



**CIVIL ENGINEERING ASSESSMENT
TO SUPPORT PROPOSED
PLAN CHANGE
104 TOWNSEND ROAD
AND 141 SOUTH BELT
WAIMAKARIRI, RANGIORA**

Engineers and Geologists

**CIVIL ENGINEERING ASSESSMENT
TO SUPPORT PROPOSED PLAN CHANGE
104 TOWNSEND ROAD AND 141 SOUTH BELT
WAIMAKARIRI, RANGIORA**

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Copies to: Summerset Villages (Rangiora) Limited 1 electronic copy
Riley Consultants Ltd 1 copy

Issue:	Details:	Date:
1.0	Civil Engineering Due Diligence Assessment	4 February 2019
2.0	Civil Engineering Plan Change Assessment	4 September 2019
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1.0 Introduction

The following report has been prepared by Riley Consultants Ltd (RILEY) at the request of Summerset Villages (Rangiora) Limited. It details the findings of a preliminary civil engineering investigation of a 13.83ha greenfield site, located in south-west Rangiora at 104 Townsend Road and 141 South Belt.

The report has been prepared to support a private plan change to amend parts of the Waimakariri District Plan (WDP) pursuant to Section 73(2) and Clauses 21(1) and 22 of the First Schedule to the Resource Management Act 1991 (RMA).

This Plan Change report includes assessment of earthworks, stormwater, wastewater, water supply and roading servicing for the site. The report is to be read in conjunction with other RILEY reports covering the environmental preliminary/detailed site investigation (refer RILEY Ref: 170743-B), geotechnical assessment (refer RILEY Ref: 170743-C) and flood modelling assessment (refer RILEY Ref: 170743-E).

1.1 Summary

Future site servicing options have been assessed and appropriate solutions can be provided to enable residential development of the site under the proposed Plan Change from Residential 4B to Residential 2 with provision for a retirement village on the site. Servicing of the site includes connection to the existing adjacent council wastewater and water infrastructure with stormwater treatment and attenuation provided via on-site stormwater management basins and discharge to Southbrook. Telecommunications and power will be supplied from the surrounding networks. Necessary consents and approvals will be required for future connections which can be completed during detailed design and future consenting processes. Servicing options for the site are further outlined within the report.

2.0 Site Description

2.1 Application Site

The location of the site is shown in Figure 1 below.

Figure 1: Plan Change Site Location



The site is located in the south-western area of Rangiora township, with the northern site boundary adjoining South Belt, and Townsend Road adjoining the western boundary. East of the site is Southbrook Park, and the southern boundary adjoins Southbrook Stream (which flows west to east).

The site slopes down very gently from the north-west to south-east. Site contours show an approximate ground surface elevation of RL 26.0m at the north-western boundary and a minimum elevation of approximately RL 22.0m at the south-eastern boundary (Lyttleton Vertical Datum (LVD)).

Most of the site area is presently grassed, with a horse training track located at the northern end, adjacent to South Belt. There are two dwellings and numerous farm buildings located in the north-western corner of the site.

Medium density residential property is located to the north of the site, and a substantial new residential subdivision known as Townsend Fields is currently under construction to the north-west of the site. Southbrook Park is located to the east of the site, with the remainder of the site is bounded by rural land.

Vehicle access to the site is via two access points; one on the western boundary from Townsend Road and one from South Belt.

2.2 Background

The application site was previously part of a 23ha title that extended from South Belt, across Southbrook stream and south towards Ellis Road. An application to subdivide the property has been lodged with Waimakariri District Council (WDC) to split the land at the Southbrook stream, creating the application site north of the stream which is 13.83ha in area.

With reference to the Waimakariri District Plan (WDP), the site is presently zoned Residential 4B. It is proposed to change the zoning of the land to Residential 2 zone which would enable typical residential sections and dwellings to be constructed on the site. It is also proposed to incorporate within the zone change some specific rules to provide for the construction of a retirement village. This would result in allowing a retirement village to be constructed on all or part of the site, or all or part of the site to be developed for typical residential dwellings (in accordance with the Residential 2 zone rules).

In its current status (Residential 4B), the site can be developed into approximately 13 sections comprising lifestyle blocks with dwellings. The proposed new provisions for the Residential 2 zone will allow for up to 150 sections (with dwellings).

3.0 Proposal

This private plan change request proposes to amend the WDP to change the zoning of the site from the Residential 4B to Residential 2 zone and modify the existing planning maps covering the site, with a new Outline Development Plan (ODP).

The ODP attached in Appendix A, shows key elements to be incorporated into future residential activity on the site. These include;

- the required location of future roading links to the existing transport network,
- the provision of an esplanade reserve adjacent to Southbrook Stream,
- the location and extent of a stormwater management area and
- the allowance for a specified area for a taller main retirement village building.

The intention of the ODP is to provide certainty regarding key requirements for any future residential activity on the site, whilst allowing flexibility as the detailed design phases evolve in the future.

Future servicing options have been assessed and have confirmed that servicing of the land can be achieved in an appropriate manner to meet WDC requirements. Servicing of the site includes water and wastewater which is to be provided through connections to the WDC's reticulated network. Stormwater will be treated on-site via stormwater basins located within the site (adjacent to the esplanade reserve) before discharging to Southbrook. Telecommunications and power will be supplied from the surrounding networks. The specific design for these services will be determined at the time of future subdivision or land use consents of the land. Future residential activity of the site would be undertaken in general accordance with the ODP and other specific requirements for the site.

4.0 Preliminary Civil Engineering Assessment

4.1 Site Access and Roothing

The main existing site access is directly off South Belt near the intersection of Pentecost Road via a formed driveway to the existing farmstead, with a second site access from Townsend Road to the residential dwelling. The southern side of South Belt is formed with a sealed shoulder and unformed berm along the entire frontage of the site. There is no kerb and channel present along this rural frontage. The northern side of South Belt is formed with kerb and channel, grassed berms and a footpath along the frontage of the existing residential housing.

The proposed ODP will require the creation of two access points off South Belt with the position of the access points determined by traffic engineers and advice from WDC. The southern side of South Belt will need to be improved to allow for a formed kerb and channel including a pedestrian footpath. The proposed internal roading network of the site will be proposed at a later stage of the development design for which WDC will be consulted.

4.2 Earthworks

As noted above, the existing site contours have a high point of RL 26.0m in the north-west corner and a low point of RL 22.0m in the south-east corner. This provides an overall site gradient of approximately 1 in 150. The site is bounded by an existing formed council drain along the east and Southbrook to the south.

A preliminary assessment of the required fill volumes for the site has been carried out to provide a suitable formation level for residential development, including for a retirement village if that option proceeds. This assessment is based on the predicted flood levels in the 200-year flood event as presented in the WDC Flood Hazard Map, and a freeboard of 400mm from flood level to finished floor level.

A small section of the central site may achieve minor cut to a depth of 0.2m, but most of the site will be in fill to achieve necessary finished levels. Typical fill depths will range from 0m to 1.5m and will need to be placed to an engineered standard in accordance with geotechnical recommendations (refer RILEY Ref: 170743-C). The depth of fill is expected to increase with proximity to Southbrook to mitigate flooding risk due to the existing lower ground level adjacent to the stream.

The underlying natural soils across the site are suitable for reuse as fill for residential development provided there is proper moisture conditioning of the material prior to placement. It is likely that suitable fill may be sourced from construction of the proposed stormwater management basins. Additional imported fill material will be required to achieve the required earthwork formation levels.

Preliminary site contamination assessments indicated that any surplus topsoil and underlying natural soils that need to be removed from the site, and with contamination concentrations exceeding background criteria, will need to be disposed of at an appropriately licensed fill facility (see our Preliminary and Detailed Site Investigation, RILEY Ref: 170743-B, for more detail).

Earthworks will require careful staging in order to minimise exposure of stripped surfaces to the weather and reduce sediment laden run-off to Southbrook. Additionally, dust and sediment control measures will be required under dry or windy conditions. Construction Erosion and Sediment Control (E&SC) measures may include a combination of a temporary sediment pond, silt fencing, bunding and clean water diversions. The measures necessary to avoid adverse effects from earthworks are standard in nature and can be addressed as normal through earthworks consent processes with both district and regional councils.

4.3 Stormwater

The existing site is an established farmstead with overland stormwater draining towards the south-east (Southbrook) and to the east (existing council drain). The southern side of South Belt and the eastern side of Townsend Road both have minor channels within the berms which convey minor flows to the channel along the eastern boundary and to Southbrook. Flows in excess of these roadside channels will overtop to the site. The existing site is also subject to flooding as mentioned below in the natural hazards section of this report, which will impact on the development levels required around site.

During development of the site, the stormwater along the perimeter of the site will need to be managed by forming the frontage of South Belt and Townsend Roads with kerb and channel. The existing road network stormwater can be collected and conveyed to Southbrook and the existing council drain via graded channels, swales and sumps along the upgraded road corridors.

The existing council stormwater ponds located to the south-east of site are not able to accept the proposed site stormwater as they have been sized for the existing subdivisions to the north and are currently at capacity. The existing ground conditions reduce the possibility to discharge stormwater to ground as the ground water table is within 300mm of the surface.

4.3.1 Site Stormwater Management

Site stormwater can be managed via sumps, pipelines, pre-treatment devices and wet ponds. Sumps will be as per WDC standards with traps to collect coarse particles and floating debris. Stormwater will be reticulated via conventional buried pipelines discharging to the stormwater treatment system. Stormwater collected from site can be pre-treated via proprietary gross particle separators approved by WDC. This pre-treated run-off will receive final treatment via wet pond facilities before discharging to Southbrook as required by WDC. The Wet ponds are proposed to treat and attenuate stormwater flow to pre-development levels. The discharge to the stream will be via piped outlet with controls to reduce exit velocities, which will reduce the risk of erosion. The treatment achieved will likely be an improvement over the existing runoff as the land parcel is largely untreated. There will be an increase in overall stormwater volumes created, but the attenuation occurring within the ponds will reduce the peak flow rates to predeveloped conditions.

4.3.2 Wet Ponds

Two wet pond facilities are proposed to provide treatment and attenuation of stormwater flows from the site. One basin is located at the south-eastern corner of the site with the other basin also located on the southern boundary but to the west of the other basin.

The wet ponds are sized to treat the first flush event as per the CCC Waterway, Wetlands and Drainage Guide (WWDG) and attenuate the 50-year, 12-hour rainfall event. The pond geometry and layout will be designed in accordance with Auckland Council GD-01 guidelines with respect to forebays, permanent pools, safety benches and layout parameters. Calculations of these volumes are provided in Appendix B of this report. A summary of the minimum pond volumes is provided in Table 1.

Table 1: Wet Pond Volumes

Wet Pond Feature	Pond A (m ³)	Pond B (m ³)	Comment
First Flush Volume	1,438	383	25mm per CCC WWDG
Forebay Volume	216	57	15% of First Flush per AKL GD-01
Permanent Pool	1,222	325	Balance of First Flush
Attenuation Volume	2,785	752	Minimum calculated from TP-108

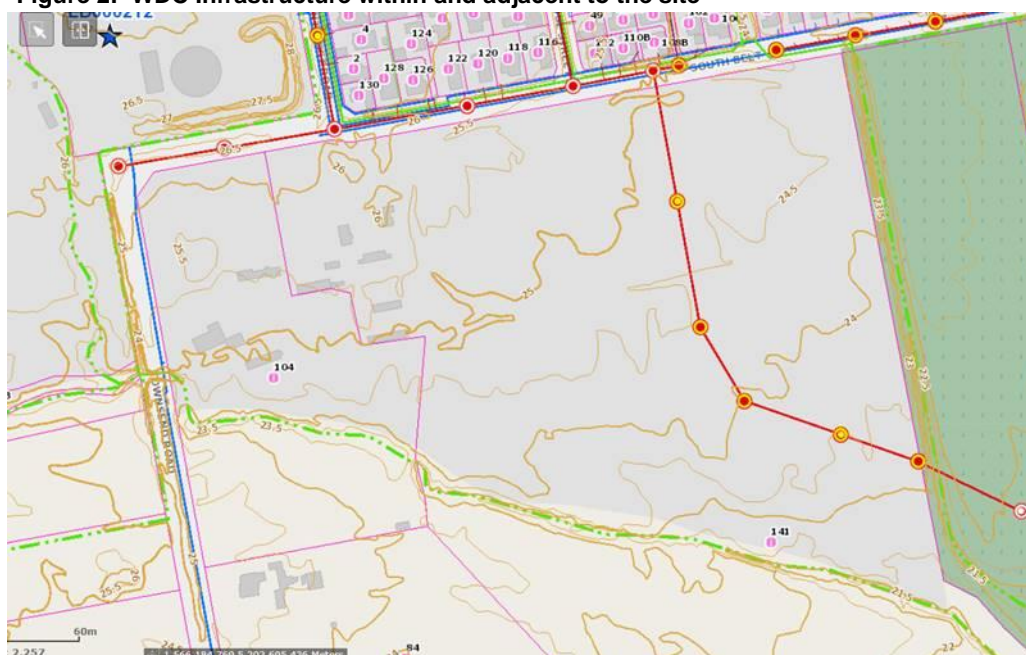
4.3.3 Overland Flow Paths

Secondary stormwater flows beyond the capacity of the primary piped reticulation network can most appropriately be conveyed via overland flow paths. These overland flow paths can be formed by the internal site roading network with associated swales grading towards the stormwater management basins. Overland flows can be contained in the proposed wet ponds up to the 50-year, 12-hour event. Overland flows in excess of this event (greater than the 2% AEP) are most appropriately discharged via an emergency spillway directly into the Southbrook. These events are considered rare to very rare in occurrence and would likely coincide with flood conditions being experienced within Southbrook.

4.4 Wastewater

An existing 300mm diameter gravity wastewater main runs through the eastern portion of the site from South Belt, through to the eastern boundary. This wastewater main is contained within a 2m wide easement in gross for the right to drain wastewater. Figure 2 indicates the location of this main, along with other WDC infrastructure within and adjacent to the site.

Figure 2: WDC Infrastructure within and adjacent to the site



WDC has indicated that this 300mm diameter main presently services a large catchment but is in the process of being duplicated with a new 475mm diameter main that is being installed along South Belt, east of the existing wastewater main through the site.

WDC have confirmed that the existing 300/450mm wastewater main in South Belt has the capacity to service the proposed plan change site. There is enough capacity to service the whole site for medium density residential dwellings or for a combination of residential and a retirement village from these mains located along South Belt.

A preliminary estimate of anticipated wastewater flows that could be generated from typical residential activity on the site has been completed. These flows were calculated in accordance with the WDC ECoP Part 6.

The anticipated wastewater flows for the residential area is provided in Table 2:

Table 2: Wastewater Demand

Wastewater Demand	Mixed Residential 2 and Retirement Village Development	Residential 2 Development
Average Dry Weather Flow (l/s)	1.9	1.2
Peak Dry Weather Flow (PDWF) (l/s)	4.7	2.9
Peak Wet Weather Flow (PWWF) (l/s)	12.2	8.8
Total Daily Production (m3)	162	101

The demand arising from a mixture of Residential 2 and retirement village, is higher than that of a solely Residential 2 zoned subdivision of individual houses, assuming minimum lot sizes of 600m² (as per WDC ECoP Table 17.1) and up to 150 sections developed over the same area, where total daily production and peak wet weather flow are anticipated to be 101m³ and 8.8L/s, respectively. Calculations of this demand are provided in Appendix C of this report. Capacity to provide for either future development scenario can be achieved.

The reticulation network within the site will need to be sized to convey peak wet weather flows to the existing 300mm main. It is anticipated that a standard 150mm diameter pipe network will be adequate for the site, with all wastewater mains located in the road carriageway.

4.4.1 Re-alignment of Existing Wastewater Main

Development of the site may require re-alignment of the existing 300mm wastewater main which currently runs through the site. The present location of this main will limit development options given the need to avoid future building foundations over the existing wastewater main and easement¹. Relocation of the wastewater main would involve a staged decommissioning of the existing main and replacement with a new 300mm main along the eastern boundary of the site running south from South Belt. A permanent wastewater connection to this relocated main could then be formed at the south-eastern corner of the site. Discussions with WDC regarding this re-alignment has determined that this is acceptable provided that the pipeline can be contained within the western bank of the council drain and not have an impact to any future building foundations should the main require maintenance. We have reviewed this alignment and can confirm these conditions can be met.

¹ Council generally does not allow any buildings over public gravity wastewater mains greater than 225mm diameter as per (WDC ECoP Section 6.7.4).

4.5 Water Supply

Correspondence with WDC to date indicates there is a 375mm diameter water main located in the southern traffic lane of South Belt and a 150mm diameter main located centrally. WDC has indicated that there are no known capacity constraints, although extension of the existing network may be required to provide linkage between Pentecost Road and Townsend Road. During a liaison meeting on 31 January 2019, WDC confirmed a minimum operating pressure of 400kPa. Three possible connection points from the development area to the WDC water supply system in South Belt are as follows:

- 375mm diameter water main (located to the east of Pentecost Road).
- 150mm diameter water main (located to the east of Pentecost Road). This main currently services the properties to the north of South Belt.
- Possible network extension: 300mm diameter connection between Pentecost Road and Townsend Road.

An assessment of the water demand requirements has been completed for the site in relation to medium density residential units and a mix of residential and retirement village development.

The design potable water usage requirements for residential dwellings is 0.1L/s/dwelling based on the WDC ECoP Section 7.5.2; however, this is for residential zones and generally overestimates the flow requirements for a typical retirement village where lower occupancies result in lower peak water demand flows. Therefore, the assessment for a retirement village, has been assessed based on NZS 3500.1:2003: Plumbing and Drainage while the Residential 2 development has been assessed based on WDC ECoP Section 7.5.2.

The anticipated total instantaneous water supply demand for the total development area are provided in Table 3:

Table 3: Water Supply Demand

Water Supply Demand	Mixed Residential 2 and Retirement Village Development	Residential 2 Development
Peak Demand (l/s)	19.5	15.0

The demand for a retirement village, is higher than the total instantaneous potable water demand for a typical Residential 2 zoned subdivision. Calculations of this demand are provided in Appendix D of this report.

The water supply capacity is sufficient to service development of the whole site for medium density residential dwellings or for a combination of residential and a retirement village.

4.5.1 Fire Fighting Water

RILEY has undertaken a preliminary investigation into the firefighting requirements for the proposed plan change. The required firefighting flows have been determined in accordance with SNZ PAS 4509:2008 (Tables 1, 2, and C1), and based on a fire classification of FW2, the required firefighting flow is 12.5L/sec from a hydrant within 135m with another 12.5L/sec from a hydrant within 270m, residual pressure greater than 100kPa.

WDC has advised that connection from the 150mm diameter main within South Belt has sufficient pressure to supply both the potable demands (both for Residential 2 and higher density development, such as a retirement village) and firefighting demands for the site. The main building for the retirement village will be serviced by a dedicated fire sprinkler main, which will be designed in accordance with national standards by an accredited fire sprinkler engineer.

4.6 Natural Hazards

The WDC Hazard Map shows the flood hazard and depths across the site based on the 0.5% Annual Exceedance Probability (AEP), or 200-year return period, rainfall flood event including break-out of the Ashley River. These natural flooding hazards have been addressed in a specific flood hazard assessment of the site (refer RILEY Ref: 170743-E).

4.7 Proposed Utilities

4.7.1 Electrical Service

The existing site power supply is serviced by an overhead three-phase power supply, which is conveyed along South Belt from the western corner of site to service the existing farmstead. We have confirmation from the local electrical provider MainPower New Zealand Limited, that a larger site development can be serviced from the existing networks (Appendix E).

4.7.2 Communications Service

The existing site communications is serviced from the existing network (Chorus NZ Limited) in the northern berm of South Belt. We have confirmation from Enable Networks that a larger site development can be serviced by their existing network (Appendix E).

5.0 Conclusion

The possible future development of the land as a result of this plan change for either medium density residential units or a mix of residential and retirement village development can be serviced by the existing council wastewater/infrastructure, stormwater discharge to Southbrook, and communications/power supply by the surrounding networks. In order to achieve these connections, the following works will be required on-site:

- Earthworks will be required to raise the existing ground levels above potential flood levels and provide flow paths for overland stormwater flows;
- In accordance with the Natural Hazards assessment (refer RILEY Ref: 170743-E) the finished floor levels of any proposed buildings on-site will be required to meet minimum levels with a freeboard of 400mm;
- Stormwater reticulation systems will be required to collect and convey stormwater on site to a stormwater pond;
- Wet ponds will be required to treat, and attenuate stormwater generated from the site to pre-developed conditions;
- Wastewater reticulation systems will be required to collect, and discharge wastewater generated to the council reticulation mains;
- Council wastewater reticulation mains have capacity to convey the proposed site wastewater generation;

- Re-alignment of the council wastewater drain can be achieved, but will be at the developer cost;
- Water supply reticulation systems will be required to service the proposed site from a proposed service lateral connection to the existing council reticulation mains;
- Council water supply reticulation mains have capacity to provide sufficient volumes and pressures to meet normal demands and firefighting flows;
- Communications services will require an extension of the existing fibre service mains as reticulated by Enable;
- Electrical services will require an extension of the existing primary mains as reticulated by MainPower.

Providing these works are completed at the necessary time (future subdivision consent, resource consent or building consent) the servicing of the proposed site use can be appropriately achieved.

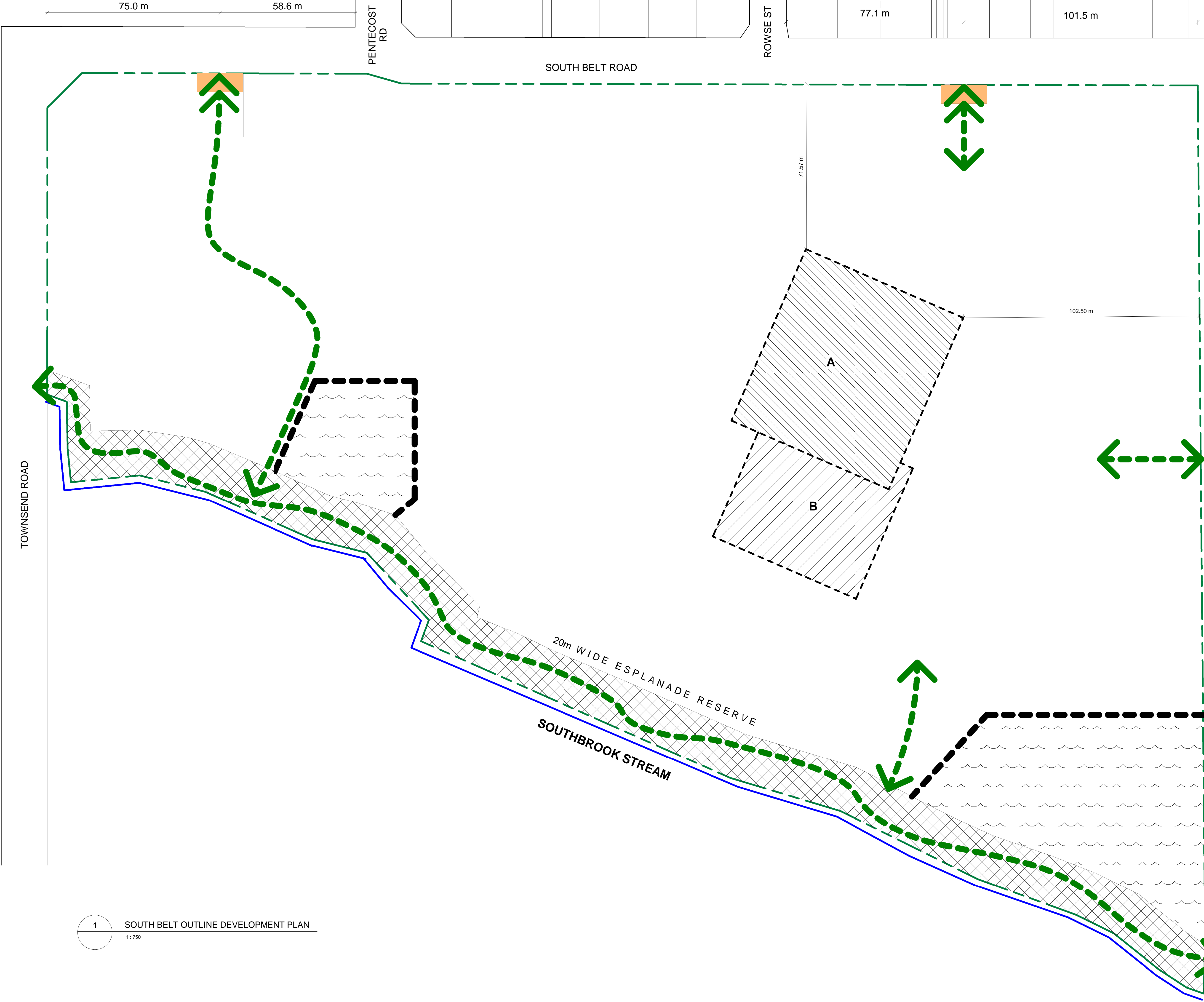
6.0 Limitation

This report has been prepared solely for the benefit of Summerset Villages (Rangiora) Limited as our client with respect to the brief for the and consent authorities and processing the consent(s). The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards and should not be construed as legal or planning opinions. Where opinions or judgements are to be relied on, they should be independently verified with appropriate advice.

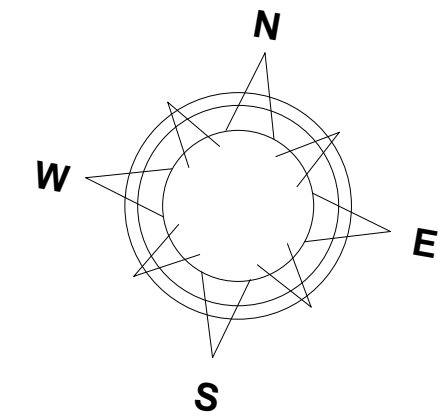
APPENDIX A

Outline Development Plan



LEGEND

- Outline Development Plan Area
- Fixed Road Connection (20m)
- Esplanade Reserve
- South Brook Stream
- Stormwater Management Area
- Height Restriction Area A (14m)
- Height Restriction Area B (10.5m)
- Indicative Pedestrian / Cycle connection (location and alignment may vary)



Rev	Date	Description

Client.

Summerset

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Project Name.
 SUMMERSET VILLAGE RANGIORA

Project Stage. Block Number.
 DRAFT


Drawing Title.
 SOUTH BELT OUTLINE DEVELOPMENT PLAN

DO NOT SCALE DRAWINGS. DATE 18/09/19
 Original Sheet Size: A1
 Project Number. Drawing Number. Rev
 048 MP.001

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APPENDIX B

Stormwater Calculations

	4 Fred Thomas Drive, Takapuna, Auckland 0622 PO Box 100253, North Shore, Auckland 0745 Tel: 09 489 7872 Email: riley@riley.co.nz	Project No:	170743	Page	1	of	2
		Project:	104 Townsend Road and 141 South Belt, Rangiora				
	22 Moorhouse Avenue, Addington, Christchurch 8011 PO Box 4355, Christchurch 8140 Tel: 03 379 4402 Email: rileychch@riley.co.nz	Calc:	LS	Date:	15/10/2019		
		Check:	RAB	Date:	15/10/2019		
Description:	Stormwater Management Basin Design						

Purpose:

Size the stormwater management facility to service development of 9.93 and 2.63 ha blocks. Two separate basins to be provided. Basin to be sized to cater for either full Residential 2 development (minimum 600m² lots) or full development as a retirement village.

Previous correspondence with Waimakariri District Council has determined that a wet pond will be appropriate based on-site location. The wet pond will be the primary water quality and quantity control mechanism for the site.

Method:

- Waterways, Wetlands and Drainage Guide, Chapter 6
- GD01 - Stormwater Management Devices in the Auckland Region

Parameters:

Determine Runoff Coefficients for full development of a retirement village based on NZBC runoff coefficients and compare this to the runoff coefficient for Residential 2 based on Waimakariri Code of Practice.

Land Use	C (NZBC)	C (NZBC-slope adjusted)	Total Site Coverage%	Comment
Roof	0.90	0.85	0.356	Non absorbent
Road	0.85	0.8	0.267	Asphalt and concrete paved surfaces
Landscape area	0.25	0.2	0.378	Garden, lawns
Village Composite Runoff Coefficient			0.59	

The above site coverage % is based on other retirement villages. The runoff coefficients from NZBC E1 have been adjusted by -0.05 for site grades of 0-5%.

WDC Runoff Coefficient for Residential 2 Land Use as per Table 5.3 is 0.65.

For basin sizing calculations, use C=0.65 as allows for either full Residential 2 or as development such as a retirement village

First Flush Volume

The First Flush Volume is the volume from the first 25mm of rainfall falling on impervious areas within the catchment area. The first flush volume has been calculated as per WWDG Section 6.4.1


imp %	0.62	Estimated based on runoff coefficient = 0.65
C _{eff}	100%	
C _D	0.9	
C _{ff}	0.63	

	Main Site	Balance Land		
A _{TOTAL}	9.13	2.43	ha	Excluding pond area
First flush depth d _{ff} (mm):	25	25	mm	
Volume first flush, V _{ff} V _{ff} = 10 × C _{ff} × A _{total} × d _{ff}	1438	383	m ³	

Wetpond Volumes

The wetpond is sized to attenuate up to the 50-year 12-hour event as agreed with WDC. The wetpond has been sized as per Auckland Guideline GD01.

Rainfall depths have been obtained from HIRDS v3 using RCP8.5 (2081-2100).
Rainfall depth = 120.0mm

	4 Fred Thomas Drive, Takapuna, Auckland 0622 PO Box 100253, North Shore, Auckland 0745 Tel: 09 489 7872 Email: riley@riley.co.nz 22 Moorhouse Avenue, Addington, Christchurch 8011 PO Box 4355, Christchurch 8140 Tel: 03 379 4402 Email: rileychch@riley.co.nz	Project No:	170743	Page	2	of	2	
		Project:	104 Townsend Road and 141 South Belt, Rangiora					
		Calc:	LS	Date:	15/10/2019			
		Check:	RAB	Date:	15/10/2019			
Description:	Stormwater Management Basin Design							

					Main Site	Balance Land
	CN	Ia	S	Runoff depth, Q24	Runoff volume, V24	Runoff volume, V24
Pervious	74	5	89.24	64.751	2240.4	604.9
Impervious	98	0	5.18	115.031	6372.7	1720.6
Predeveloped	74	5	89.24	64.751	5827.6	1573.5
Total required storage (m ³) 50-year 12-hr					2785	752
First Flush (Water Quality) Volume					1438	383


A sediment forebay is required prior to the basin. The volume of the forebay has been sized based on 15% of the water quality volume, being the first flush volume.

Summary

	Main Site	Balance Land	
First Flush Volume	1438	383	m ³
Forebay Volume	216	57	m ³
Permanent Water Volume	1222	325	m ³
Attenuation Volume (total)	2785	752	m ³

APPENDIX C

Wastewater Calculations

	4 Fred Thomas Drive, Takapuna, Auckland 0622 PO Box 100253, North Shore, Auckland 0745 Tel: 09 489 7872 Email: riley@riley.co.nz	Project No:	170743	Page	1	of	1
		Project:	104 Townsend Road and 141 South Belt, Rangiora				
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		Check:	LS	Date:	15/10/2019		
Description:	Wastewater Demand						

Purpose: Determine wastewater demands for the site based on either full Residential 2 development (minimum 600m² lots) or full development of a retirement village based on Waimakariri District Council engineering standards.

Method: WDC Engineering Code of Practice (ECoP) Part 6

Demand

Development as full retirement village

The wastewater demands for development such as a retirement village have been calculated based on WDC ECoP part 6, using the following parameters:

- Per capita demand of 250 l/p/d for residents and a staff demand of 50 l/p/d
- Peak wet weather flow factor = 2.5 (WDC ECoP 6.5.4)
- Peak wet weather flow factor=2.6 (WDC ECoP Chart 6.1 for 50<No. Dwellings<550)
- Occupancy rates for villas and townhomes of 1.3 persons per unit, while all other facilities are calculated at a 1 person per unit.
- The estimated number of units is based on other similar retirement villages.

The above parameters were used to calculate total flow and average flow rates for the village and are summarised below:

	Number Units	Occupancy	Per Capita Flows (l/p/d)	Total demand (m ³ /day)
Villa/Townhouse	343	446	250	111.5
Assisted Living Suites	78	102	250	25.5
Memory Care Apartments	28	28	250	7.0
Resthome & Hospital Beds	60	60	250	15.0
Staff	0	64	50	3.2
	509	700		162.2

Average Daily Flow (ADF) = 1.9 litres/sec

Peak Dry Wastewater flow (PDWF) = 4.7 litres/sec

Peak Wet Weather Wastewater flow (PWWF) = 12.2 litres/sec

Standard Residential 2 (minimum 600m²)

Potential Development = up to 150 (Res 2 600m²)

Residential population density = 2.7 people per dwelling (WDC ECoP 6.5.6)

Maximum Occupancy = 405 people

Per capita wastewater flow = 250 litres/sec/person/day

Average Daily Flow (ADF) = 1.2 litres/sec


Total wastewater demand = 101 m³/day

Peak Dry Weather Wastewater Flow (PDWF) = 2.9 litres/sec

Peak Wet Weather Wastewater Flow (PWWF) = 8.8 litres/sec

APPENDIX D

Water Supply Calculations

	4 Fred Thomas Drive, Takapuna, Auckland 0622 PO Box 100253, North Shore, Auckland 0745 Tel: 09 489 7872 Email: riley@riley.co.nz	Project No:	170743	Page	1	of	2
		Project:	104 Townsend Road and 141 South Belt, Rangiora				
	22 Moorhouse Avenue, Addington, Christchurch 8011 PO Box 4355, Christchurch 8140 Tel: 03 379 4402 Email: rileychch@riley.co.nz	Calc:	RAB	Date:	15/10/2019		
		Check:	LS	Date:	15/10/2019		
Description:	Water Supply Peak Flows						

Purpose: Estimate potable water usage requirements for the site based on either full Residential 2 development (minimum 600m² lots) or full development as a retirement village.

Development as full retirement village: Reference to Table 3.2 of AS/NZS 3500.1: 2003 Plumbing and Drainage – Water Services

Demand

Water usage requirements determined based on WDC ECoP is generally for residential zones and overestimates flow requirements for a typical retirement village which generally have a lower occupancy per dwelling.

The potable water usage requirements for the village has been calculated from AS/NZS 3500.1:2003, although this demand has been factored to account for the reduced occupancy of the village units where standard units have been factored by 0.75 (1.3 residents on average per unit) and hospital and dementia care units factored by 0.5 (1.0 residents per unit). Allowance has also been made to service the bowling green and maintenance shed, and both units have been factored by 0.5.

Based on the factored demand, the total village instantaneous potable demand is 19.5 L/s of which 5.5 L/s services the main building (Main building includes Assisted Living Suites, Memory Care Apartments, and Resthome & Hospital Beds).

Total demand based on AS/NZS 3500.1:2003

	Number Units	Reduction Factor	Equivalent Units	Total demand (l/s)	Demand per unit (l/s)
Villa/Townhouse	343	0.75	257.3	13.89	0.0405
Assisted Living Suites	78	0.75	58.5	3.16	0.0405
Memory Care Apartments	28	0.5	14	0.76	0.0270
Resthome & Hospital Beds	60	0.5	30	1.62	0.0270
Maintenance Shed	1	0.5	0.5	0.03	0.0270
Bowling Green	1	0.5	0.5	0.03	0.0270
	511		360.8	19.47	


$$Q = 0.03n + 0.4554 \sqrt{n}$$

Where n=511

$$Q = 0.03 \times 511 + 0.4554 \sqrt{511} \\ = 25.6 \text{ L/s}$$

Factored demand based on reduced occupancy

$$Q = 0.03 \times 361 + 0.4554 \sqrt{361} \\ = 19.5 \text{ L/s}$$

	4 Fred Thomas Drive, Takapuna, Auckland 0622 PO Box 100253, North Shore, Auckland 0745 Tel: 09 489 7872 Email: riley@riley.co.nz	Project No:	170743	Page	2	of	2
		Project:	104 Townsend Road and 141 South Belt, Rangiora				
	22 Moorhouse Avenue, Addington, Christchurch 8011 PO Box 4355, Christchurch 8140 Tel: 03 379 4402 Email: rileychch@riley.co.nz	Calc:	RAB	Date:	15/10/2019		
		Check:	LS	Date:	15/10/2019		
Description:	Water Supply Peak Flows						

Standard Residential 2 (minimum 600m²)

Method: WDC ECoP Section 7

Demand

Potential Development = up to 150 sections (Res 2 600m²)

Demand per dwelling = 0.1 litres/sec/dwelling (WDC ECoP Section 7.5.2)

Total Water Supply Demand = 15 litre/sec

APPENDIX E

***Correspondence from
MainPower and Enable***

Edward Shaw

From: Brian Heron <brian.heron@mainpower.co.nz>
Sent: Tuesday, 29 July 2014 12:14 p.m.
To: Edward Shaw
Cc: Kevin Large; Paul Oliver
Subject: RE: [#196916] 141 South Belt and 104 Townsend Road, Rangiora: Private Plan Change Request

Edward

Mainpower will be able to supply the subdivision.

A budgetary estimate to supply the lots is \$2,200 plus GST per lot at todays rate

This is with the developer providing the trenching and backfilling for all the cables and ducts, including any excavation required in South Belt

Probable Time frame would be 8 to 10 weeks after acceptance of our quotation to us being able to schedule staff to lay the cables

There will also be the cost of installing Streetlights provided by the developer, presently a budget cost of \$1000 plus GST per column

The developer will need to arrange a streetlight design and purchase the columns and fittings

Thanks

Brian Heron
Network Manager Customer Services

From: Edward Shaw [<mailto:Edward.Shaw@eliotsinclair.co.nz>]
Sent: Tuesday, 29 July 2014 11:19 a.m.
To: Brian Heron
Subject: [#196916] 141 South Belt and 104 Townsend Road, Rangiora: Private Plan Change Request

Hi Brian,

I've attached a proposed plan of a subdivision for the property at 141 South Belt & 104 Townsend Road, Rangiora (Part of Lot 1 DP 45826 & Part of Lot 3 DP 73557).

The anticipated number of allotments that would be created on the site is approximately 140.

Can you please advise whether MainPower New Zealand Ltd has the capacity to service these lots?

If upgrading of the current MainPower network would be required could you provide a broad costs and time frame to do this work?

I look forward to hearing from you.

Kind regards,

Ed.

Russell Brents

From: Rob Armstrong <Rob.Armstrong@enable.net.nz>
Sent: Monday, 19 August 2019 2:18 PM
To: Russell Brents
Cc: Leanne Sutherland
Subject: RE: Communications Servicing for 141 South Belt and 104 Townsend Road Rangiora

Hi Russell

Yes we can service this development

I haven't quite answered where we will attach to our network yet

Can you advise if any trenching is required either across the road or east down South Belt Road for other services?

Rob Armstrong

Business Development Manager | Enable Networks Limited

Ph 0800 434 273

M +64 274 321 903

www.enable.net.nz



From: Russell Brents <rbrents@riley.co.nz>
Sent: Wednesday, 7 August 2019 2:25 PM
To: Rob Armstrong <Rob.Armstrong@enable.net.nz>
Cc: Leanne Sutherland <lsutherland@riley.co.nz>
Subject: RE: Communications Servicing for 141 South Belt and 104 Townsend Road Rangiora

Hi Rob,

Thanks for the quick reply, we are planning on approximately 140 lots with two accesses off of South Belt most likely one between Pentecost/Townsend Rd and the other between Rowse/Martyn St. The scheme plans are currently in development, but we would like to confirm the servicing for a plan change application.

Russell Brents
Riley Consultants Ltd

From: Rob Armstrong <Rob.Armstrong@enable.net.nz>
Sent: Wednesday, 7 August 2019 2:13 PM
To: Russell Brents <rbrents@riley.co.nz>

Cc: Leanne Sutherland <lsutherland@riley.co.nz>

Subject: RE: Communications Servicing for 141 South Belt and 104 Townsend Road Rangiora

Hi Russell

You can see our network on our snip below

I will need to assess through a feasibility with design

They will want to know where the entrance to stage 1 will be and how many lots in total in the development

Can you send me this info please?



Rob Armstrong

Business Development Manager | Enable Networks Limited

Ph 0800 434 273

M +64 274 321 903

www.enable.net.nz