survey + Site Survey Drawing

Appendix B – *Kerepi Concept Master Plan*

Appendix C – Concept Services Development Plan

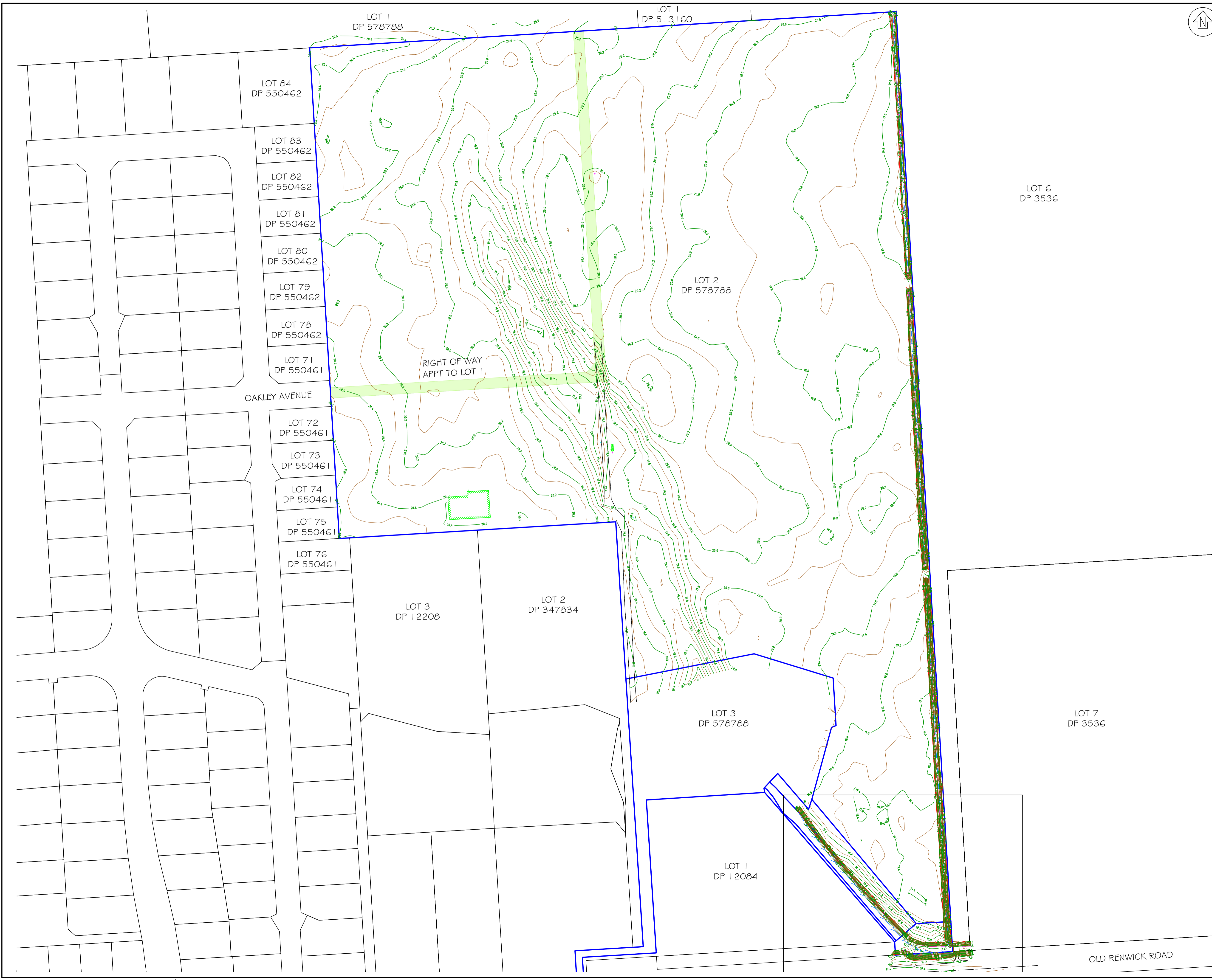
Appendix D – *Spreadsheet Detailing Sewer Design Flows*



NOTES

LEGEND

top of bank	
bottom of bank	
minor contour	
major contour	
building	



HEIGHT DATUM: BBC
 HEIGHT ORIGIN: BP 1 SO 509725
 RL 19.479

CONTOUR INTERVAL:
 MAJOR: 0.2m
 MINOR: 0.1m

REVISION	DATE	BY

KEREPI LTD

SITE SURVEY

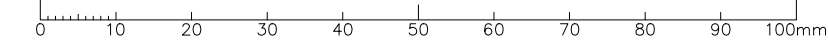
46 OLD RENWICK ROAD,
 BLENHEIM

SITE PLAN

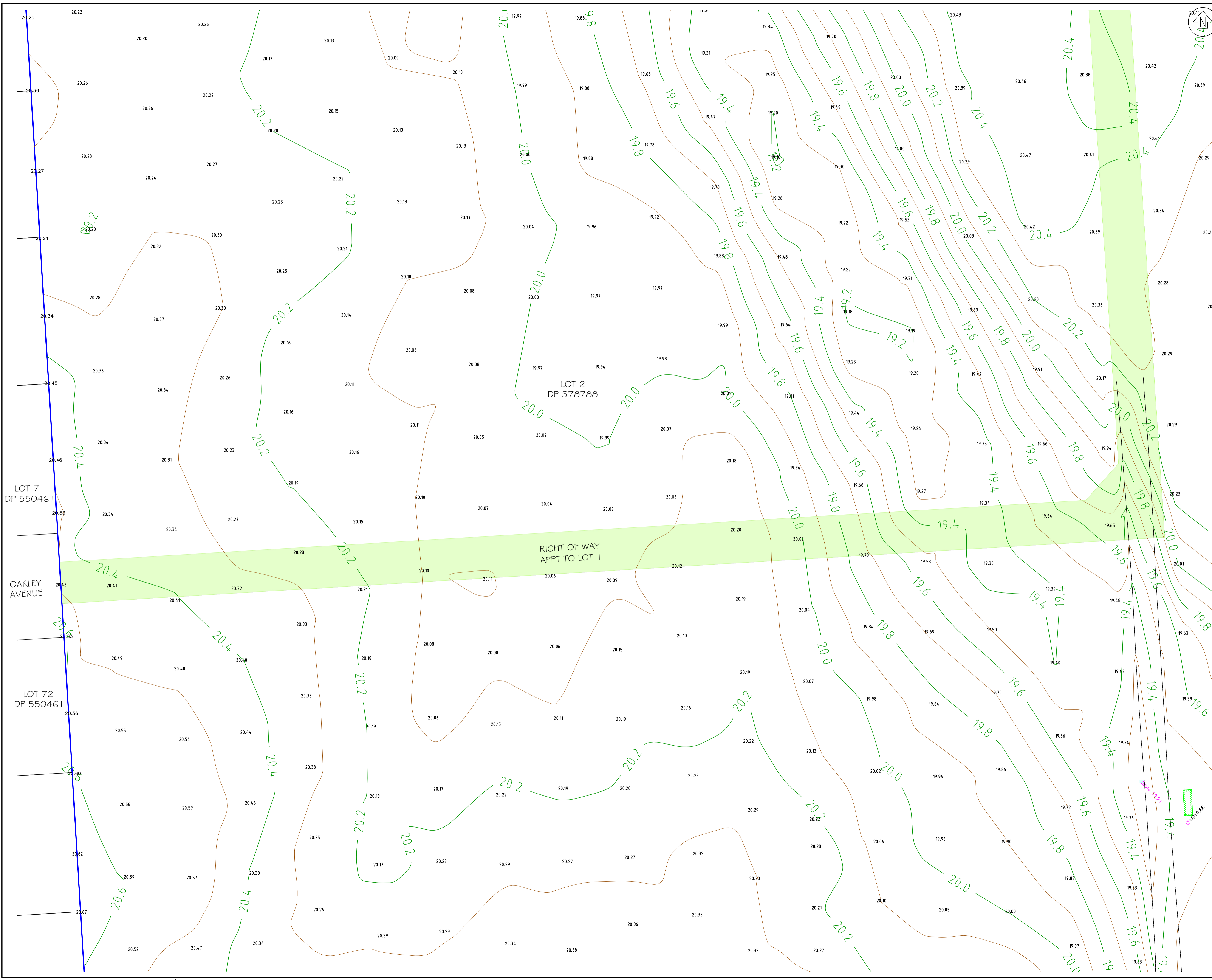
AysonSurvey+
RESOURCE MANAGEMENT + LAND DEVELOPMENT + SUBDIVISION

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 ayson.co.nz

DESIGNED	JOB No.
DRAWN 31/08/2022 HM	15329
CHECKED	
SCALES	SHEET No.
A1 1:1000 A3 1:2000	TP01
	ISSUE
	A



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NOTES

LEGEND

top of bank	
bottom of bank	
minor contour	
major contour	
building	

HEIGHT DATUM: BBC
 HEIGHT ORIGIN: BP 1 SO 509725
 RL 19.479

CONTOUR INTERVAL:
 MAJOR: 0.2m
 MINOR: 0.1m

REVISION	DATE	BY

KEREPI LTD

SITE SURVEY

46 OLD RENWICK ROAD,
 BLENHEIM

SITE PLAN

AysonSurvey+
 RESOURCE MANAGEMENT + LAND DEVELOPMENT + SUBDIVISION

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DESIGNED	JOB No.
DRAWN 6.09.22 MR	15329
CHECKED	SHEET No.
SCALE A1 1:200	TP03
A3 1:400	ISSUE
CAD	A

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SITE IDENTIFICATION

Legal Description: -
 TA Zoning: Urban Residential 2
 Topographic Class: T1

Zones

- Wind: High
 - Earthquake: 3
 - Durability: B
 - Snow Loading: 0.0 kPa

Designed to: NZS3604:2011

NOTES

WIND CALCULATION

WIND REGION: A
 LEE ZONE: NO
 GROUND ROUGHNESS: OPEN
 SITE EXPOSURE: EXPOSED
 TOPOGRAPHIC CLASS: T1

- LEGEND:**
- HOUSE TYPES:**
- TYPE A: 2 STOREY, 3 BDRM, 1 BATH, SINGLE GARAGE = 42 IN TOTAL
 - TYPE B: 2 STOREY, 3 BDRM, 1 BATH, DOUBLE GARAGE = 30 IN TOTAL
 - TYPE C: 2 STOREY, 3 BDRM, 2 BATH, DOUBLE GARAGE = 07 IN TOTAL
 - TYPE D: 1 STOREY, 3 BDRM, 1 BATH, SINGLE GARAGE = 20 IN TOTAL
 - TYPE E: 1 STOREY, 2 BDRM, 1 BATH, SINGLE GARAGE = 6 IN TOTAL
- LOT TYPES:**
- 100 - 199m² LOTS = 26 IN TOTAL
 - 200 - 299m² LOTS = 60 IN TOTAL
 - 300 - 400m² LOTS = 19 IN TOTAL
- KEY:**
- 5m LIVING COURT = 59 IN TOTAL
 - 4m LIVING COURT = 46 IN TOTAL



PRELIMINARY

These drawings are for preliminary discussions only. They are subject to Territorial Authority approvals, engineering, and New Zealand Building Code requirements.

All work is to be carried out in full accordance with the NZBC and Territorial Authority requirements as they apply. Any queries and discrepancies must be confirmed with the Designer before beginning any work. IMPORTANT: Our full terms & conditions of trade can be found on our website (www.premierservices.co.nz). Your continued instruction will amount to acceptance of these terms and conditions of trade.



COLLETT GROUP LTD. CLIENT :
 SCHEME PLAN PROJECT :
 KEREPi GROVE, OLD RENWICK RD, BLENHEIM. LOCATION :
 OVERALL SCHEME PLAN DRAWING :

PREMIER SERVICES LIMITED Address | 6 Champion Road, Richmond 7020 Phone | 03 544 1829 Email | info@premierservices.co.nz Website | www.premierservices.co.nz

Rev. ID	Rev. Name	Change Name	Date

SITE IDENTIFICATION

Legal Description: -
 TA Zoning: Urban Residential 2
 Topographic Class: T1

Zones

- Wind: High
 - Earthquake: 3
 - Durability: B
 - Snow Loading: 0.0 kPa

Designed to: NZS3604:2011

NOTES

WIND CALCULATION

WIND REGION: A
 LEE ZONE: NO
 GROUND ROUGHNESS: OPEN
 SITE EXPOSURE: EXPOSED
 TOPOGRAPHIC CLASS: T1

LEGEND:

- INDICATIVE PATIO AREA.
- OUTDOOR LIVING AREA
- BIN STORAGE



Rev/ID	Rev. Name	Change Name	Date

COLLETT GROUP LTD. CLIENT :
 SCHEME PLAN PROJECT :
 KEREPi GROVE, OLD RENWICK RD, BLENHEIM. LOCATION :
 1:500 SITE PLANS DRAWING :

PRELIMINARY

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SITE IDENTIFICATION

Legal Description: -
 TA Zoning: Urban Residential 2
 Topographic Class: T1

Zones

- Wind: High
 - Earthquake: 3
 - Durability: B
 - Snow Loading: 0.0 kPa

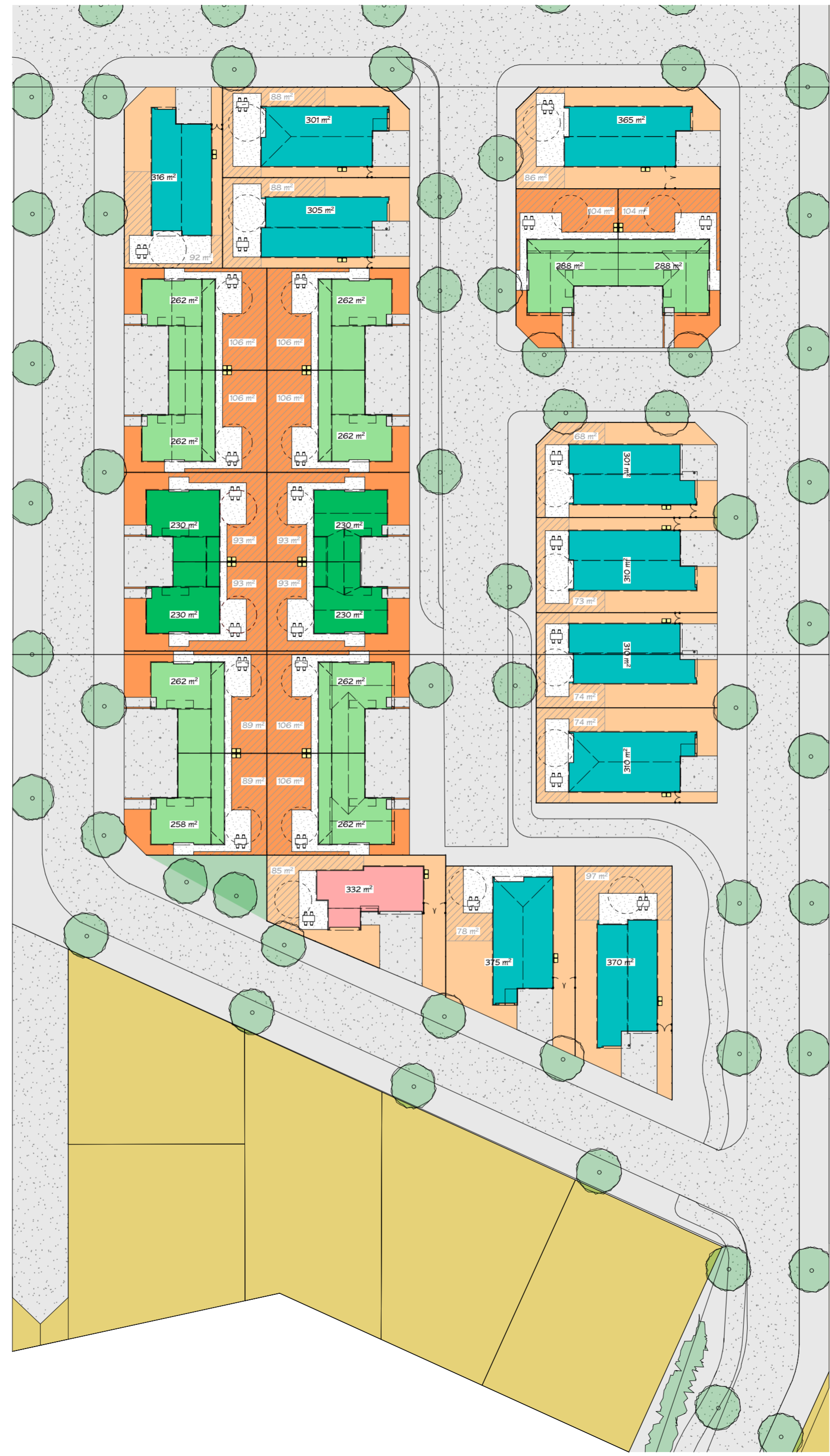
Designed to: NZS3604:2011

NOTES

WIND CALCULATION

WIND REGION: A
 LEE ZONE: NO
 GROUND ROUGHNESS: OPEN
 SITE EXPOSURE: EXPOSED
 TOPOGRAPHIC CLASS: T1

- LEGEND:**
- INDICATIVE PATIO AREA.
 - OUTDOOR LIVING AREA
 - BIN STORAGE



RevID	Rev. Name	Change Name	Date

PRELIMINARY

These drawings are for preliminary discussions only. They are subject to Territorial Authority approvals, engineering, and New Zealand Building Code requirements.

All work is to be carried out in full accordance with the NZBC and Territorial Authority requirements as they apply. Any queries and discrepancies must be confirmed with the Designer before beginning any work. IMPORTANT: Our full terms & conditions of trade can be found on our website (www.premierservices.co.nz). Your continued instruction will amount to acceptance of these terms and conditions of trade.

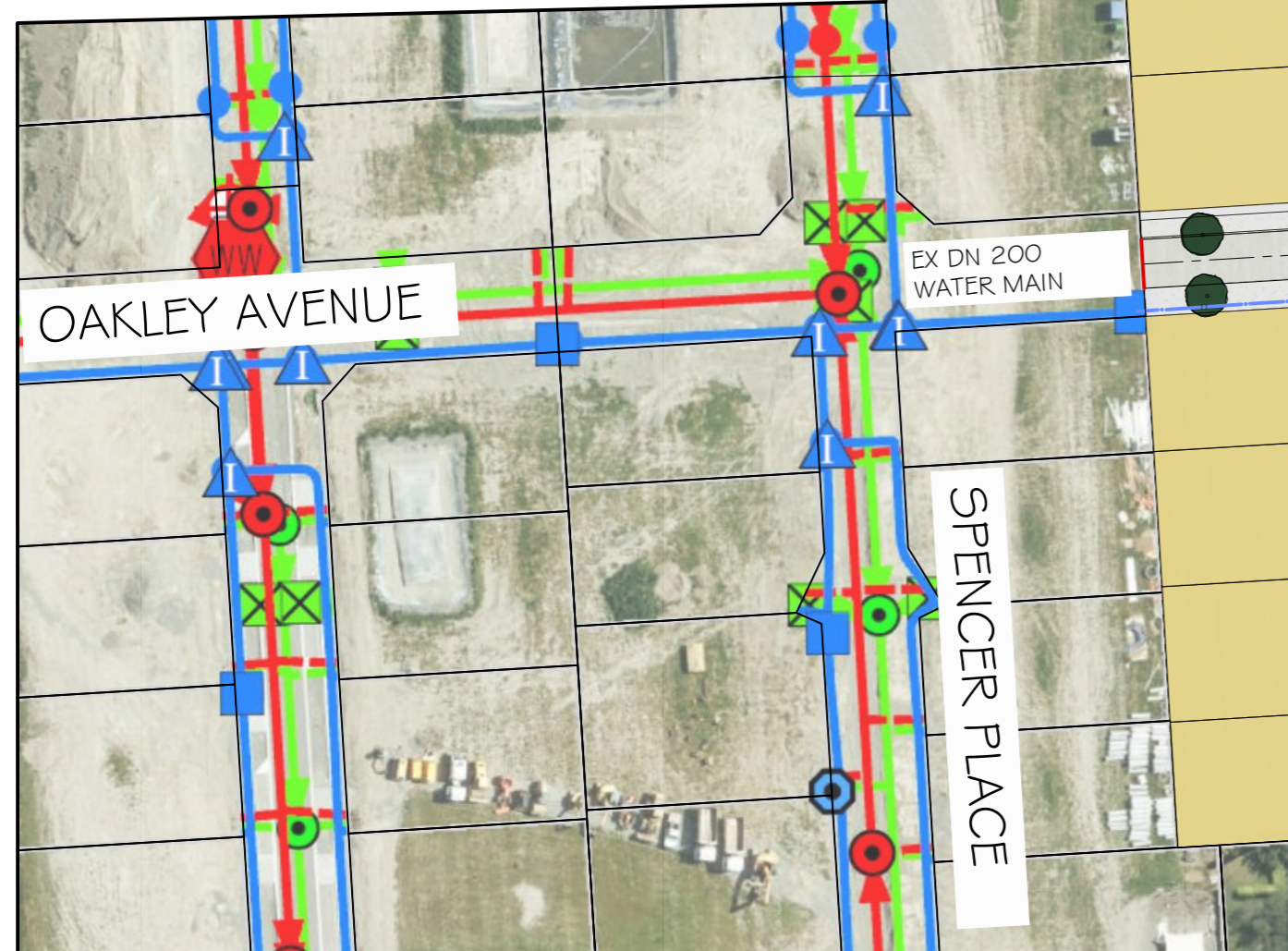
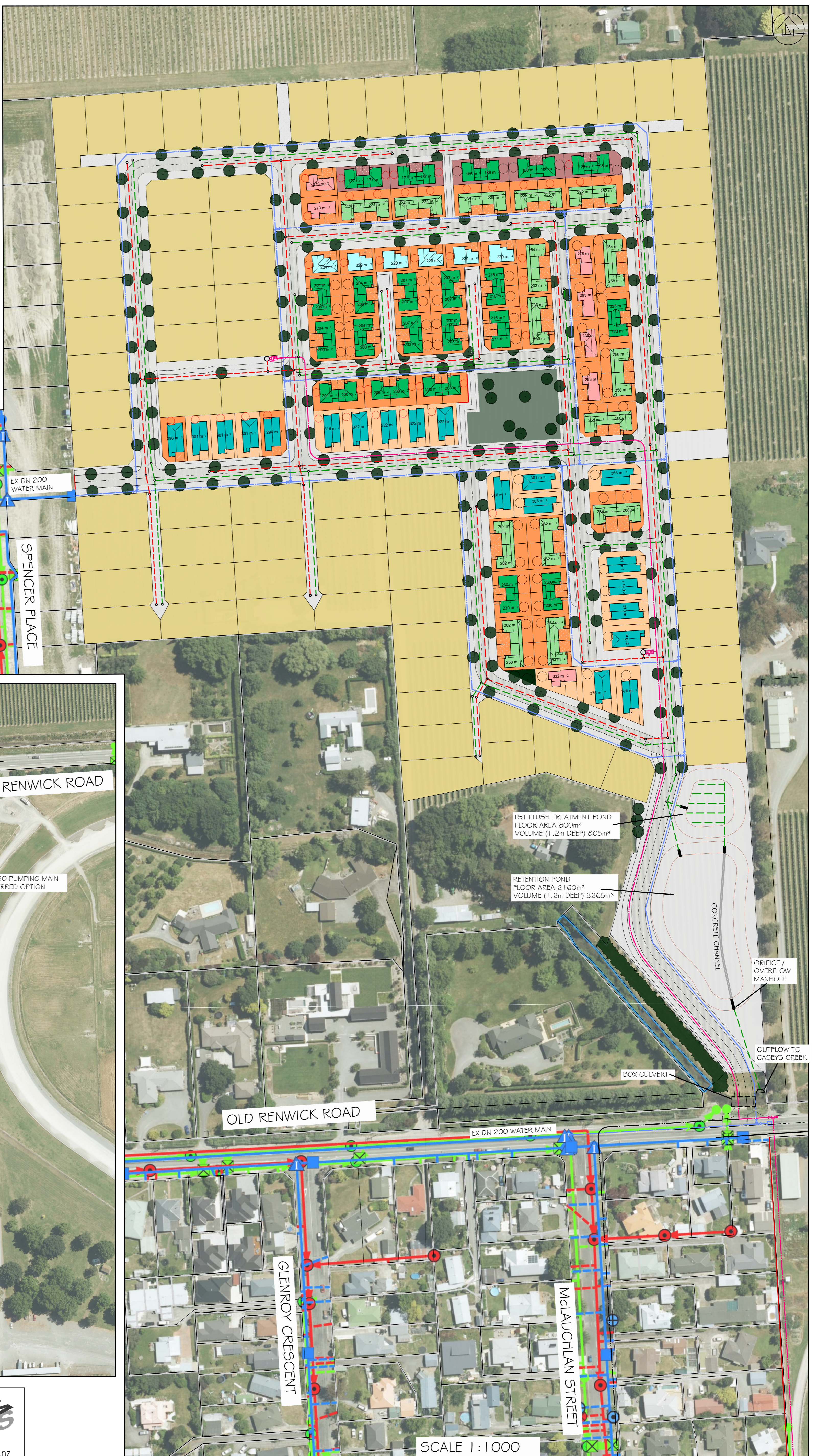
LEGEND:

- DN 200 WATER MAIN — — — — —
- DN 150 WATER MAIN — · — · — · —
- DN 100 WATER MAIN — — — — —
- SEWER PUMP STATION ⊗
- DN 150 GRAVITY SEWER - - - - -
- DN 250 PRESSURE SEWER — — — — —
- DN 150 PRESSURE SEWER — · — · — · —
- DN 100 PRESSURE SEWER — — — — —
- STORMWATER PIPE (SIZE VARIES) - - - - -

NOTES:

- PLAN DOES NOT SHOW:
- SEWER LATERALS
 - STORMWATER LATERALS
 - WATER LATERALS
 - STORMWATER SUMPS AND CONNECTIONS
 - HYDRANTS
 - WATER RIDER MAINS

MASTER PLAN PROVIDED BY PREMIER SERVICES LIMITED



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RESOURCE MANAGEMENT + LAND DEVELOPMENT + SUBDIVISION

CLIENT	KEREPI LTD		
DESIGNED	TS	PROJECT	KEREPI
DRAWN	07/12/2022 HM	CHECKED	TS
SCALE	A1 1:1000	LOCATION	Old Renwick Rd, Blenheim
REV	REVISION DETAILS	DATE	BY
A03	RE-ARRANGED LOTS & 2ND SEWER OPTION	07/12/22	HM
A02	RE-ARRANGED LOTS	23/11/22	HM
A01	ISSUED FOR INFORMATION	22/11/22	HM

TITLE	SERVICES CONCEPT
JOB NUMBER	15329
SHEET	AS01
ISSUE	A03

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Proposed Kerepi Plan Change Sewer Design Flows

Kerepi		Balance East		Total
Large Lots				
Number of Lots	188.000			
Person per Lot	2.400			
Small Lots				
Number of Lots	0.000			
Person per Lot	2.000			
Average person/Lot	2.400	Dweloins/hectare	10.000	
Sewage Load per person per day	270.000	Sewage Load per person per day	270.000	
persons/lot	2.400	persons/lot	2.400	
Sewage Load per lot per day	648.000	Sewage Load per lot per day	648.000	
Area	12.040 ha	Area	18.156	
Dwellings	188.000	Dwellings	181.560	
Dwelings per hectare	15.615	Dwelings per hectare	10.000	
Sewage Load per hectare per day	10,118.272	Sewage Load per hectare per day	6,480.000	
Sewage Load per hectare per second	0.117	Sewage Load per hectare per second	0.075	
Peak Factor for Dry Peak hour	2.300	Peak Factor for Dry Peak hour	2.300	
Dry peak Hour Flow per second	0.269	Dry peak Hour Flow per second	0.173	
Sewer Base Flow	0.020	Sewer Base Flow	0.020	
Sewer Infiltration flow	0.180	Sewer Infiltration flow	0.180	
Total design flow per hectare	0.469	Total design flow per hectare	0.373	
Peak Design Flow	5.651	Peak Design Flow	6.763	
Pump and Rising main Flow	11.302	Pump and Rising main Flow	13.526	24.828
	45.52%		54.48%	100.00%