

BEFORE THE WAIMAKARIRI DISTRICT PLAN REVIEW HEARINGS PANEL

IN THE MATTER OF the Resource Management Act 1991

AND

IN THE MATTER OF the hearing of submissions and further submissions on the Proposed Waimakariri District Plan

AND

hearing of submissions and further submissions on Variations 1 and 2 to the Proposed Waimakariri District Plan

Hearing Stream 12E: Rezoning Requests

**FIRST STATEMENT OF EVIDENCE OF ALASTAIR MCNABB
(CIVIL WORKS AND SERVICING INFRASTRUCTURE)
FOR RICHARD AND GEOFF SPARK
(PDP SUBMITTER 183 / VARIATION 1 SUBMITTER 61)**

Dated 5 March 2024

Aston Consultants Limited
Resource Management and Planning
PO Box 1435
Christchurch

Attention: Fiona Aston
Phone: 0275 332213
Email: fiona@astonconsultants.co.nz

Counsel instructed:
David Caldwell, Barrister
Bridgeside Chambers
PO Box 3180
Christchurch

Phone: 021 221 4113
Email: dcc@bridgeside.co.nz

Summary Statement

1. Fraser Thomas prepared an Infrastructure Assessment Report, dated 1 March 2024 (**Appendix A**) for two blocks of land comprising multiple titles which for the purposes of submissions on Variations 1 and 2 to the Proposed Waimakariri District Plan are known as:
 - (a) Block A: North of Boys Road (approximately 25.7 ha).
 - (b) Block B: South of Boys Road and west of a future Eastern Bypass Arterial Road (approximately 36.4 ha).

The approximate location and extent of the subject site, and 'Block A' and 'Block B', are shown in the Introduction of the Fraser Thomas Ltd Infrastructure Assessment Report.

2. The Infrastructure Assessment Report provides a desktop assessment of the proposed development of the site, in terms of civil infrastructure and servicing potential, to determine if the site is suitable for the proposed development.
3. Waimakariri District Council and Environment Canterbury have been consulted to determine specific requirements, preferences and/or processes for the proposed future development.
4. Mainpower have been consulted to determine availability of supply of power, and Chorus have been consulted to determine availability of supply of communication services, for the proposed subdivision.
5. The site assessment has included input from site topographic survey, preparation of a conceptual site earthworks model, preliminary roading assessment, preliminary water supply, stormwater and wastewater flow and demand calculations, and preliminary assessment and sizing of attenuation requirements for stormwater arising from the developed site, to meet pre-development conditions.
6. Fraser Thomas Ltd has undertaken 2D flood modelling and associated reporting, to assess impacts arising within and adjacent to the site, using the conceptual site earthworks model, for the 200-year critical storm event. Reporting and evidence demonstrating that there is a less than minor effect to adjacent and upstream areas is provided separately.
7. In summary, the infrastructure assessment concludes that a combination of existing infrastructure, and new infrastructure, will accommodate the proposed development, and

the site is considered suitable to be rezoned for future residential development, subject to further design, and planned WDC infrastructure upgrades being completed.

8. As described in the geotechnical engineering brief of evidence, hydrological conditions across the subject are complex. Based on the results of our shallow and deep investigations (and shallow and deep piezometers), it is likely that there are some 'perched' water tables, in some of the surficial soils, and also a confined aquifer (within the underlying gravels). I consider there are engineering solutions to manage groundwater on this site.
9. As described in the geotechnical engineering brief of evidence, provided civil infrastructure construction works are undertaken in accordance with the relevant New Zealand Standard Codes of Practice, the interception of any surficial perched water lenses or the phreatic surface, by underground serviceline trenches, is expected to have a 'less than minor' effect on the receiving environment. Civil infrastructure works are not expected to intercept the confined aquifer underlying the site.
10. Some of the infrastructure proposed for the site will be constructed at, or above, the existing ground level, and therefore will not touch upon or encounter groundwater. Infrastructure in this category likely includes a substantial portion of stormwater, wastewater and water supply infrastructure, and utilities.
11. Other infrastructure would be constructed below the existing ground level – for example, deep infrastructure such as wastewater pump stations, pipe and cable connections to existing utilities and servicing infrastructure, and possibly some stormwater pipelines and other new piping infrastructure, particularly near the periphery of the site where earthworks filling is minimised, or where crossing the proposed Rangiora Eastern Link.
12. However, if it is deemed a requirement to avoid the interception of any surficial perched water lenses or the phreatic surface, one of the ways this could be achieved would be by providing a 'cushion layer' of engineered fill, above the existing ground surface, in which the underground serviceline trenches could be founded.
13. Whilst roading is addressed in the Infrastructure Assessment Report, transport matters are more fully addressed in a separate document prepared by Lisa Williams of Novo Group.
14. Whilst flooding and overland flowpaths are summarised in the Infrastructure Assessment Report, flood matters are more fully addressed in a separate document prepared by Amir Montakhab of Fraser Thomas Ltd.

15. Whilst earthworks are addressed in the Infrastructure Assessment Report, geotechnical matters are more fully addressed in a separate document prepared by Mason Reed of Fraser Thomas Ltd.

Introduction

16. My name is Alastair Caleb Vincent McNabb, and I have over 18 years' experience working as a civil engineer, and in related fields. I am a Principal Civil Engineer and manage the Christchurch civil engineering team at Fraser Thomas Limited, where I have been employed for close to four years, and am predominantly engaged in land development and civil infrastructure work (or equivalent).
17. I have a background in due diligence assessments, bulk water supply transmission, stormwater and wastewater design, flood levee and pond design, general civil works, design management, construction monitoring and contract administration.
18. I have been responsible for project planning and delivery of design projects in three waters, multi-disciplinary infrastructure projects, infrastructure assessments, and overseeing construction projects across many sectors including industrial, mining, marine, international aid, municipal infrastructure and buildings, whilst based in New Zealand, Australia, Papua New Guinea, Vanuatu, New Caledonia and Uganda. I have worked in New Zealand from 2005 to 2010, and from 2020 to 2024.
19. I hold a Bachelor of Engineering in Natural Resources Engineering from the University of Canterbury. I am Chartered Professional Engineer MIEAust, CPEng, IntPE (Aus), APEC Engineer.
20. My current role primarily involves identifying and scoping civil engineering works for new greenfield and brownfield developments, preparing concept designs and managing preliminary and detailed design for new developments, undertaking three waters engineering detailed design work, undertaking quality assurance across all phases of land development design projects, and undertaking due diligence studies and assessment of existing infrastructure for due diligence and plan change applications, assessment of new development potential and consenting for a variety of development types, as well as providing overview to the civil engineering team construction monitoring and contract administration activities.
21. I have specialist skills and considerable experience in assessing and determining infrastructure requirements, pipeline and open channel hydraulics, stormwater, wastewater and water supply flow estimation, and gravity and pumped pipeline design,

covering greenfield and brownfield developments, and municipal renewals and extensions ranging from small to large scale projects.

22. I have undertaken and/or been the reviewer on several desktop investigations for similar zoning plan changes in the Canterbury region including:
- (a) Brookside Road Plan Change, Rolleston.
 - (b) Shands Road Plan Change, Prebbleton.
 - (c) AgResearch Ltd, Lincoln.
23. In regard to the Infrastructure Assessment Report, I scoped and planned the investigations and studies undertaken to assess existing infrastructure and new infrastructure requirements, and reviewed the completed investigations and reporting.

Code of Conduct

24. I have read the Code of Conduct for Expert Witnesses (contained in the Environment Court Practice Note 2023) and I agree to comply with it. Except where I state that I rely on the evidence of another person, I confirm that the issues addressed in this statement of evidence are within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from my expressed opinions.

Scope of Evidence

25. My evidence addresses civil engineering, infrastructure works and servicing of the site.
26. In preparing my evidence I have referred to and have considered the results of the geotechnical field investigations and appraisal works reported in the Geotechnical Investigation Report, dated 23 November 2023. I have also considered information relating to the hydrological conditions at the site, as indicated by standpipe piezometer
27. In preparing my evidence I referred to and considered the following codes, standards and plans:
- (a) Waimakariri District Council (WDC) Activity Management Plans.
 - (b) WDC Engineering Code of Practice (ECoP).
 - (c) ECan Erosion and Sediment Control Toolbox.
 - (d) CCC Waterways, Wetlands and Drainage Guide (WWDG).

- (e) WDC Operative District Plan.
- (f) WDC website flood and coastal hazards modelling maps.

28. It is understood that the submission seeks to rezone:

- (a) the land north of Boys Road, and within the South East Rangiora Development Area (Block A), to Medium Density Residential (MRZ), and
- (b) the land south of Boys Road and west of the eastern bypass (Block B), to MRZ or, in the alternative, rezone this land to MRZ, BIZ (Business Industrial Zone), Format Retail/Mixed Use or a mix of these zones.

Block B comprises two portions, a large northern portion and a smaller southern area (Block C). Our Block B findings capture the Block C area.

Conclusion

29. In general terms and within the limits of the investigations, assessments, review of information and consultations with authorities and providers, as outlined and reported in the 1 March 2024 Infrastructure Assessment Report, the site is considered suitable to be rezoned for future residential development, provided future infrastructure upgrades are completed, and subject to further design and consultation with Council, and other service providers, during proposed future site development and design stages, to confirm specific civil design and servicing requirements.

Alastair McNabb

5 March 2024

Appendix A

Fraser Thomas Ltd “Infrastructure Assessment Report”,
dated 1 March 2024

RICHARD AND
GEOFF SPARK



Fraser Thomas

ENGINEERS • RESOURCE MANAGERS • SURVEYORS




PROPOSED DISTRICT PLAN,
REZONING REQUEST
SPARK DAIRY FARM,
BOYS ROAD, RANGIORA

INFRASTRUCTURE ASSESSMENT REPORT

RICHARD AND
GEOFF SPARK

PROPOSED DISTRICT PLAN,
REZONING REQUEST
SPARK DAIRY FARM,
BOYS ROAD, RANGIORA

INFRASTRUCTURE ASSESSMENT REPORT

Project No.	CH01508	Approved for Issue	
Version No.	2	Name	G Madden
Status	FINAL	Signature	
Authors	A McNabb T Allan M Pepper		
Reviewer	A McNabb	Date	1 March 2024

Fraser Thomas Limited

Consulting Engineers, Licensed Surveyors
Planners & Resource Managers
**Unit 3a Barry Hogan Place,
Riccarton 8041**
PO Box 39 154, Harewood Post Centre, 8545
Christchurch, New Zealand
Tel : +64 3 358-5936
Email: mreed@ftl.co.nz

**PROPOSED DISTRICT PLAN, REZONING REQUEST
SPARK DAIRY FARM, BOYS ROAD,
RANGIORA**

INFRASTRUCTURE ASSESSMENT REPORT

RICHARD AND GEOFF SPARK

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**PROPOSED DISTRICT PLAN, REZONING REQUEST
SPARK DAIRY FARM, BOYS ROAD,
RANGIORA**

INFRASTRUCTURE ASSESSMENT REPORT

RICHARD AND GEOFF SPARK

1.0 INTRODUCTION

This report sets out the investigations undertaken, assessment of site servicing constraints and site servicing engineering requirements, undertaken for the site located at Spark dairy farm, on Boys Road, Rangiora, to support a plan change application.

The current farm property is comprised of multiple titles (see below) and is best broken down into three separate areas for the purpose of this investigation. These three areas being:

- (i) Block A: North of Boys Road (approximately 25.7 ha)
- (ii) Block B: South of Boys Road and West of Future Arterial Road (approximately 30 ha)
- (iii) Balance Farm (approximately 138 ha) – outside of the scope of this report.

Block A comprises the following titles:

Address	Legal description	CT Ref	Area (ha)
19 Spark Lane	Lot 2 DP 418207	469981	2.1080
	Lot 3 DP 418207	469982	14.1950
	Part Rural Section 1436	CB9F/58	1.7275
234 Boys Road	Lot 1 DP 22100	CB1C/810	7.6739
TOTAL			25.7044 ha

It also includes the Rosburn Events Centre and Northbrook Museum - 17 Spark Lane, legally described as Lot 1 DP 418207 (2.08 ha)

Land south of Boys Road (appx 30 ha) is part of the larger Sparks farm title, legally described as LOTS 1, 3 DP 418207 LOT 1 DP 80780 LOT 1 DP 80781 RURAL SECS 1883 1884 2452 2512 PT RURAL SECS 316 358A 387 1436 1438 BLK VII XI RANGIORA SD 1.

The approximate location and extent of the subject site is shown in Figure 1 below.

Specifically, this report addresses:

- (a) Existing civil infrastructure in proximity to the site, and additional infrastructure expected to be required for future development

- (b) Earthworks extents likely to be required to construct development building platforms and raise site levels above specified flood event levels
- (c) Existing electrical and telecommunications infrastructure in proximity to the site, and additional infrastructure expected to be required for future development
- (d) Relevant performance standards and codes of practice that a future development would comply and align with.

This report is based upon the information that could be obtained during consultation with Waimakariri District Council and Environment Canterbury, review of council maps, district plans, activity management plans and liaison with services providers during the study period, and in some instances is based upon limited capacity and servicing information available or received from supply and service entities.

Standards and codes referenced herein, would generally use the latest revision required by council, should future revision be made.

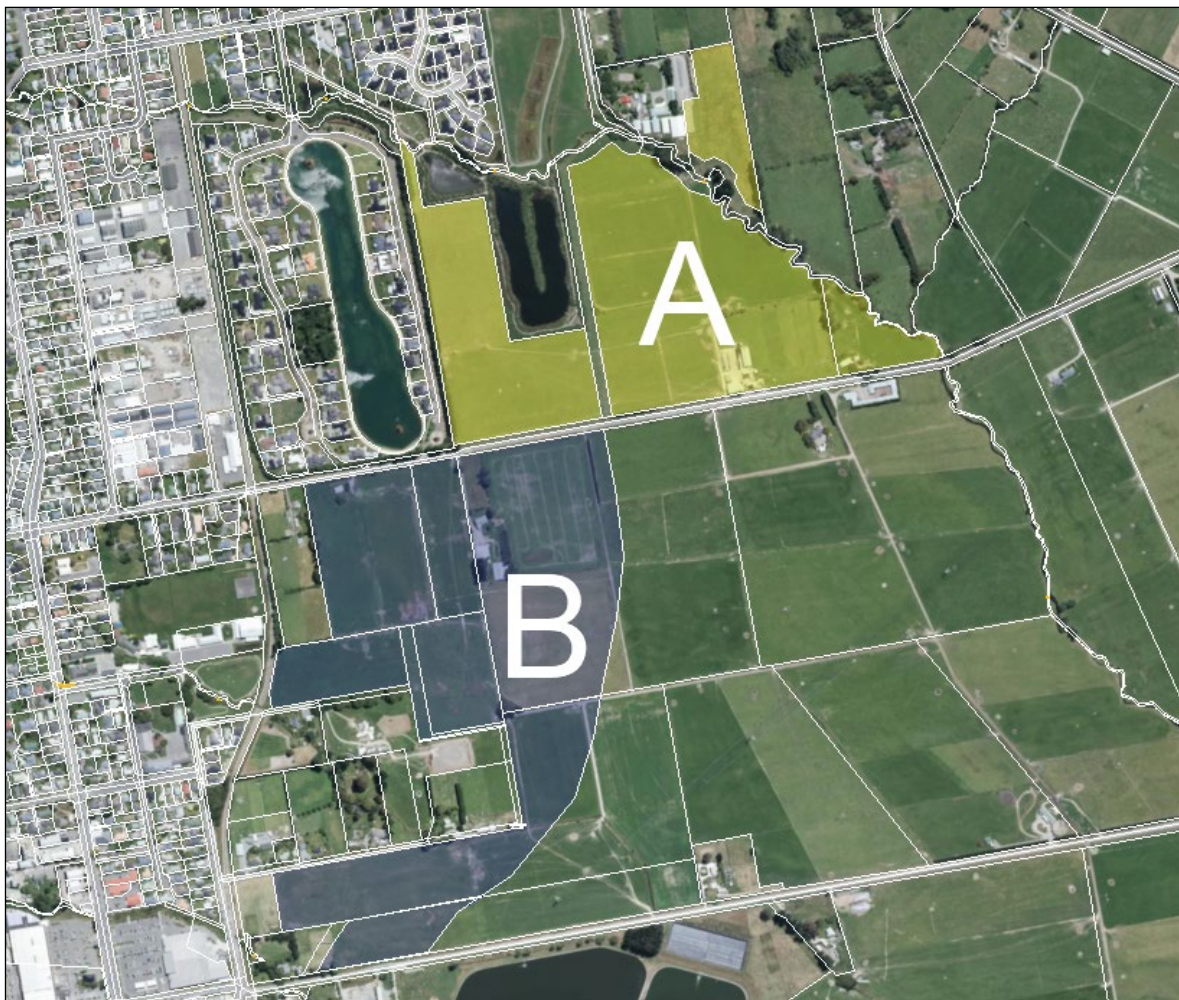


Figure 1: Site Location and Areas

The proposed Rangiora East Road Connection Designation splits Block A into east and west sections and provides the southern and eastern boundary for Block B. It also splits the southern portion of Block B from the bulk of Block B.

2.0 EXISTING SITE CHARACTERISTICS

The subject site is generally located between North Brook creek (to the north), and Marsh Road (to the south). Boys Road roughly bisects the site, centrally. Existing rural properties abut the eastern site boundary, and existing semi-rural and residential properties abut the site to the west.

The site has the following characteristics:

- (1) The topography within the subject site is generally flat
- (2) The majority of the site comprises paddocks vegetated with grass
- (3) Two existing single storey dwellings are located across the site, and generally have several ancillary sheds and garages, of various construction styles and claddings
- (4) A lake, associated with the Northbrook wetlands, is positioned on the northern side of the site
- (5) Several existing farm drains run through the site, a spring pops up, and three streams run through, or adjacent to the site, including South Brook, Middle Brook and North Brook).

Refer to Figure 2 for illustrations of general site characteristics.

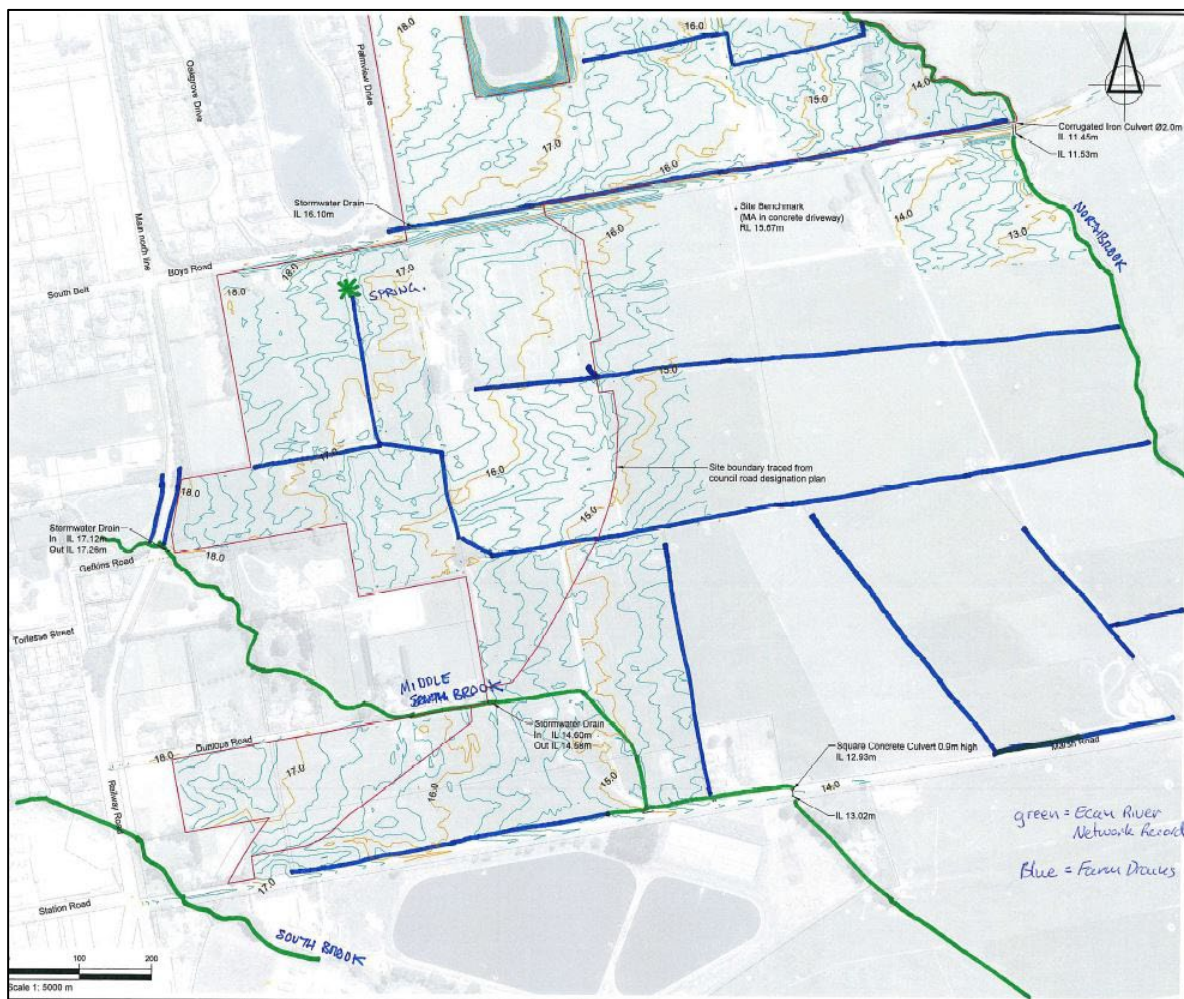


Figure 2: Streams (green) and Farm Drains (blue)

3.0 PROPOSED DEVELOPMENT

As discussed in Section 1.0 of this report, the subject site proposed for development, comprises an area totalling approximately 55.7 ha.

The submission on Variation 1 requests:

- (1) Rezoning all land north and south of Boys Road outlined in red on Figure 1 below ('the Site') Medium Density Residential Zone (MRZ). With respect to the land south of Boys Road and west of the eastern bypass, in the alternative, rezone this land to MDRZ, BIZ, Format Retail/Mixed Use or a mix of these zones
- (2) And, rezoning all land north of Boys Road and within the South East Rangiora Development Area to MRZ.

The anticipated yield, assuming a net density of 15 hh/ha is anticipated to be approximately 560 - 600 households (hh).

The yield for each block is expected to be in the order of (+/- 10 hh):

- Block A 290 hh
- Block B 290 hh

4.0 EARTHWORKS

4.1 OVERVIEW AND RELEVANT STANDARDS

Land modification work will be required to lift the site above flood levels, road corridors and amenities.

It is expected that land modification works will comprise topsoil stripping and stockpiling, bulk cut and fill earthworks, and topsoil respread.

It is expected that earthworks would be undertaken in accordance with:

- Consents issued by Waimakariri District Council (WDC)
- Consents issued by Environment Canterbury Regional Council (ECan)
- WDC Engineering Code of Practice (ECoP) Part 4 Geotechnical Requirements (Earthworks and Land Stability)
- NZS 4431: 1989 Code of practice for Earth Fill for Residential Development
- Geotechnical investigation report recommendations.

4.2 EARTHWORKS CONSIDERATIONS

Reshaping of land, and the as-constructed gradients, would be dictated by existing watercourses, lot shaping, roading networks, wastewater drainage, finished floor level requirements and stormwater overland flowpath requirements. The overall finished land slope is expected to generally align with the existing landform direction.

The following criteria would generally be applied to earthworks for land shaping. Actual completed works may differ depending on design outcomes and agreement with District and Regional Councils:

- Lot gradient minimum 1:400 slope to road, maximum 1:100 slope to road
- Lot levels sufficient to raise floor levels above flood levels as per code requirements
- Road gradient minimum slope 1:450, maximum slope 1:20 (unlikely)
- Overland flowpath sufficient slope to convey 1 in 50 year Annual Recurrence Interval (ARI) flood flows along road networks
- Cut and fill balancing to minimise imported or exported fill, with fill up to approximately 3.5m above existing ground within middle of site and an average fill of approximately 1.0m - 1.25m across the development
- Wastewater ground slope similar to pipeline slope to convey wastewater flows.

Prior to any cut to fill operation commencing, earthworks areas would be stripped of topsoil and stockpiled onsite for respread upon completion of bulk earthworks. Unsuitable topsoil materials would be removed from site and disposed of at an appropriate approved facility.

It is likely that fill will be imported to site in order to meet site filling requirements. However, it is anticipated that at least some of the additional fill required to meet the deficit, could be sourced onsite from road trims, trenching spoil, attenuation basin excavation and other excavation activities.

Between Gefkins Road and North Brook Road, surficial peat material will likely require removal or remediation works, as part of any subdivisional earthworks, in order to provide for stable building platforms and infrastructure. It should be noted that the removal of peat will have an impact on earthworks, including:

- Additional engineered fill will be required to replace the removed material
- The material will be considered 'cut to waste', as it is unlikely that the material will be able to be re-used in the development.

Fill placement should be certified by a professional engineer to confirm that it has been placed in accordance with relevant standards and engineering requirements.

5.0 EROSION AND SEDIMENT CONTROL

5.1 OVERVIEW AND RELEVANT STANDARDS

Erosion and Sediment Control (ESC) plans and accompanying erosion and sediment control drawings, detailing mitigation and prevention measures to combat the effects land disturbance activities upon surrounding and downstream areas will be required.

It is expected that ESCP preparation and implementation would be undertaken in accordance with:

- Consents issued by WDC
- Consents issued by ECan (including discharge consents)
- ECan Erosion and Sediment Control Toolbox.

5.2 EROSION AND SEDIMENT CONTROL CONSIDERATIONS

ESC plans and any amendments would be submitted to WDC and ECan for approval.

Objectives for ESC plans and potential mitigation measures would include:

- (1) Compliance with consent conditions
- (2) Minimise the extent and duration of works on the site, including temporary stockpiles
- (3) Stabilise exposed areas as soon as practicable by sowing or mulching to prevent erosion
- (4) Ensure revegetation can occur in a staged manner to reduce the risk of silt/sediment leaving the site and entering downstream receiving environments
- (5) Installation of perimeter controls such as diversion drains, silt fences and construction entrances to prevent sediment leaving the site
- (6) Provide sediment removal devices such as sediment retention ponds to minimise the amount of sediment laden runoff leaving the site and entering watercourses
- (7) Ensure control measures are inspected and repaired after storm events
- (8) Ensure the site is rehabilitated prior to the removal of control measures
- (9) Mitigate dust emissions from the site during earthworks to minimise adverse effects on nearby properties
- (10) Minimise potential environmental effects.

Site ESC works would be implemented prior to land disturbing activities commencing, and maintained for the duration of the infrastructure activities associated with the development, and/or until surfaces have stabilised, and in accordance with relevant issued consents.

ESC would be monitored by the construction contractor, construction monitoring engineer and ECan and WDC representatives.

6.0 GROUNDWATER

The hydrological conditions across the subject are complex. Based on the results of our shallow and deep investigations, including shallow and deep piezometers, it is likely that there are some 'perched' water tables, in some of the surficial soils, and also a confined aquifer within the underlying gravels.

For concept design purposes, it is assumed that the surveyed water levels in the various farm drains and streams located at the site is representative of the phreatic surface underlying the site. The elevation of the phreatic surface, as indicated by the water levels in the various drains, varies from approximately RL 16.53m (measured at the western end of the Boys Road), to approximately RL 12.75m (measured at the eastern end of Boys Road). At these locations, these surveyed groundwater elevations are equivalent to a depth to groundwater of approximately 600mm below the surrounding ground surface (i.e. immediately abutting the drain).

7.0 STORMWATER

7.1 OVERVIEW AND RELEVANT STANDARDS

The site is on the boundary of the Rangiora Drainage Rating Area, shown below in Figure 3, from the Rangiora Urban Drainage Scheme Activity Management Plan 2021, Appendix A: Figure 11 Plan of Serviced Areas as of January 2021.

It is expected that stormwater design and construction would be undertaken in accordance with:

- WDC ECoP
- Christchurch City Council (CCC) Construction Standard Specification (CSS)
- CCC Waterways, Wetlands and Drainage Guide (WWDG)
- Auckland Regional Council Technical Publication 10 (ARC TP10) Stormwater management devices design guideline
- New Zealand Building Code (NZBC) Clause E1 Surface Water.

Block A is located within WDC consent CRC184601 (To discharge stormwater and water treatment chemicals into land and to surface water). Block B has no current stormwater consents for development.

Existing site conditions allow for stormwater to sheet and flow overland across paddocks, and into farm drains that follow fence lines through the site. These drains then flow into North Brook.

The site is not currently connected to a public stormwater system, however all nearby water bodies feed into the Cam River catchment.

Stormwater water bodies, that are discharge options, include:

- North Brook
- Middle Brook
- Boys Roadside drains
- Marsh Roadside drain.

Geotechnical site investigations, described in the Fraser Thomas Ltd (FTL) Geotechnical Investigation Report, dated 23 November 2023, included with the Rezoning Request, have established that:

- Underlying ground conditions consist of sandy gravel materials commencing approximately 1.0m to 2.3m below the existing ground surface (at the locations of test pits), with various layers of top soil, silt, and peat above
- The water table ranges between 1.2m to 2.0m below ground level at time of investigation, with the shallowest groundwater level being approximately 600mm below ground level.

These types of soils, in conjunction with the high ground water level in this area, make stormwater soakage to ground difficult to achieve.

Site stormwater management is therefore anticipated to encompass a network of pipes, swales, basins, and treatment devices to provide conveyance, treatment and disposal to either groundwater recharge or discharge to nearby streams.

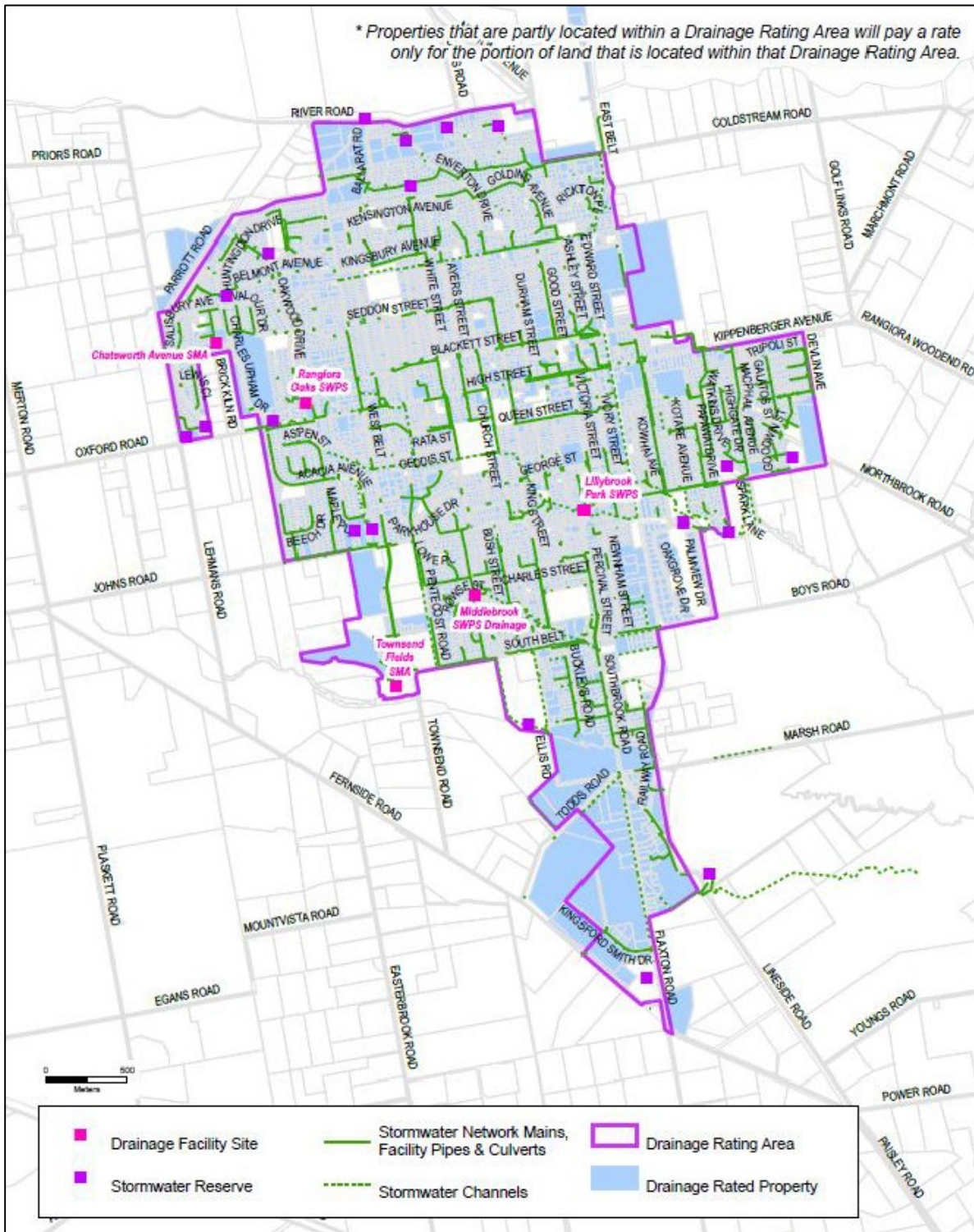


Figure 3: WDC Plan of Serviced Areas as of January 2021

7.2 STORMWATER CONVEYANCE

Concept level stormwater main pipeline alignments are sketched over the a + urban concept outline development plan version 29 dated 15 January 2023, and spot heights from the concept earthworks model were added to each end of the pipelines.

- (6) A wetland through the development may be possible
- (7) Stormwater events up to 1 in 50 year ARI or less must achieve neutrality within the development area
- (8) Treatment and attenuation will have to be within the development area.

A pre-application meeting with ECan was arranged at advice of WDC and confirmed the following:

- WDC, as the current and future stormwater consent holder, advice for stormwater attenuation, treatment, and outfall conditions shall be followed.
- That the existing streams and ditches can be modified as long as ecologist advice is followed
- Depth to water table is critical for any excavated stormwater basin or channel
- Groundwater may be intercepted as long as a ground water take consent is received, however, as the area is currently over allocated this is unlikely to be granted.

Treatment options discussed in the pre-application meetings with both WDC and Ecan include:

- (a) Swales
- (b) Wetlands
- (c) Proprietary treatment devices.

Additional options that could be considered:

- (i) Raingarden
- (ii) First flush basin
- (iii) Dry basin.

Several of these options provide a degree of attenuation as well as treatment, and some function best when paired in a treatment train approach. Treatment and attenuation options would be investigated for suitability and fit with the overall development layout during the developed design phase.

Exact requirements for this category of infrastructure, with respect to methodology and any capacity constraints for the existing stormwater network, would be determined during the subdivision design stage, following detailed investigation and consultation with Council.

Basin design will need to consider the high groundwater levels, to determine the basin type, and to determine and minimise effects upon the receiving environment.

Discharge consent will be required from Ecan for the development. Consents would be transferred to WDC upon completion of subdivision works.

In accordance with WDC EcoP, Part 5 Stormwater and Land Drainage, Section 5.5.2, road and site stormwater capture and discharge systems would be sized to accept 5-year ARI rainfall events, including runoff from individual sites exceeding the 5-year ARI rainfall event, with up to the 50-year ARI rainfall event being conveyed as overland flow via the road network.

Stormwater infrastructure will be vested in Council upon completion.

7.3.2 Concept Stormwater Basin Design

The site is split into three catchments that drain to the proposed stormwater basins:

- Block A West 9.75ha
- Block A East 17.21ha
- Block B 29.25ha.

Pre-development flows for each basin's catchment have been calculated for every storm event in a 1 in 50 year ARI using NIWA HIRDS RCP 8.5, with a run off coefficient of 0.3 used for grass pasture.

Post development flows for each basin's catchment have been calculated for every storm event in a 1 in 50 year ARI using NIWA HIRDS RCP 8.5, and a run off coefficient of 0.65 for residential development.

A critical storm duration for each basins live storage capacity was determined by deducting the post-development runoff volume from pre- -development from the site. A basin volume was also calculated based on only the 24h pre-development flow rate being allowable as the maximum discharge from the basins. The worst case basin size arising from this analysis has been adopted for concept level basin design sizing.

Concept basin minimum volumes are determined to be:

- Block A West 5,200m³
- Block A East 9,200m³
- Block B 15,600m³.

The basins have been designed looking solely at attenuation, however they will also act as first flush basins during the conceptually designed 24 hour drain down period. Additionally, it is possible to construct the basins as a dual first flush basin and attenuation basin if necessary.

Basin size calculations are provided in Appendix D.

7.4 FLOODING AND OVERLAND FLOWPATHS

7.4.1 Flooding

Council flood and coastal hazards modelling maps available on their website show the depth and extent of surface flooding for the 1 in 200 year and 1 in 500 year ARI events. This model displays the worst case of, localised flooding model, and a combination of storms and river flows in the Ashley Breakout Flooding model as a flood hazard map, as well as each of the flood models individually.

As required by Section 106 of the Resource Management Act, a flood risk assessment has been undertaken. Fraser Thomas Ltd has produced a 2D flood model and associated reporting, to assess impacts arising within and adjacent to the site, using a conceptual site earthworks model, during the 200-year critical storm event. Reporting is provided separately.

The 2D flood model demonstrates that there is a less than minor effect upon downstream and adjacent properties for the 1 in 200 year flood event and Ashley [River] Breakout event.

7.4.2 Overland Flow

Overland flows from properties will flow to the roading network via direct runoff. The roading network will serve as an overland flow path, and convey runoff to attenuation basins, rain gardens, soakage basins, or wetlands that would be designed during the subdivision consent stage.

The site with its stormwater management structures, and secondary flow path will attenuate stormwater flows up to the 1 in 50 year event, and reduce the runoff generated from the developed site to pre-development levels for storm events up to a 50 year recurrence interval.

The proposed Rangiora East connection road will create a stormwater interception barrier. The proposed road design incorporates large swales, a raised road, and large treatment basins. This road will reduce any stormwater runoff heading in the eastern direction.

Coordination with WDC in the staging and stormwater design of Rangiora East connection road is expected to result in a coordinated road and development stormwater system. This may include the combining of stormwater overland flow paths and coordination of stormwater treatment options.

8.0 WASTEWATER

8.1 OVERVIEW AND RELEVANT STANDARDS

The site is located outside of the Rangiora wastewater scheme as shown below in Figure 8, Figure 13 – A1 – Plan of Serviced Area (Rangiora) of the WDC Activity Management Plan 2021 Rangiora Wastewater Scheme 3 Waters / July 2021. The eastern part of Block A and the entirety of Block B are located within the wastewater rated property zone.

It is expected that wastewater design and construction would be undertaken in accordance with:

- WDC ECoP
- CCC CSS
- NZBC Clause G13 Foul Water.

If this proposed plan change is granted it would need to include the western portion of Block A in the wastewater rated property zone and the entirety of the proposed subdivision in the wastewater serviced property zone. This was discussed in a pre-application meeting where WDC indicated that these boundaries are indicative at present but following the plan change being accepted Block A and B would be included in these service zones and rate paying zones.

The site would be serviced by the Rangiora Wastewater Treatment Plant (WWTP) via pumpstations and new pressure main network.

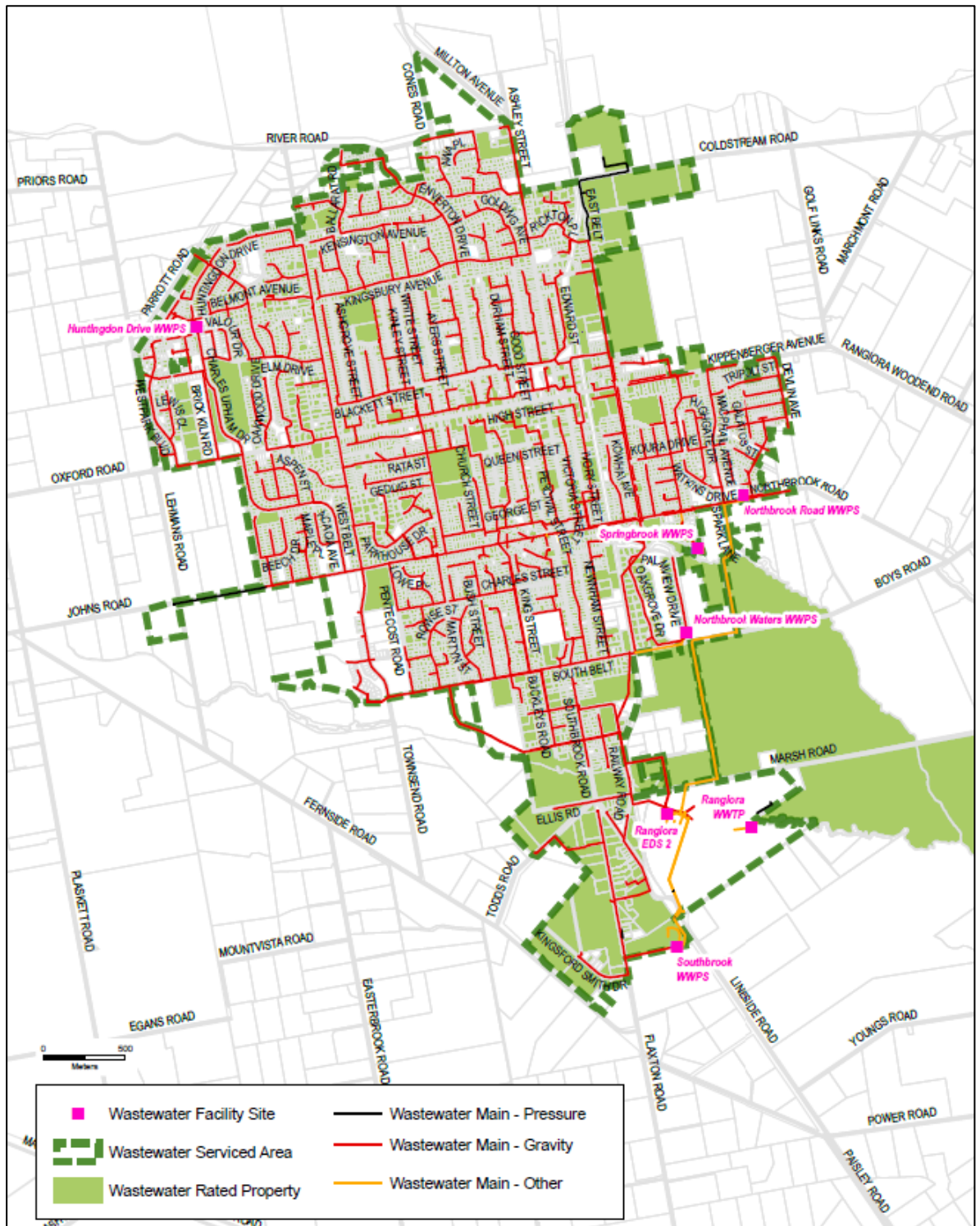


Figure 8: WDC Plan of Serviced Areas as of July 2021

As of July 2021, the projected wastewater connections for 2019/2020 was 7,285 properties generating a projected average dry weather flow of 8,977m³/day. The projected number of connections in the 2024-2031 period is 9,560 properties generating a projected 10,355m³/day, which is a 31% increase in connected properties.

The total development is estimated to provide 290 (+/-10) households for Block A, and 290 (+/-10) households for Block B. WDC ECoP Section 6.5 outlines the calculations to estimate wastewater flows.

These calculations give wastewater flows for each block of:

- Average Dry Weather Flow 203 m³/day
- Peak Dry Weather Flow 506 m³/day
- Peak Wet Weather Flow 1,271 m³/day

The total development flows, based on 600 households, are calculated as:

- Average Dry Weather Flow 405 m³/day
- Peak Dry Weather Flow 1013 m³/day
- Peak Wet Weather Flow 2,106 m³/day

WDC have indicated that the Rangiora WWTP will have enough capacity to service this development, and future expansions and upgrades of the Rangiora WWTP may be fast tracked if required to allow for Rangiora to continue developing.

Existing Council wastewater pipelines nearby or adjacent to the site include:

- An existing 300NB PVC wastewater pipeline, classed as “Other” by WDC, flowing north to south through the centre of Block A and Block B
- An Existing 825NB RCON wastewater pipeline, classed as “Gravity” by WDC, flowing north to south through the south-west corner of Block B.

No wastewater connections from the site to the existing wastewater network were identified.

Council have advised that the existing 300NB PVC pipeline running through Block A and Block B is at capacity.

Other nearby wastewater infrastructure includes the Northbrook Waters Wastewater Pump Station (WWPS), located near the south west of Block A, and the Rangiora WWTP, located to the south of Block B.

8.2 WASTEWATER DISPOSAL

Potential options have been identified to provide wastewater servicing to Block A:

- (1) The entire site to drain to a new gravity network before being pumped out of the development by a new pump station
- (2) Western portion of Block A draining via gravity to the existing pump Northbrook Waters Wastewater Pump Station, which will require upgrades, or to a new pump station, and the eastern portion of Block A to new gravity network draining to a new pump station
- (3) Western portion of Block A and eastern portion of Block A draining via gravity network to separate pump stations
- (4) Low pressure sewer system pumping to a new pump station

- (5) Low pressure sewer system pumping to existing the existing pump Northbrook Waters Wastewater Pump Station which will require upgrades.

Options that require a single unified site for Block A may have difficulties as the site is currently bisected by the existing 300NB PVC wastewater main, and by the proposed arterial road. WDC is open to options for how to route the new required wastewater mains.

Potential options have been identified to provide wastewater servicing to Block B:

- (i) Several new gravity networks draining to several new pump stations
- (ii) One large gravity network draining to one large pump station for majority of the site with the southern portion of Block B draining to its own gravity network with its own pump station
- (iii) A low pressure sewer system to a single booster pump station
- (iv) A low pressure sewer system to several booster pump stations
- (v) A low pressure sewer system pumped to a new low pressure connection to the existing Rangiora WWTP.

WDC have indicated that they have a preference for the new wastewater network to be a gravity system with main pump stations rather than a low pressure pumped sewer system.

All wastewater network options above will discharge from the wastewater pump stations to the wastewater mains that WDC will indicate have sufficient capacity. This may include construction of new wastewater mains that will require sufficient capacity for future development in the area. These wastewater mains have many iterations of what is possible and depend on timing of other developments and upgrades of the surrounding infrastructure. The locations and alignments of potential options are varied and many, and depend on what developments in the Block Are undertaken first.

Multiple WWPS are likely to be constructed within the site to transfer wastewater flows from the site via a new rising main to the WWTP, and may also be required to transfer flows into the existing gravity network. A new WWPS or upgrades to existing WWPS may be required to have sufficient capacity to allow for future development as indicated by WDC. Locations and timings of new WWPS or upgrades to WWPS are varied and many, and depend on what developments in the Block Are undertaken first.

Co-ordination with WDC regarding future capacity to be allowed for, proposed upgrades, and alignments for wastewater mains will be made during the developed design phase to provide a cohesive wastewater network for Rangiora.

Gravity wastewater drainage will be used to service lots within the site, and drain to a WWPS for conveyance to the WWTP. Flush tanks may be required for low gradient pipelines if suitable gradients are unable to be achieved following overall reshaping of the land.

9.0 RETICULATED WATER SUPPLY

9.1 OVERVIEW AND RELEVANT STANDARDS

As of 2023, the WDC Activity Management Plan 2021 Rangiora Water Supply Scheme (July 2021) indicates there is currently surplus capacity to service this development with a current consented capacity of 30,100m³/day, a current redundancy capacity of 12,596m³/day daily flow, and a current demand of approximately 17,504m³/day based on 2021 Peak.

It is expected that water supply design and construction would be undertaken in accordance with:

- WDC ECoP
- CCC IDS and CSS
- SNZ 450:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice.

Refer to the WDC report Rangiora and Kaiapoi Structure Plan 3 Waters Servicing Requirements – 2021 Update Figure 16 Rangiora Water Supply Statistics, for water demand and supply.

It is indicated that there is an additional water supply to be added to the network identified by Table 21 Summary of Capital Works (Includes Renewals) of the WDC Activity Management Plan 2021 Rangiora Water Supply Scheme.

The site is partly located within the Rangiora Water Supply Scheme boundary as shown on Appendix A: 'District Map of Water Supply' in the Activity Management Plan 2021 Rangiora Water Supply Scheme July 2021. Council have confirmed that any additional areas will be included in the scheme if added to the Rangiora water supply network.

The site is currently serviced by several on-site water supply wells, which are planned to be Decommissioned.

The timing of this development is currently unknown; however, supply is predicated based on WDC planned projects being completed. The WDC report Rangiora and Kaiapoi Structure Plan 3 Waters Servicing Requirements – 2021 Update indicates the planned supply and capacity projects will occur when development occurs.

Existing Council water pipelines adjacent to the site include:

- (1) An existing 200NB PVC watermain, laid in the berm along the northern side of Northbrook Road
- (2) An existing 100NB PVC watermain is laid in the berm along the northern side of Boys Road ending 60m west of 197 Boys Road accessway
- (3) An existing 100NB uPVC watermain is laid in the berm along the southern side of Marsh Road, ending 20m east of the WWTP road accessway.

There are no existing hydrants in the immediate vicinity of the site.

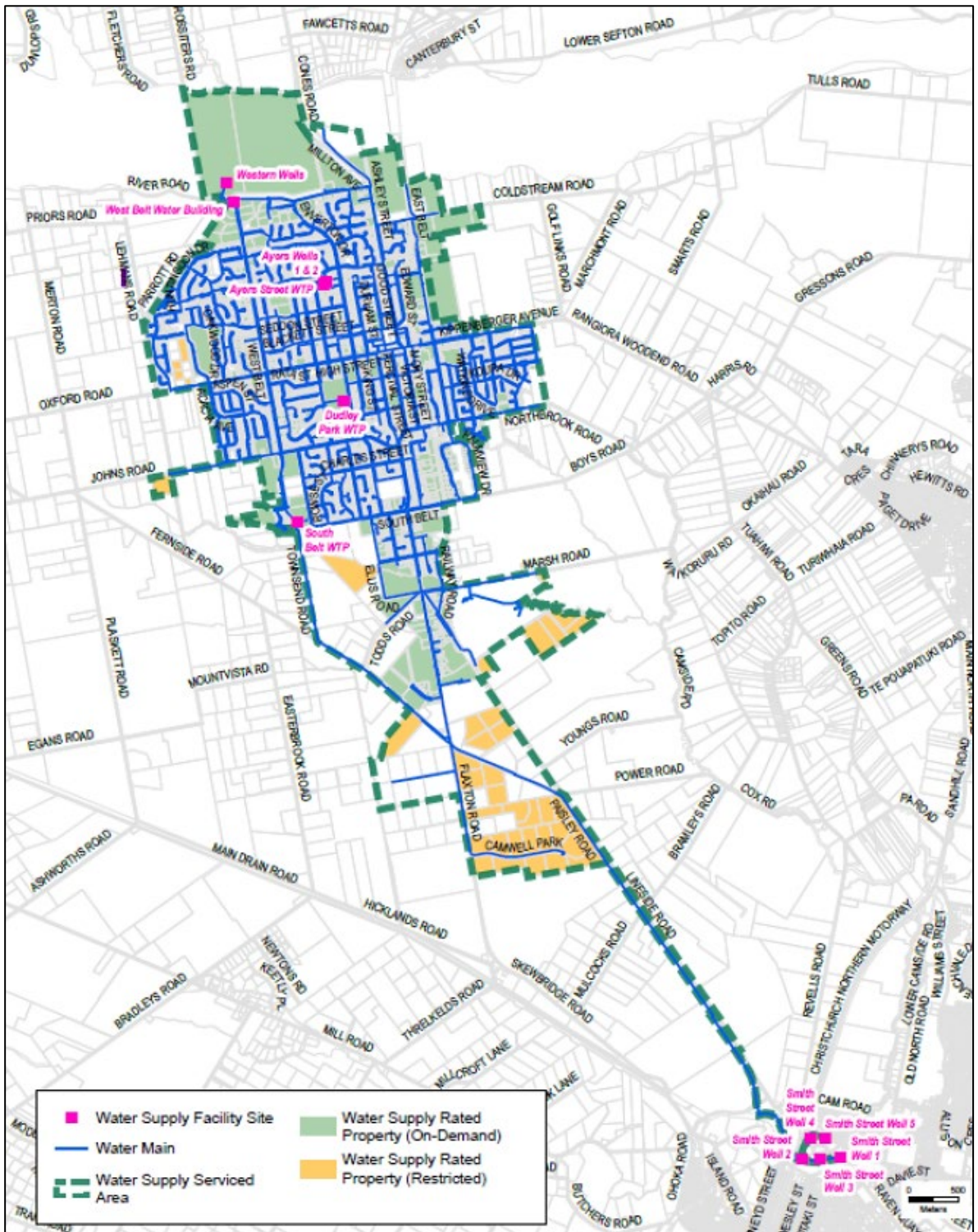


Figure 9: WDC Plan of Serviced Areas as of July 2021

9.2 WATER SUPPLY

Potential options have been identified to provide water supply services to the site.

Based on WDC report Rangiora and Kaiapoi Structure Plan 3 Waters Servicing Requirements – 2021 Update, the following two works are required:

- (1) A Tee connection off Northbrook Road. The main will require approximately 350m extension to the south along Sparks Lane. This will require a stream crossing over North Brook
- (2) Upgrading the existing 100NB PVC watermain laid in the berm along the northern side of Boys. This main would require an extension and upsizing, up to 1km to the east, along Boys Road.

The above works would complete a ring main through Block A and provide the northern connection for Block B.

During the pre-application meeting, Council advised that:

- (i) 100NB pipes are not suitable for the development to connect too
- (ii) Block A will primarily be fed from a proposed 200NB along Boys Road
- (iii) Block B has not been allowed for in WDC water supply planning for the 50-year forecasts
- (iv) The main feed running down South Brook could directly feed Block B
- (v) Water scheme boundaries would be extended to include development
- (vi) Any headwork upgrades will be undertaken by council when required, funded by development contributions.

Block B would have the possibility of two western connections to complete a ring main through the area:

- (1) Gefkins Road (Private)
 - a) Would require agreement from either KiwiRail and private land owners to gain an easement for the public line
 - b) Would require upgrading Gefkins Road, Railway Road and the Torlesse Street intersection
 - c) This upgrade would require crossing railway land which requires additional consents from KiwiRail
- (2) Marsh Road
 - a) Would result in upgrading watermain back to the intersection of Southbrook Road and Station Road
 - b) This upgrade would require crossing railway land which requires additional consents from KiwiRail.

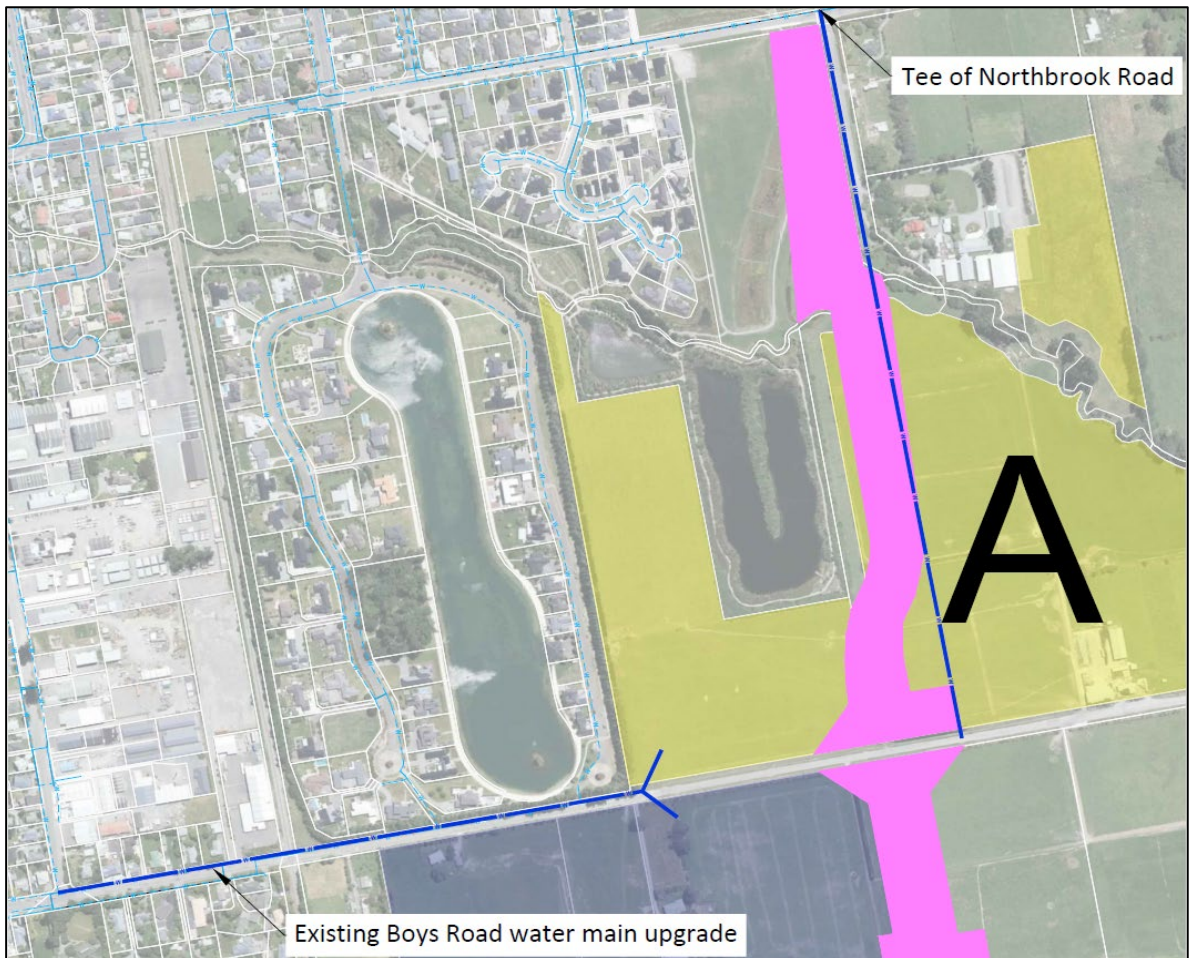


Figure 10: Required water supply connections for Block A

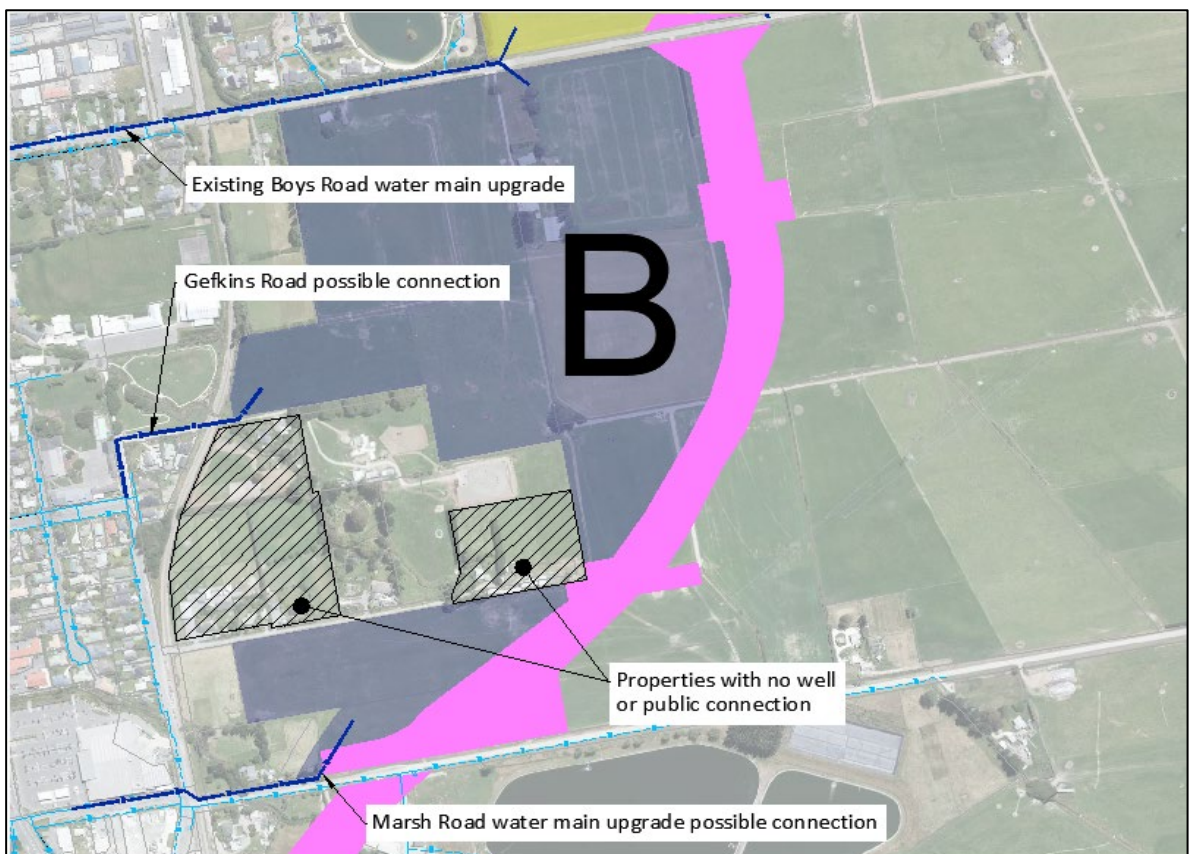


Figure 11: Potential water supply connection options for Block B



Figure 12: ECan well online search

ECan well search database and Waimakariri 3 waters GIS websites indicate that the following sites adjacent to Block B have no potable water connections:

- 2 Dunlops Road
- 24 Dunlops Road
- 28 Dunlops Road
- 32 Dunlops Road
- 34 Dunlops Road
- 17 Gefkins Road.

No planned site development works will affect the above properties water connections.

The viability of using existing nearby watermains for connection to the proposed development, in terms of flow and pressure capacity, requires confirmation from council at resource consent stages. Council have preliminarily confirmed connections will be allowed from pipe diameters greater than 150NB.

Confirmation would be sought from council that the current water supply capacity projects will provide sufficient capacity to service the development. However, it is inferred from planned water supply upgrades, that current and planned future water supply capacity increases and network extensions are likely to be sufficient and available to service the site.

Planned water network upgrades are illustrated in Figure 13.

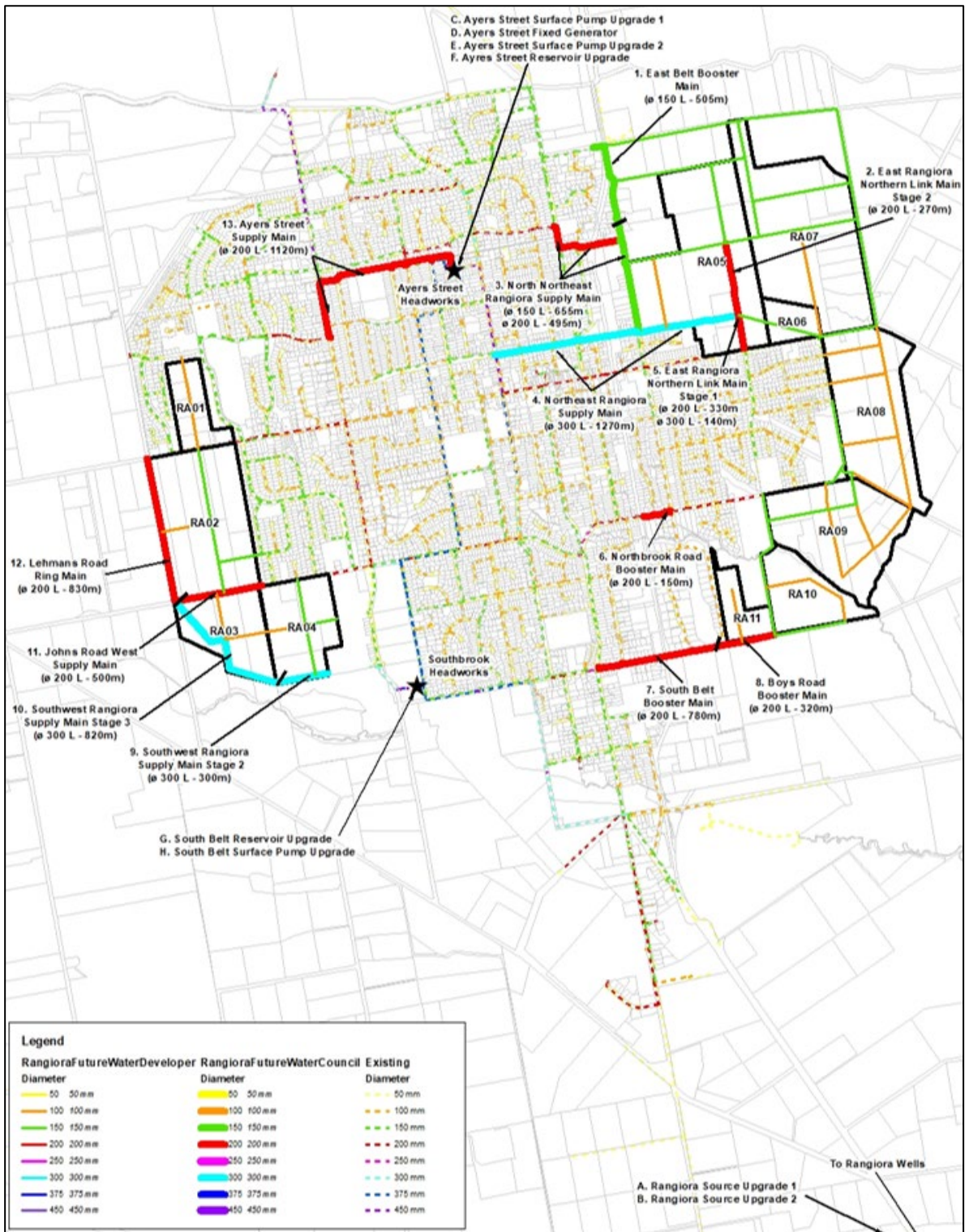


Figure 13: Planned water network upgrades, Rangiora and Kaiapoi Structure Plan 3 Waters Servicing Requirements Report

There are five supply and capacity scheme upgrades listed in the WDC Rangiora and Kaiapoi Structure Plan 3 Waters Servicing Requirements – 2021 Update report, Table 4 and Table 5.

Planned water supply upgrades include:

- Supply improvements:
 - Rangiora Source Upgrade
 - Upgrade 1, increases pumped supply to 290 L/s total for pump station, triggered at 8,900 rating units in Rangiora
 - Upgrade 2, increases pumped supply to 405 L/s total for pump station, triggered at 12,000 rating units in Rangiora
 - Ayers Street Surface Pump Upgrade
 - Upgrade 1, increases pumped supply to 300 L/s total for pump station, triggered at 9020 rating units in Rangiora
 - Upgrade 2, increases pumped supply to 400 L/s total for pump station, triggered at 13,000 rating units in Rangiora
 - Ayers Street Reservoir Upgrade
 - Additional 4,500m³ storage, triggered at 15,200 rating units in Rangiora
 - South Belt Reservoir Upgrade
 - Additional 4,300m³ storage, triggered at 10,600 rating units in Rangiora
 - South Belt Surface Pump Upgrade
 - increases pumped supply to 400 L/s total for pump station, triggered at 13,000 rating units in Rangiora
- Conveyance improvements:
 - South Belt Booster Main
 - Upgrade and extension of the existing watermain, from 100NB to 200NB, when the development begins east of the existing railway
 - Boys Road Booster Main
 - Installation of a 200NB water main from South Belt booster main, when the land subdivision begins east of Sparks Lane.

The development of Block A and Block B would represent an approximately 8% increase (580 +/- 20) in the number of connections in the Rangiora water supply Block, based on June 2020 statistics from the Activity management plan 2021 Rangiora Water Scheme.

WDC has confirmed there is sufficient water supply for Block A based on preapplication meeting notes.

We infer from this assessment that current, and planned future water supply capacity increases and network extensions, are likely to be sufficient and available to service the site.

9.3 FIRE WATER

The site has access to existing fire hydrants, two on Boys Road and two on Marsh Road. Some fire hydrants have been excluded as they are across railway lines and are not practical to utilise.

Site development must provide sufficient water supply and access to water supplies, for firefighting purposes, in accordance with the New Zealand Fire Service Fire Fighting Water Supplies Code of Practice (SNZ PAS:4509:2008).

Detailed assessment will need to be undertaken, during the design stage, to confirm that the proposed supply connections are sufficient size for firefighting purposes.

Fire hydrants will be constructed on the new watermain to meet firefighting requirements. All building sites will be within 135m of a hydrant.

10.0 ROADING

10.1 OVERVIEW AND RELEVANT STANDARDS

Indicative primary and secondary road layouts providing access to and transport routes within the proposed subdivision are illustrated on the Outline Development Plan (ODP) submitted as part of the Northbrook plan change application.

It is expected that road design and construction works would be undertaken in accordance with:

- WDC Operative District Plan
- WDC ECoP
- CCC CSS
- New Zealand guide to pavement structural design (NZ Transport Agency (NZTA))
- Austroads Guide to Road Design (2021)
- Austroads Guide to Pavement Technology (2017).

10.2 ROADING CONSTRAINTS

General constraints for roading on the development are:

- (1) Horizontal curve radiuses within the road reserve are dependent on design speed requirements
- (2) Vertical Geometry would have a minimum gradient of 1:400
- (3) On Boys Road, road junctions require 125m spacing between intersections, in accordance with Proposed District Plan Transport section
- (4) On the Proposed East Connection, road junctions require 550m spacing between intersections, in accordance with Proposed District Plan Transport section.

10.3 ROAD NETWORK

Several new primary and secondary road connections are proposed to be made to the three existing roads (Northbrook Road, Boys Road, and Marsh Road) and the proposed Rangiora East connection Road designation, illustrated in Figure 14 as designation WDC-47, bounding the site to the north, east and south. Provision of future road connections to the adjacent block of land to the south is included.

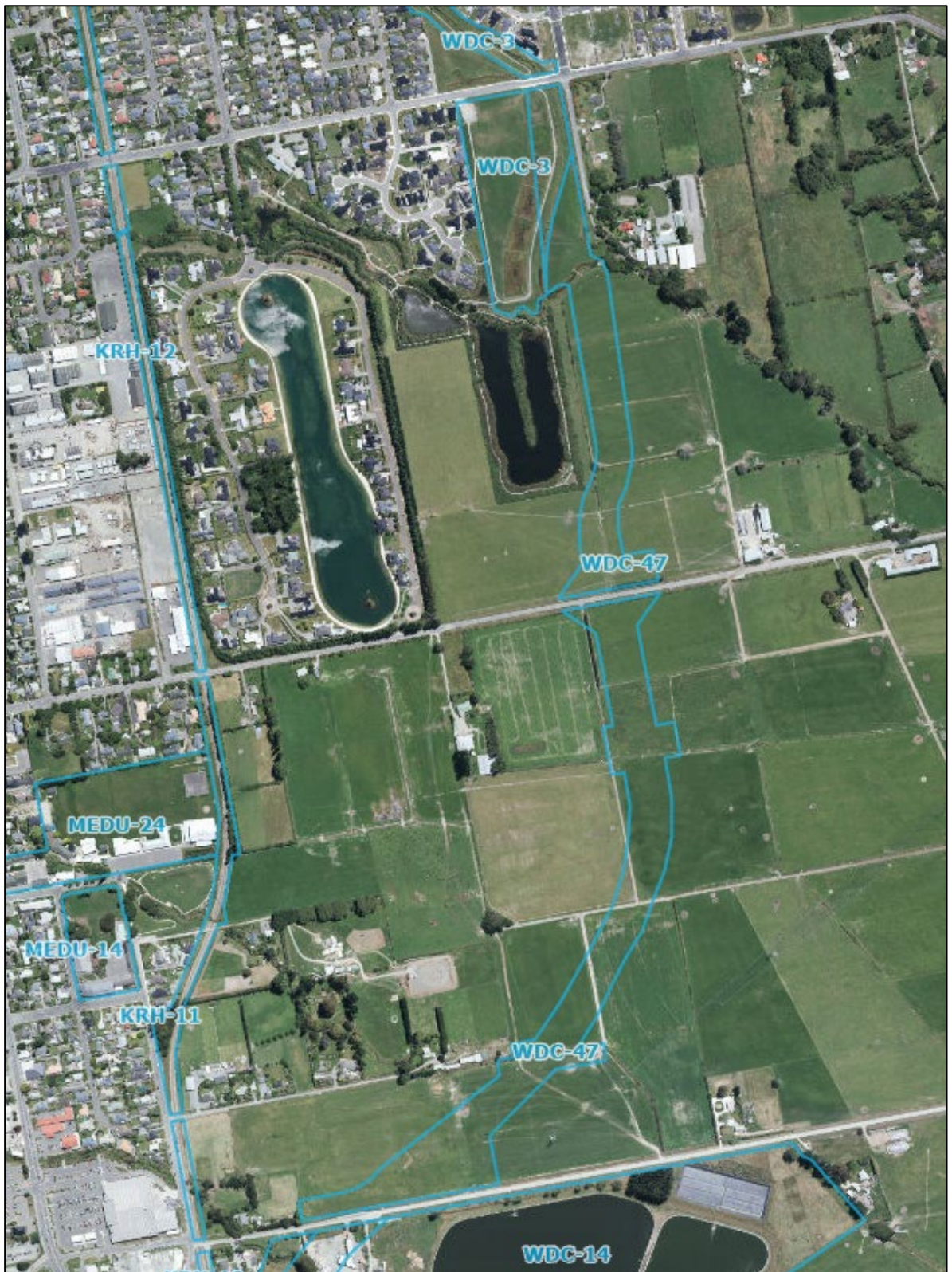


Figure 14: Proposed District Plan Designations

During the pre-application meeting, WDC advised that:

- (1) East connection road has been determined as a limited access road, intersection spacing will be determined by District plan requirements
- (2) Local road speeds are to be 30-40km/hr and arterials 50km/hr

- (3) Berms need sufficient space from trees, planting at minimum 20m spacing
- (4) Future bus routes will likely route along the east connection road
- (5) Preference for narrower roads, 6.5m carriageways for local roads
- (6) Utilities and services should be installed under grass berms and not footpaths
- (7) On street parking is desired, dependent upon density of housing
- (8) Marsh Road is planned to be sealed within 5 years
- (9) Road design is to be in “harmony” with streams and “other features”
- (10) Marsh Road rail crossing is planned to be upgraded within 5 years.

The road network in the development is expected to comprise two-way 16m – 23m legal width road corridors as appropriate for the class of road, shared area, or cul-de-sac. Major link roads will generally include designated pedestrian and cycle ways.

Upgrade works to widen and/or rehabilitate existing bounding roads, and the site frontage, are likely to be required to accommodate increased traffic volumes; these are indicated on the ODP.

In addition to the public roading network, there is likely to be numerous shared right of way lots forming part of the private movement network within the development.

A Traffic Impact Assessment prepared by Novo Group Limited (February 2023) is included with the Northbrook Subdivision plan change submission.

The roading network will be vested in Council upon completion; except for private accessways.

10.4 ROAD STRUCTURE

Asphaltic concrete is expected to be the predominant road carriageway surfacing material. Shared zones, if any, may be paved, all or in part, with plain concrete, exposed aggregate or paving blocks to delineate shared areas from general road types, and encourage vehicle user awareness of pedestrians using these areas.

Pavement calculations would allow for projected residential vehicle volumes and projected heavy commercial vehicle movements.

Right of Way access to lots would be surfaced with concrete pavement.

Footpaths within the roading network would be formed from concrete or asphalt concrete in consultation with Council.

Road carriageways would use WDC standard, mountable kerb and channel, nib kerb and vee channel on both sides to counteract edge break (fretting) and delineate the carriageway to road users.

Kerb and channel and vee channel would catch and direct stormwater flows via road sumps to stormwater treatment and disposal management systems. Nib kerbs would be used alongside roadside swales and other similar stormwater treatment systems to allow entry of overland flows.

Grass swales may be used to direct stormwater flows, provide a degree of stormwater treatment, and convey stormwater to the expected attenuation system or be the discharge point from the proposed development.

10.5 POTENTIAL FOR GROUND REMEDIATION

Between Gefkins Road and Northbrook Road, surficial peat material will likely require removal/remediation works to provide stable subgrade for roading formation construction. Two options have been identified to provide sufficient road subgrade strength:

- Additional engineered fill beneath the road formation to replace the removed peat material
- Ground pre-loaded to induce settlement within the peat layers.

11.0 POWER SERVICES

Power services are currently servicing the site for residential use, farming activities and well/bore operation.

Dial before you dig information shows the following existing infrastructure in the area:

- (1) 11-66kV underground cables are located along Boys Road before passing through the centre of Block A
- (2) 11-66kV overhead powerlines following Boys Road
- (3) 11-66kV overhead powerlines passing through the centre of Block A and the eastern edge of Block B
- (4) 11-66kV overhead powerlines following Marsh Road
- (5) <66kV overhead powerlines from Marsh Road through the south-eastern part of Block B.

Power supply would be provided to the site according to service provider and industry standards. Installation of cabling is expected to be underground, with small above-ground kiosks located within the development as required for power supply reticulation.

Mainpower has confirmed availability of supply for this proposed subdivision, and that any reticulation infrastructure installation timeframes, and details of supplies to any stages and individual lots, would be determined as part of the subdivision engineering design process.

Communications with the service provider are supplied in Appendix C.

12.0 STREET LIGHTING

Street and park lighting will be provided to the subdivision in accordance with the WDC ECoP, in a style consistent with the Rangiora township and surrounds, and in consultation with Council.

Category P3 Lighting is the minimum required lighting to comply with the WDC ECoP Part 11 Appendix A for the Collector, local roads, and right of way accesses.

Specific intersection lighting design at the entrances to Marshes Road, Boys Road and the Rangiora East Road Connection designation will be required, rated to category V3 respectively.

13.0 TELECOMMUNICATIONS SERVICES

Telecommunication services are currently servicing the site for residential use and farming activities.

Dial before you dig information shows that existing underground Chorus fibre optic networks are present in all roads bounding the site, and that Enable services are present in Rangiora but terminate at the railway to the west of the site.

Chorus has confirmed availability of supply for this proposed subdivision, and advised that any reticulation infrastructure installation timeframes, and details of supplies to any stages and individual lots, would be determined as part of the subdivision engineering design process.

Communications with the service provider are supplied in Appendix C.

14.0 CONCLUSIONS

This report provides a desktop assessment of the proposed development of the site, in terms of civil infrastructure and servicing potential, to determine if this site is suitable for the proposed development.

Waimakariri District Council and Environment Canterbury have been consulted to determine specific requirements, preferences and/or processes for the proposed future development.

Fraser Thomas Ltd has undertaken 2D flood modelling and associated reporting, to assess impacts arising within and adjacent to the site, using a conceptual site earthworks model, for the 200-year critical storm event. Reporting demonstrating that there is a less than minor effect to adjacent and upstream areas is provided separately.

Outcomes of the assessment, conclude, in general, that a combination of existing infrastructure, and new infrastructure, will accommodate the proposed development, subject to further design.

Further site investigation and consultation with Council, and other service providers, would be undertaken during proposed future site development and design stages, to confirm specific civil design and servicing requirements.

15.0 LIMITATIONS

The professional opinion expressed herein has been prepared solely for and is furnished to our client, Richard and Geoff Spark, and for the information of Council, on the express condition that it will only be used for the purpose for which it is intended.

No liability is accepted by this firm or by any Principal, or Director, or any servant or agent of this firm, in respect of its use by any other person, and any other person who relies upon any matter contained in this report does so entirely at its own risk. This disclaimer shall apply notwithstanding that this report may be made available to any person by any person in connection with any application for permission or approval, or pursuant to any requirement of law.

We do not assume any liability for misrepresentation or items not visible, accessible or present at the subject site during the time of the site inspection; or for the validity or accuracy of any information provided by our client or third parties that have been utilised in the preparation of this report.

The conclusions and recommendations expressed herein should be read in conjunction with the remainder of this report and should not be referred to out of context with the remainder of this report.

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APPENDIX A

WDC Pre-Application Meeting Minutes

PRE-APP MEETING, SPARKS REZONING – EAST RANGIORA

DATE: 16 NOVEMBER 2022, 1.00PM

VENUE WAIMAKARIRI DISTRICT COUNCIL RANGIORA OFFICES.

ATTENDEES:

Ivan Thomson(Aston Consultants), David Mawhinney, Alistair McNabb (Fraser Thomas),Geoff Spark (Property Owner), Mark Buckley (Policy Panner), Jan McSloy (WDC Infrastructure), Shane Binder (WDC Transport), John Read (WDC Greenspace) Wendy Harris (WDC Consents Manager).

PURPOSE OF MEETING

Ensure all the necessary constraints and opportunities are identified to enable due diligence to be completed, estimate the yield and an ODP to be prepared,

INTRODUCTIONS

DISCUSSION

Power & Data

Noted that Mainpower and Chorus have confirmed capacity and can respond to the demand.

Design required at a later date

Stormwater

There are several stormwater treatment ponds around this location. The obvious places to drain water for Area A is to the North Brook, and for Area B is to the South Brook or to the existing open channel along Marsh Road. The ODP includes a 3- water layer in the development plan at <https://waimakariri.isoplan.co.nz/draft/rules/0/290/0/0/0/223>

The decision on the Ecan Court of Appeal concerning the taking and use of groundwater has affected the application of Rules 5.128-130? in the Land and Water Regional Plan and has closed current consent route – Council’s cannot consent new water infrastructure or discharging to ground as it now a prohibited activity) in areas where water has been over allocated.

- 1) Does road run off require treatment before draining to the roadside water courses?
Currently drains straight into the channel? If treated what does council require?

Can we remove / pipe the existing open channels through the farmland? Depends on their environmental qualities but probably not. Should be seen as an opportunity

- 2) Does council prefer a wetland through the development or a centralised treatment system of ponds?

- 3) What attenuation and treatment does the council require for roof and road runoff?

Run-off needs to be treated at some stage. E.g. through swales or preparatory device.
Attenuation is required for surfaces over 65% impermeable.

Possible existing attenuation available – will depend on site coverage and densities. Permeable pavement not an alternative to attenuation but can still help. On site soakage subject to good reliable infiltration testing – location, time period. Better to reticulate to centralised detention system.

- 4) Can treated stormwater runoff from the development be discharged to North Brook for Area A, and South Brook / Marshes Road Drain for Area B? Need to check capacity and feasibility/ecological values. Check the Belgrave consents. Iwi will have some concerns. Area is covered by the Global SW consent 1846/01
- 5) Is discharge of stormwater to ground via soakage acceptable to council? South of Area B has decent drainage according to the land owner. This would appear to be caught up in the CoA decision?

Flooding

Talk to Chris Bacon. PDP map may not be right – could be a 100yr plan – need to check. Refer to WDC property information. Ecan flood modelling indicates ~0.7m flooding across the southern section of Area B (1:200yr storm event) which is listed as medium to low flood hazard. The same modelling indicates minimal to no flooding in Area A and minimal low flood hazard areas.

- 1) What modelling would the council accept to set finished floor levels through this development? Run off through road calculated with the Rational Method assuming maximum development, then AutoCAD Civil3D Hydraflow Express sections through each property.
- 2) Is council happy with this design storm event, NIWA HIRDS V4, 2% AEP (per WDC ECOP Part 5 5.5.2), 8.5 RCP 2081-2100 (per WDC ECOP Part 5 5.5.3)?
- 3) How does the council require this information to be displayed? Displayed on a plan showing extent of flooding and then FFLs for each lot?
- 4) It feels like altering the overland flows in the southern area of Area B may impact the wastewater treatment ponds. Are there any requirements the council has for development in this area?

- 5) Is the council happy with overland flows to the North Brook, South Brook, and Marshes Road Drain?

Wastewater

- 1) Is there sufficient capacity for this development?
- 2) There are planned upgrades and extension to the aeration ponds in 2025 and 2026 and the later (~2050) central Rangiora capacity upgrade stages look to be including waste water treatment plant upgrades. Connections to pumping stations to be confirmed. Possibly along Boys Road
- 3) This site is within the wastewater rated property area. Will council include it within the wastewater services area?
- 4) Dial Before You Dig requests do not show the existing wastewater main running through the site. Can you please provide size, material, inverts, high/low pressure, etc, information?
- 5) Confirm if there are any special conditions, council would apply to the easements for existing wastewater mains running through the site.
- 6) This main does not follow the route of the proposed arterial road link. Will this be relocated with those works?
- 7) Can we build residential buildings over these mains if they are not proposed to be moved?
- 8) Does council require allowance for potential additional future pipelines to run through the site, in the same alignment, or are road reserves would be sufficient
- 9) Does council require new wastewater main pipelines to allow for future capacity from other developments? If so, how will cost sharing work?
- 10) Is gravity wastewater system to localised pump stations preferred or do council prefer a localised pressure system where each house has a pump?

- 11) Can this development connect to the existing pressure mains running through the site or will a new connection to the treatment plant on Marshes Road be required?
- 12) What is the preferred wastewater connection location?

Water supply

- 1) Is there sufficient capacity in the existing network to supply the proposed development?
- 2) Can we connect to Northbrook Road 200NB PVC at Sparks Lane?
- 3) Can we connect to Boys Road 100NB UPVC Water main?
- 4) Boys Road 100NB PVC pipe requires upgrading, or is this being upgraded as part of council capital works programme URW0122?
- 5) Can we connect to Marshes Road 100NB UPVC Water main?
- 6) Does Marshes Road 100NB PVC pipe require upgrading?
- 7) What residual pressure do council require, we assume we comply with code of practice part 7.5.3?
- 8) Is there council available pressure information on water lines?
- 9) When no contamination is present what is council's preferred pipe material?

Roading

- 1) Is the Eastern arterial a limited access route? This is to be determined but there is no indication in the details of the designation that it will be a LAR. See <https://waimakariri.isoplan.co.nz/draft/rules/0/290/0/0/0/223>. The route includes provision for cycleways and walkways the detailed design of which are to be

determined. The design of the cycleway may determine the desirability of direct property access.

- 2) How many intersections are we allowed off the arterial? Not limited access , Council designation, early 2030s
- 3) What is the required design speed for local access roads, following council speed reviews with NTZA? 40-50kph. Like narrow roads 6.5m carriageways with reserve in a 16m
- 4) PDP Table 4 TRAN 9 primary / Secondary does not correspond to local collector. Need to be recognised in the ODP movement network
- 5) What are the minimum and maximum road widths? Is there any flexibility in these widths?
- 6) What cycle infrastructure is required? Collector roads expect some sort of separated cycle way. Need to tailor cycle route design to destinations e.g. town centre school.
- 7) IS CCC IDS threshold design requirements relevant?
- 8) On street parking requirements?
- 9) Do we allow for future bus routes? Along the eastern link.
- 10) How much of Marshes Road requires sealing related to this development – will be done in five years? Question mark. Arterial road may need to be shifted so it does not interfere with the wastewater infrastructure Can integrate building of new wastewater line with the road, and the Belgrove development.
- 11) Is using One network roads categories appropriate for determining traffic volume in pavement design?
- 12) Are council upgrading any railways crossings under the current programme of works?
- 13) New corridor needs to be redesigned in harmony with the streams and other features in accordance with the conditions of the designation.

Earthworks

- 1) Scale of earthworks will be determined by regulatory overland flow paths, servicing design, roading layout and ground conditions.

Planning

- 1) Implications of the NPS-UD as relates the Spark Brothers submissions on the PDP and Variation 1 – WDC still going through the HBCA which is being undertaken by Fraser ? probably Colgrave. Ivan to contact him to confirm.
 - 2) Planner has already confirmed that the NPS-HPL will not need to be given effect to.
 - 3) Policy implications for the direction of urban development in Rangiora. Council policy planner saw area B as a logical extension within the confines of the Eastern Corridor.
 - 4) Odour setback from wastewater treatment plant – nothing in the Plan but default position is 500m. This is clearly going to need specific assessment from an expert including some modelling considering future climatic conditions. There is the possibility of providing a buffer through a non-sensitive land use such as business zoning, which is within the scope of the submission: BIZ, Format Retail/Mixed Use or a mix of GRZ, MDR, BIZ.
- 1) and/or Format Retail/Mixed Use zones.
 - 2) Setbacks from designated bypass road 6m . Need to find out whether there is direct property access.
 - 3) Esplanade Reserve requirements and any other anticipated green links – standard 20m will be taken on subdivision.
 - 4) There was some discussion around the current size, function and siting of reserves but these can be discussed through the ODP.

SPARK REZONING SUBMISSION at 197 BOYS ROAD, RANGIORA

PRE-APPLICATION QUERIES for WAIMAKARIRI DISTRICT COUNCIL

Meeting Purpose: Obtain existing infrastructure servicing and flooding mitigation information for the proposed development, to prepare a Brief of Evidence for Plan Change – Submission No. 183.

Site Area A: Net developable area approximately 20ha (Refer Figure 1).

Site Area B: Net developable area approximately 21ha (Refer Figure 1).

Yield Area A: Up to 300 lots.

Yield Area B: Up to 315 lots.



Figure 1: Development Areas

The land subject to the plan change submission is best described by two separate areas:

- (1) Rezoning all that land to the west of the proposed Eastern Bypass from Rural Lifestyle Zone to General Residential and Medium Density – in the vicinity of Boys Road (South Belt) and Marsh Road Rangiora (portion south of South Belt/Boys Road); or in the alternative rezone, the rezoned of this land to GRZ, MDR, BIZ, Format Retail/Mixed Use or a mix of GRZ, MDR, BIZ and/or Format Retail/Mixed Use zones.
- (2) Rezoning all land north of Boys Road (South Belt) and within the Southeast Rangiora Development Area (portion north of South Belt/Boys Road) GRZ (under the PWDP this land is zoned RLZ, and is subject to a proposed Council certification process for delivery of land for housing).

A: FLOODING:

Ecan flood modelling indicates approximately 0.7m depth of flooding across the southern section of Area B (1 in 200-year storm event); classified as medium to low flood hazard. The same modelling indicates minimal to no flooding in Area A; classified as minimal low flood hazard.

- 1) What level modelling would the council accept to set finished floor levels through the development?

Finished floor levels should be set no lower than 500mm above the 200 year ARI flood event to meet ECAN Regional Policy Statement requirements. Corresponding lot levels should be set no lower than 225mm below this figure to enable prospective home buyers to build to standard Building Code requirements.

Is runoff along roads calculated using the Rational Method, assuming maximum development coverage, and AutoCAD Civil3D Hydraflow Express sections through each property?

For the 200 year event it is recommended this is modelled using a dynamic 2D model. It would be Council's recommendation to adopt the outputs from the existing flood models as a boundary condition. Council can supply these.

- 2) New earthworks, raising the development above flood levels, and altering the overland flows in the southern area of Area B, may increase flood flows directed towards the existing wastewater treatment ponds. Are there any requirements the council has for development in this area?
For all development areas it will be necessary to manage the runoff and associated discharge within the development area up to a 1 in 50 year event to maintain stormwater neutrality. For flood events beyond a 50 year event and up to a 1 in 200 year event it will be necessary to demonstrate effects on neighbouring properties are no more than minor. This includes assessment of any affected habitable floor levels. If flood depths are increased on the Rangiora WWTP site this will need to be considered and assessed at the time to determine whether effects are less than minor.
- 3) Are there any restrictions or particular requirements council is aware of that could affect potential development of the site?
The future development of the eastern arterial road will need to be incorporated into any flood assessment on the site to ensure the potential effects are fully accounted for.
Consideration should also be given to groundwater levels in the area and the potential for artesian spring flows to affect flood levels.

B: WASTEWATER

- 1) Will the wastewater serviced area boundary be extended to include the proposed development?

The Council doesn't have a defined serviced area boundary. If the development of this land was approved the Council would extend the Rangiora Wastewater Scheme to include this area.

- 2) Is there sufficient capacity in the existing reticulation network to accept flows from the development, and transfer flows to the existing treatment plant, or is new reticulation required?

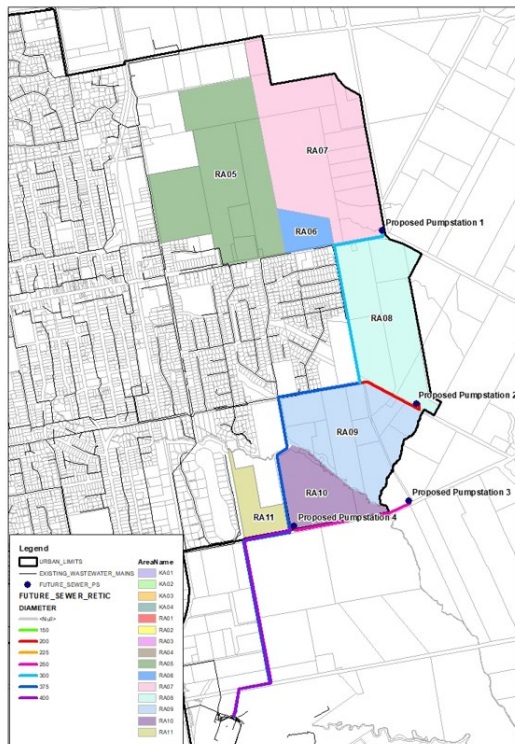
New reticulation will be required.

- 3) Can this development connect to the existing pressure mains running through the site, or will a new connection to the treatment plant be required?

The development of Area A will not be able to connect into the existing pressure mains running through the site as these are at capacity for the existing developed land to the north. However the future development of this land has been considered by Council at a high level (see below) and there may be opportunities to connect into pipelines being constructed by the Bellgrove development. Further work will be needed to confirm the available capacity and the associated costs of connecting into these pipelines.

The development of Area B will need further consideration as this has not been considered by Council for wastewater servicing previously. A gravity main that runs through the site may provide some capacity, equally it may be necessary to connect into a new rising main that would service Area A. Further work would be required to determine the best solution for this land.

In all instances the Council does not want to see a multitude of rising mains connecting into the WWTP from the east of Rangiora so consideration will be needed as to how the infrastructure from these future development areas can be consolidated.



- 4) Is there sufficient capacity in the existing treatment plant to accept flows from the proposed development?

The existing treatment plant will be able to accept flows from the proposed development. If the development triggers any capacity upgrades with the WWTP or further downstream in the Eastern Districts system these will be undertaken by Council and funded through the Development Contributions established for Rangiora Sewer and Eastern Districts Sewer.

- 5) Will the planned treatment plant upgrade projects provide sufficient capacity to service the development?

We note there are planned upgrades and extension to the aeration ponds in 2025 and 2026 and the later (~2050) central Rangiora capacity upgrade stages appear to be including wastewater treatment plant upgrades.

Yes. Ongoing upgrades have been planned and budgeted for the WWTP over the next 50 years in response to planned growth that is funded by Development Contributions collected from developments over the full scheme.

- 6) Would council require the developments new wastewater network to allow additional capacity to transfer flows from other future developments?

This is possible. As part of subdivision consenting the Council will identify if additional capacity is required and will fund any extra-over costs (if any) associated with this.

- 7) Would council prefer a gravity wastewater collection system, or a low-pressure system?

Council's preference is for a gravity wastewater system in built up urban areas. Low-pressure wastewater networks are only approved in rural residential areas and in urban areas subject to high liquefaction risk.

- 8) Can the developments wastewater be discharged to existing pump stations, or would new pump stations be required?

New pumpstations will be required.

- 9) Please clarify that the offset of 500m from the treatment plant to proposed residential areas within the development is from

- (a) the WWTP boundary, or
- (b) the edge of the existing ponds

C: WATER SUPPLY

- 1) Will the Waimakariri Water Supply Scheme Boundary be extended to include the proposed development?

The Council doesn't have a defined serviced area boundary. If the development of this land was approved the Council would extend the Rangiora Water Supply Scheme to include this area.

- 2) Is there sufficient capacity in the existing network to supply the proposed development?

Upgrades will be required along South Belt / Boys Road as indicated on the AMP capital works plan (URW0122) to service Area A. If the additional demand triggered any headworks upgrades then these would be undertaken by Council and funded through Development Contributions collected under the Rangiora Water Development Contribution.

Area B was not part of the 50 year infrastructure planning undertaken by Council. Further work would be required to determine what upgrades would be needed to service this land.

- 3) Will the planned water supply capacity addition projects provide sufficient capacity to service the development?

We note the Activity Management Plan indicates two key projects, comprising a new reservoir (scheduled to be undertaken in 2026/27), and a new water abstraction source (scheduled to be undertaken in 2023/24), to cater for population growth and provide redundancy in the water supply system

See answer to No 2

- 4) Is following existing council water infrastructure (nearby and adjacent to the site) suitable to connect to?

- (c) An existing 200NB PVC watermain, laid in the berm along the northern side of Northbrook Road

Use of this main will require an approximately 350m extension to the south along Sparks Lane,

and will require a stream crossing across the North Brook

Yes this would be a suitable connection point and would provide a sensible ringed through to Boys Road

- (d) An existing 100NB PVC watermain is laid in the berm along the northern side of Boys Road ending 60m west of 197 Boys Road accessway

Use of this main would require an extension, up to 1km to the east, along Boys Road

We note that the Boys Road watermain has been identified by WDC for extension and upgrade beyond 2040, as indicated in the 'Activity Management Plan 2021 Rangiora Water Supply Scheme' (July 2021)

The proposed 200mm dia watermain along Boys Road should be the primary connection point. The existing 100mm dia main could be used to extend a rider main along Boys Road but this would need to be considered and confirmed as part of Subdivision Engineering Approval.

- (e) An existing 100NB uPVC watermain is laid in the berm along the southern side of Marsh Road, ending 20m east of the WWTP road accessway

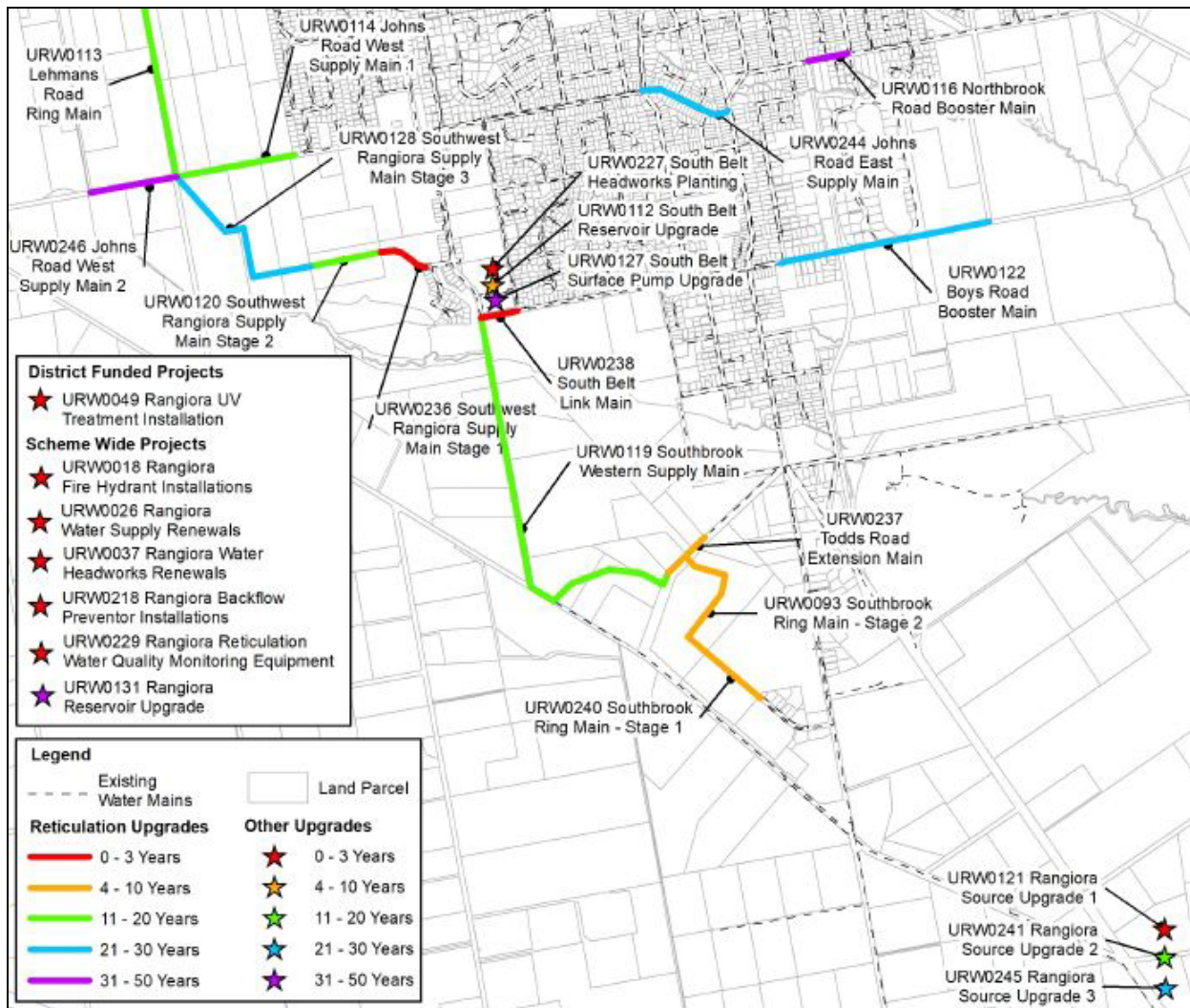
It is likely this main will not be sufficiently sized to connect into and a new main will be required along Marsh Road to connect into Railway Road or possibly further west into Southbrook Road (refer No 2) however further work is required to confirm this.

- 5) What other water supply pipelines are available, or preferred by council, to connect to?

There will be additional work required to determine the water servicing requirements for Area B. It is likely there will need to be a connection made to a new pipeline along Marsh Road that may extend as far west as Southbrook Road (see 4e). There may also be the need for new connection points made to the intersections of Railway/Dunlops Road and/or Railway/Torlesse/Gefkins depending on the final design and roading layout for Area B.

- 6) Will the planned water supply network extension projects shown below be sufficient to service the development?

Yes for Area A, No for Area B (see points made above)



D: STORMWATER

- 1) Does council have clarification from ECan regarding allowable solutions to detain or attenuate stormwater generated on the site following recent ECan decisions around groundwater?

Not at this stage

- 2) Would council accept overland flows from the development to flow into the North Brook, South Brook, and Marshes Road Drain, as currently occurs from the existing landform?

Stormwater generated from 5 year and 50 year ARI storm events must be managed within the development area with appropriate attenuation and treatment to achieve stormwater neutrality before discharging into the receiving environment. It would be appropriate for these managed discharges to use the North Brook, South Brook and Middlebrook (Marsh Road Drain).

It would be appropriate to direct overland flows that overwhelm the stormwater management areas into the North Brook, South Brook and Middlebrook (Marsh Road Drain) as the alternative would be discharging over private land.

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Meeting Notes

Spark Rezoning Submission Meeting Notes 3 Feb 2023 2.00pm Rakahuri Room

Present:

WDC: Jenn McSloy, Chris Bacon, Kelly LaValley. Wendy Harris, Matt Bacon,

External: Ivan Thomson (Aston Consultants) Alistair McNabb (Fraser Thomas) Geoff Spark (landowner)

Notes: Leila McIntyre

Meeting Purpose: To obtain existing infrastructure servicing and flooding mitigation information for the proposed development, to prepare a Brief of Evidence for Plan Change – Submission no. 183.

Are the PDP submissions being heard with rezoning submissions?

WDC advised hearings commencing in May and will last for 12 months. They are looking at a similar approach to Selwyn District Council. One of the options being hearings first followed by rezoning.

How do we deal with amendment act in terms of submissions on rezoning?

Still working on MDRS rezoning. Align requirements to have independent hearings panel which is different. Don't want to have submitters to both hearings having to argue twice.

How do you want council to engage with submitters seeking rezoning?

Not nailed down yet. Hold a normal pre-app meeting for DP review with directions soon re submittal of evidence.

How much time have we got?

Will not happen soon. If the panel hears the PDP submissions, rather than just rejecting on the basis they will hear the variation later, it will be helpful to get direction from the panel as to the merits so that when they get to the hearing it will be useful for rezoning submitters to have an idea whether zoning meets strategic plans, and then argue the MDRS later. A lot of complexity to consider as to how to deal with it. WDC will watch Selwyn DC very closely as to what happens with their hearings.

Servicing plan has been prepared for the A block but not yet sent to Alister. **WDC to share it as it will answer questions re wastewater.** B Block WDC haven't looked at it – so no detailed info for what council think on how to service it or what upgrades will be required.

How should Fraser Thomas approach that from plan change perspective? Follow code of practice guidelines?

Look at activity management plans you will see what the current capacity is. There is a capacity for growth.

But where does that growth happen?

If growth happens faster than council planned, it means we end up bringing forward those types of projects. Funded through development contributions. In Rangiora specifically – wouldn't be expecting individual developments to have to come with a new source of water. Could be specific costs at wastewater treatments plant to connect a rising main to the inlet based on specific

modifications to accommodate, but don't need to get into specifics for a plan change. It is a connection cost within the wastewater treatment plant.

LTP will be next reviewed 1 July 2024. Water services entities take over for 3 waters. WDC not sure yet out how to approach that. It is unlikely WDC will be doing a full LTP as far as 3 waters goes but still considering.

Planning merits if it stacks up in terms of that, showing that compared to other areas of Rangiora it has an advantage, then provisions of servicing might be given priority if it is feasible. Can show connections to the existing system cost effectively.

Are Selwyn asking for MDRS to prove you can service at that density?

They are making 15 households per hectare plus 20% - feasible demand rather than MDRS demand. WDC haven't thought that far along.

Do you have to plan to be able to service a 20-50 density – working on the feasible capacity?

Submitters just put in a margin for extra density.

Two approaches – city has medium density minimum of 30 per hectare on every site. Medium residential zone enables this – Selwyn is making the assumption.

Does the wastewater plan being close to B block have an advantage?

Distance is good but the cost of wastewater servicing for the area is the cheapest in Rangiora and not contributing to upgrades in west of Rangiora. Complicated for WDC around servicing other eastern and north-eastern parts of Rangiora – e.g., Bellgrove going south. Avoid multitude of rising mains all feeding into treatment plant. It is a challenge how to consolidate in a sensible fashion – with the amount of infrastructure once everything is developed.

Any update on eastern link bypass road proposed? Could that carry the new sewer from Bellgrove down?

It is a timing issue. The designation for that road in the PDP and WDC have it in Proposed Annual Plan siting in year 9 (commencing 2023/2024) to construct and WDC are considering doing early-stage work. WDC don't know if timeline will work with rising mains in that alignment or in the existing easement for the Northbrook pump station. If land purchase started it will be great to utilise.

If development goes faster, it could potentially be bought forward depending on how quickly the early stages of project are completed. Land acquisition will be lengthy and consenting. WDC evaluating timing. Uptake of development on eastern side of Rangiora has brought forward the need for the link road. Geoff Spark is very open to discussions to work in where they can.

Wastewater plan and move northwards is ideal – Bellgrove, then A block then B Block – staging sequence. Depends on the market. This may tie into what Geoff is saying.

Matt Bacon can come back with detail of questions on sheet. Servicing report and wastewater policy which shows decisions making for pressure sewer.

Stormwater: – does Council have clarification from Ecan?

WDC are working on every level but don't have way forward yet. Kelly LaValley has a development on Todds Road where Ecan have advised any permanent excavations 600mm or deeper is

considered intercepting groundwater (which is limiting regarding stormwater.) It is a struggle to not intercept groundwater for your stormwater management.

Flooding: - Is there a preferred method of modelling for flooding through new developments?

AutoCAD, Hydraflow and run sections through properties and roads. Matt Bacon looks for 2D hydraulic modelling for that area. WDC have flood models already and can provide outputs of them. Use WDC outputs as inputs – run through development and show effects not downstream or upstream. Look at 200-year event. Set finished flow levels of 500mm freeboard for the 200.

If we do constructive earthworks, one metre high, could we direct flows across bottom area of site into treatment plant area?

There are overflows into those ponds occasionally according to flood maps. Site B Ashley break out scenario affects southern portion of site. Alistair's example – flood modelling likely to be an Ashley break out rather than localised flooding. Consider what you are doing in that southern portion.

When undertaking earthworks then absolutely. Area A you wouldn't need to consider an Ashley break out. Would be picked up using flood modelling data. Concept of less environmental effect – whatever effect you are having is less than minor. Habitable floor levels – any impact you have is going to be more than minor unless a lot of freeboard there. If it's more than 500mm you might have room to play with – less than will have a negative effect.

Rural farmland has more wriggle room, General rule of thumb all driven by what effect you are having. Ideally no effect on downstream environment. You will never have zero effect. Will have to see what that looks like with effect on wastewater plan.

If it was an effect after design process started that it affects ponds – would it be acceptable to building up embankment onto the ponds?

WDC not sure – considerations as to whether this will impact on the operation of the ponds. Does raising the level have other unintended effects.

Any restrictions you are aware of regarding filing of the site with regards to flooding apart from the 500mm freeboard and modelling later in the design process?

Again, demonstrating with the modelling that you aren't having effects on upstream and downstream properties. With residential subdivision – try to achieve 500mm freeboard between 200 year – have lots within 25mm of that level. Homeowners can build to building code requirements without having to have extra high foundations.

Kelly's expectation – modelling 200 year would be required to support the rezoning request. Not left until detailed design. The 50-year modelling – overland flow paths and looking at that level of details can be left until resource consenting stage. Demonstrating that a development is feasible regarding the natural hazard of flooding. So, must adhere to the 200-year 2D model.

Is it appropriate to rezone essentially? Is it feasible to put houses on the rezoned portion?

A rule in the plan that governs the residential activity status – you will break through a recession plane. A plan change accepts that you abide by the rules in the plan. Plan change to OP there isn't a lot of guidance around this – with the Proposed plan there is a different approach to floor levels.

Alistair to have a look at the framework for flood assessment to get guidance from plan change and what WDC see happening at subdivisions.

Wastewater: - – serviced area boundary will it be extended to include this?

No defined boundary per se. If approved and serviced with wastewater, then that land will be come part of the wastewater scheme. Boundaries on maps are indicative at present. Schemes, drainage schemes don't have defined boundaries. More of an indication of where the existing servicing starts and finishes.

RPS structure boundary – working it out right now. It wouldn't matter as you would have to service if rezoned anyway. It would just form part of the boundary – it becomes part of the council network.

Capacity of large existing rising main is now at capacity and not suitable for connections. Comes through farm currently. After first couple of stages of Bellgrove it has reached capacity.

Geoff advised that from that easement that went through there was a written arrangement that they had access to 25 sewer connections for any future developments. This could be credited across to something else.

Would council require the development's new wastewater network to allow additional capacity to transfer flows from other future developments?

WDC are looking for coordinated approach with Bellgrove and Geoff's proposed development – ideally two pipes. Open to upsizing – would do near the end of the development cycle. Block that would include A but not B of having to upsize. Looking at putting a main down there – alongside the existing one and will give capacity for so many years. The main and existing will be at capacity in several years then will resize the old main – giving 50-60 years life. WDC to juggle the infrastructure to avoid multitude of pipes heading down the corridor. Haven't allowed for area B. Will make tweaks accordingly.

When the eastern link bypass goes in, will a new sewer go in the same line?

This hasn't been considered by WDC because of timing. Won't be in place by the time Bellgrove completed. Still got the issue of existing main which will be a constraint in terms of any development on the land. Would have to lay the new line and the existing main on the new road alignment. In principle it makes sense but tricky. Bellgrove would need additional capacity before the road goes in unless it is bought forward then it could potentially be done at the same time.

Road is being funded 25% funded through development contribution for development area – 25% from district growth and 50% from 3 level service.

Would council approach them and need access to the land causing disturbance to the farm?

WDC would have to look at existing agreement around the easement. Consultation would happen.

When would the sewer be upgraded?

New rising main finished in 2.5 years – new one will be built. Replacement of existing one is further out. In the 8–10-year timeline or longer. 2.5 year one will involve Geoff's farm being excavation. **Kelly to check on that.** Bellgrove are leading it – further discussions required as to who leads that. Tying all works in taking into consideration all works being done. Achieve something better together rather than piecemeal.

Not keen on low pressure system, would want a gravity wastewater system. New is the most likely requirement. Nothing in that area to connect into. Wastewater servicing for area A talks about pump station locations. No work done on Area B – expect one if not two pump stations required.

Meeting Notes

Clarification of 500 metre offset development to wastewater treatment plant – boundary to edge of existing ponds, river sensitivity issue and house proximity. Should have a 500-metre buffer – **Jen McSloy has asked about this and waiting for a call back.**

Rezoning you will have to consider whether you put it forward as part of that argument. Possible industrial zone or setback. Selwyn don't have a rule. Not sure if WDC have a rule. **Matt B will ask Mark where he got that from.** Mark may be able to provide the standard.

Council's view on southern end of block being commercial/industrial – less sensitive to odour than residential.

Wastewater will be undertaking calculation flows from development and comparing to wastewater capacity.

Do you know whether it will take additional flows with 300-600 lots being developed?

WDC in regard to treatment plant – assume it is available. If your development accelerated demand at the treatment plant, they would bring work forward. Development Contributions funding it.

Population capacity now and programmed works – is it in the wastewater plan to what it is programmed to receive and long-term potential?

Services Mandeville, Ohoka, Loburn, Leigh, Fernside now. WDC have done some work on it – indications are that there is enough capacity without major upgrades to 2060. Based on forecast growth.

Water supply: – identified upgrades that WDC are doing and nearby pipelines. Are there any not available for connection?

100 mm pipes – safe to assume that they are not suitable for connection. Need to be upgrades – A & P plan show 200mm down Boyes Road – would be the help that would service area A – haven't looked at Area B – would need additional reticulation in Marsh Road area. Envisage as far as Southbrook Road where larger water pipes are. Most of the big-ticket items have already been done to service Southbrook area – haven't looked at Area B as part of 50-year infrastructure planning – hesitate to say good to go. Have done stress testing but looking at low density residential development. Depending on the density of the development – will change things. **WDC need to look at that.**

Main feed comes down Southbrook Road – could potentially be extended. Extending scheme boundaries to cover development for water – scheme gets extended to those areas.

Ballpark time frame for lodging submission on the plan – will be a plan change type submission with all assessments done.

Rural lifestyle – confirm whether soil assessments need to be done.

Meeting ended at 3.00pm.

APPENDIX B

ECan Pre-Application Meeting Minutes

RMA233284 197 and 234 Boys Road, Rangiora

Pre-application meeting notes

Date: 22/02/2023

Attendees:

Michele Stevenson. Nick Griffiths. Fouad Alkhaier, Jeiselle Capalad, Deepani Seneviratna – Ecan

Adele Dawson - Incite

Ivan Thomson – Aston Consultants

Alastair McNabb, David Mawhinney, Max Pepper, Anshu Thapa – Fraser Thomas

Meeting notes

Fraser Thomas etc are currently preparing evidence for a Plan Change in relation to rezoning Area A and Area B. Needing information at a high level to support the rezoning.

Stormwater consents

AWA Court of Appeal decisions has influenced the interpretation of Environment Canterbury's Land and Water Regional Plan Rules. Any stormwater system that intercepts groundwater is now assessed under the general take and use of groundwater rules. These rules are generally subject to the take being within allocation limits, if the take exceeds the allocation limits it would be classified as prohibited and no consent can be granted. This is the issue recently publicised. At this location, the groundwater allocation is exceeded therefore any groundwater take arising from intercepting groundwater can only be consented where it falls within the permitted activity limits – or possible where there is allocation made available by a consent transfer.

The relevant rules are in Section 5 and 8 of the Land and Water Plan from Plan Change 7 – these can be treated as operative. See Rules 8.5.12 – 8.5.16 and the permitted activity rules are 5.113 and 5.114.

For any stormwater consent Environment Canterbury doesn't have a particular design that must be used, we will assess every design on its merits to determine if the effects are acceptable. At a high level a treatment train including a dry basin system would likely be acceptable if appropriately sited and designed. The sizing of stormwater infrastructure tends to be for the 2% AEP consistent with the Building Code but the design requirements are often dictated by the District Council as it relates to overall flood risk in the vicinity of the site.

WDC do hold a global stormwater consent that includes Area A but it is unlikely that this is able to be used to authorise the operational and construction phase discharges initially. Typically a developer obtains the operational consents and once the assets are vested to Council the consents are transferred (or the WDC may vary their global to include the new area). A stormwater consent will be required under Rule 5.93 of the Land and Water Plan and is likely to be similar in terms of monitoring and maintenance requirements to the WDC global but may vary depending on the design, scale and receiving environment.

Groundwater

A quick review of groundwater data held for the area indicates that the highest groundwater level might be closer to 0.5m below ground level therefore there would not be 1m separation between the base of a stormwater basin and groundwater. Sufficient technical information supporting the highest groundwater level assessment will need to be provided to provide confidence that a dry basin will not become wet. This will need to consider onsite information and historical records. Any onsite monitoring needs to be shallow to capture water table. Also technical support must understand the aquifer characteristics i.e artesian pressure.

A 1m separation is not necessarily required but does influence the assessment of effects on groundwater quality, mounding effects and the duration of water present in a basin may also be relevant.

Ecology

Mark Taylor has done some work already. All drains on the site would be considered modified watercourse rather than artificial waterways. It is possible to modify these waterways but we need to ensure any proposal is consistent with the NPSFM 2020, particularly regarding effects on indigenous fish and the extent and values of rivers. While “naturalising” waterways may end with a positive outcome, the methods undertaken will be assessed to ensure that ecological values are not compromised during works i.e avoiding works during spawning, avoiding disturbing some habitats, fish salvage.

For culverts, the NES for Freshwater includes new regulations for culverts which will need to be adhered to. Bridges are preferred over culverts.

Intention is to retain springs and protect them. This is highly supported as spring provide all year round flow and are taonga for Ngai Tahu.

Discharges of stormwater to the surface water bodies will be possible but adequate treatment is necessary. This will be determined by the limits and targets in the Land and Water Plan and also the NPSFM.

Flooding

Flood modelling underway is based on the WDC flood model with the earthworks and stormwater concepts included. Target is for flood free sections in the 200 year event. This aligns with the RPS.

For assessing offsite effects – need to determine which event has the worse effects and quantify them. Once quantified need to understand the impact i.e what is the change in depth, is it the difference in a building being flooded or not, is there a risk to life etc. There is no one size fits all limit or guidance on this.

Cultural effects

Planned engagement with MKT is supported. Likely to be quite interested in effects on springs, waterways and the site is partially in a silent file area.

APPENDIX C

Services Capacity Confirmation Emails

Max Pepper

From: Margaret Singh <Margaret.Singh@chorus.co.nz>
Sent: Monday, 7 November 2022 4:23 pm
To: Max Pepper
Subject: RE: 197 Boys Road, Rangiora, Waimakariri District, 7400 - Case # 10343495

Hi Max,

Thank you for providing an indication of your development plans in this area. I can confirm that we have infrastructure in the general land area that you are proposing to develop. Chorus will be able to extend the network to provide connection availability. However, please note that this undertaking would of course be subject to Chorus understanding the final total property connections that we would be providing, roll-out of property releases/dates and what investment may or may not be required from yourselves and Chorus to deliver the infrastructure to and throughout the site in as seamless and practical way as possible.

The cost can only be finalised at the time that you are ready to proceed.

Chorus is happy to work with you on this project as the network infrastructure provider of choice. What this ultimately means is that the end customers (business and homeowners) will have their choice of any retail service providers to take their end use services from once we work with you to provide the physical infrastructure.

Please re-apply with a detailed site plan once you are ready to proceed and send me an email confirming the job is logged so I can have a Network Scoping assist me with any pricing discounts we may be able to apply based on this development being of significant volume.

Kind Regards,

Margaret Singh | Key Account Manager

CHORUS IT | M +6421560418

From: Max Pepper <mpepper@ftl.co.nz>
Sent: Wednesday, November 2, 2022 4:43 PM
To: Margaret Singh <Margaret.Singh@chorus.co.nz>
Subject: RE: 197 Boys Road, Rangiora, Waimakariri District, 7400 - Case # 10343495

Hi Margaret,

Yes we are just looking for if it will be able to be serviced with data at this point. We are doing a due diligence report at the moment.

Once we get go ahead for the design phase we would contact you for a quote and to start working on the specific design for the first stages with your design team.

Kind Regards,

Max Pepper – Civil Engineer



Fraser Thomas

ENGINEERS • RESOURCE MANAGERS • SURVEYORS

www.fraserthomas.co.nz

P - 03 358 5936 ext 7315

M - 021 371 366

Unit 3a Barry Hogan Place, Riccarton 8041; P.O.Box 39 154, Harewood Post Centre, Christchurch 8545, NZ

From: Margaret Singh <Margaret.Singh@chorus.co.nz>
Sent: Wednesday, 2 November 2022 4:39 PM
To: Max Pepper <mpepper@ftl.co.nz>
Cc: Chorus Property Developments <develop@chorus.co.nz>
Subject: 197 Boys Road, Rangiora, Waimakariri District, 7400 - Case # 10343495

Hi again Max,

We have received your request to service 930 lots situated at 197 Boys Road, Rangiora, Waimakariri District, 7400.. Are you looking for capacity confirmation here, and/or a quote? Let me know and I will have our Network Scoping team action for you.

Kind Regards,

Margaret Singh | Key Account Manager

CHORUS IT | M +6421560418

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Max Pepper

From: NSR <NSR@mainpower.co.nz>
Sent: Friday, 28 October 2022 2:05 pm
To: mpepper@ftl.co.nz
Subject: Boys Road proposed subdivision

Hi Max,

As discussed on the phone MainPower will have network capacity to service the proposed area covering the subdivision.

As there is no preliminary plan available, we cannot give any more information at this time. Any reticulation infrastructure installation timeframes and details of supplies to any stages and individual lots would be determined as part of the engineering and design process as part of the subdivision development.

Kind regards
Matthew

NETWORK SERVICES REPRESENTATIVE

Network Operations Dept

MainPower New Zealand Limited

DDI. +64 3 311 8300

HO. 0800 30 90 80

Courier 172 Fernside Road, RD1, Kaiapoi 7691

Postal PO Box 346, Rangiora 7440

www.mainpower.co.nz



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If you have any concerns about MainPower's services please call MainPower on 0800 30 90 80 to access our Complaint Resolution Service. If we are unable to resolve your concern you can contact the independent Utilities Disputes Ltd on 0800 22 33 40 or visit utilitiesdisputes.co.nz

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- Notes:
- 1, 2, and 5 require the proposed ground level to be lifted to make pipe runs work. This will be undertaken during next design phase
 - Pipe runs shown are the estimated worst case scenario pipe runs.
 - Pipe run 6 is shown for the worst case scenario where the Caldera's are merged into a road.
 - Basin base levels are based on the approximate ground level in their shown areas to avoid intercepting ground water.
 - Pipe runs are located above existing ground to avoid intercepting ground water.

Worst Case Pipe Run Runs

MP - ETL
29/02/24

Fraser Thomas Concrete Pipe Capacity Calculation Sheet			
Job no:	CH01508	Date:	29/02/2024
Client:	Spark Brothers	Revision:	A
Job Name:	Boys Road Development	Designer:	MP
		Reviewer:	
Purpose:	Concept stormwater pipeline design sizing		

Pipe calculations

SECTION OF PIPE	AREA (m2)	COEF C	Q10 l/s	PIPE DIA	GRADE %	VEL m/s	CAP l/s	Mannings n	VEL m/s	CAP l/s	Length of pipe run m	Remarks
Area 1	68,200	0.650	733	900	0.25%	1.44	914	0.011	1.68	1070	500	OK
Area 2	14,772	0.650	159	450	0.25%	1.08	172	0.011	1.06	168	400	OK
Area 3	37,500	0.650	403	675	0.25%	1.28	459	0.011	1.39	497	400	OK
Area 4	48,400	0.650	520	750	0.25%	1.34	591	0.011	1.49	658	360	OK
Area 5	31,000	0.650	333	600	0.25%	1.22	346	0.011	1.28	363	170	OK
Area 6	18,600	0.650	200	525	0.25%	1.16	251	0.011	1.17	254	320	OK
Area 7	62,500	0.650	671	900	0.25%	1.44	914	0.011	1.68	1070	530	OK
Area 8	66,800	0.650	718	900	0.25%	1.44	914	0.011	1.68	1070	470	OK
Area 9	68,400	0.650	735	900	0.25%	1.44	914	0.011	1.68	1070	530	OK

10% AEP 10min event	59.5 mm/hr	(NIWA HIRDS)
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values given assume an average slope of 5-10%.

Table 5.3 Runoff Coefficient by Zone

Land Use	Zones	C Value
Industrial, commercial, CBD, town house developments	Bus1, Bus2, Bus3, Bus4	0.80
Residential	Res1, Res2, Res3, Res6, Res6A	0.65
Rural, Rural-residential	Res4A, Res4B, Res5, Rural 4B, Rural Pegasus	See Table 5.2

Table 22-1: Manning's Roughness Coefficients.

Manning's Roughness Coefficients	
<p>I. Closed Conduits:</p> <p>A. Concrete pipe 0.011 - 0.013</p> <p>B. Corrugated metal pipe or pipe arch:</p> <p>1. 68 mm by 13 mm corrugation 0.024</p> <p>2. 150 mm by 50 mm corrugation (field bolted) 0.030</p> <p>C. Vitrified clay pipe 0.012 - 0.014</p> <p>D. Cast iron pipe, uncoated 0.013</p> <p>E. Steel pipe 0.009 - 0.011</p> <p>F. Brick 0.014 - 0.017</p> <p>G. Monolithic concrete:</p> <p>1. Wood forms, rough 0.015 - 0.017</p> <p>2. Wood forms, smooth 0.012 - 0.014</p> <p>3. Steel forms 0.012 - 0.013</p> <p>II. Open Channels, Lined (straight alignment):</p> <p>A. Concrete, with surfaces as indicated:</p> <p>1. Formed, no finish 0.013 - 0.017</p> <p>2. Float finish 0.013 - 0.015</p> <p>3. Float finish, some gravel on bottom 0.015 - 0.017</p>	<p>IV. Roadside Channels and Swales with Maintained Vegetation (for velocities of 0.6 m/s to 1.8 m/s):</p> <p>A. Depth of flow up to 210 mm:</p> <p>1. Good stand, any grass:</p> <p>a. Mowed to 50 mm 0.070 - 0.045</p> <p>b. Length 100 mm to 150 mm 0.090 - 0.050</p> <p>2. Fair stand, any grass:</p> <p>a. Length about 300 mm 0.140 - 0.080</p> <p>b. Length about 600 mm 0.250 - 0.120</p> <p>B. Depth of flow 210 mm to 460 mm:</p> <p>1. Good stand, any grass:</p> <p>a. Mowed to 50 mm 0.120 - 0.070</p> <p>b. Length 100 mm to 150 mm 0.200 - 0.100</p> <p>2. Fair stand, any grass:</p> <p>a. Length about 300 mm 0.100 - 0.060</p> <p>b. Length about 600 mm 0.170 - 0.090</p> <p>V. Roadside Concrete Side-Channels:</p> <p>A. Concrete channel, trowelled finish 0.012</p>

CLIENT Spark Brothers
 JOB Boys Road Development
 CLIENT REF. NO: C1401508 JOB No/PAGE
 BY MP CHECKED

Pipeline Sizing - Pipe fall verification

Pipe	Required Fall	Pipe Diameter	Start invert	Calculated end invert	actual end invert
1	1.25	0.90	18.95	16.80	16.80
2	1.00	0.45	18.25	16.80	16.80
3	1.00	0.675	17.00	15.33	14.52
4	0.90	0.75	16.59	14.94	14.52
5	0.43	0.60	17.03	16.00	16.00
6	0.80	0.525	17.77	16.45	15.16
7	1.33	0.90	18.30	16.07	15.16
8	1.18	0.90	17.65	15.57	14.43
9	1.33	0.90	17.54	15.11	14.43

Fraser Thomas Ltd - Attenuation Pond Calculations

Job no:	CH01508	Date:	29/08/2023
Client:	Spark Brothers Limited	Revision:	A
Job Name:	Northbrook Subdivision	Designer:	MP
	Boys Road, Rangiora	Reviewer:	DRAFT
Purpose:	To calculate draft attenuation basin sizes for outline development plan design		

Block A East

Total catchment area	17.21 ha
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Pre development

Surface	Area, A _i , ha	Run-off Coeff., C _i	C _i A _i	Surface type
Grass	17.21	0.3	5.163	Pasture and grass cover, medium soakage soil type. (NZBC E1 Table 1)

Post development

Surface	Area, A _i , ha	Run-off Coeff., C _i	C _i A _i	Surface type
Developed land	17.21	0.65	11.1865	Industrial, commercial, shopping areas and town house developments (NZBC E1 Table 1)

Attenuation storm events, i (NIWA HIRDS, RCP8.5, 2081-2100, 50 Year event) (mm/hr)

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
50	94.0	64.7	52.6	37.4	26.4	14.6	9.6	6.1	3.6	2.6	2.0	1.7

Storm duration (minutes)

Storm Length	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
	10	20	30	60	120	360	720	1,440	2,880	4,320	5,760	7,200

Pre development run-off (m³)

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
50	808.9	1,113.5	1,357.9	1,931.0	2,726.1	4,522.8	5,954.0	7,496.7	9,020.8	9,739.5	10,111.2	10,284.7

Post development run-off (m³)

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
50	1,752.6	2,412.6	2,942.0	4,183.8	5,906.5	9,799.4	12,900.3	16,242.8	19,545.1	21,102.2	21,907.6	22,283.5

Attenuation live storage (m³)

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
50	943.7	1,299.1	1,584.2	2,252.8	3,180.4	5,276.6	6,946.3	8,746.1	10,524.3	11,362.7	11,796.4	11,998.8

CCC WWDG 6.6.2 design consideration of detention basins specifies that no inundation shall exceed 24 hours in duration.

Attenuation storage required discharging at 24h pre development storm flow rate (m³)

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
50	1,700.5	2,308.4	2,785.9	3,871.4	5,281.7	7,925.2	9,151.9	8,746.1	4,551.7	-1,387.8	-8,079.1	-15,199.9

Fraser Thomas Ltd - Attenuation Pond Calculations

Job no:	CH01508	Date:	29/08/2023
Client:	Spark Brothers Limited	Revision:	A
Job Name:	Northbrook Subdivision	Designer:	MP
	Boys Road, Rangiora	Reviewer:	DRAFT
Purpose:	To calculate draft attenuation basin sizes for outline development plan design		

Block A West

Total catchment area	9.75 ha
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Pre development

Surface	Area, A _i , ha	Run-off Coeff., C _i	C _i A _i	Surface type
Grass	9.75	0.3	2.925	Pasture and grass cover, medium soakage soil type. (NZBC E1 Table 1)

Post development

Surface	Area, A _i , ha	Run-off Coeff., C _i	C _i A _i	Surface type
Developed land	9.75	0.65	6.3375	Industrial, commercial, shopping areas and town house developments (NZBC E1 Table 1)

Attenuation storm events, i (NIWA HIRDS, RCP8.5, 2081-2100, 50 Year event) (mm/hr)

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
50	94.0	64.7	52.6	37.4	26.4	14.6	9.6	6.1	3.6	2.6	2.0	1.7

Storm duration (minutes)

Storm	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
Length	10	20	30	60	120	360	720	1,440	2,880	4,320	5,760	7,200

Pre development run-off (m³)

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
50	458.3	630.8	769.3	1,094.0	1,544.4	2,562.3	3,373.1	4,247.1	5,110.6	5,517.7	5,728.3	5,826.6

Post development run-off (m³)

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
50	992.9	1,366.8	1,666.8	2,370.2	3,346.2	5,551.7	7,308.4	9,202.1	11,072.9	11,955.1	12,411.4	12,624.3

Attenuation live storage (m³)

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
50	534.6	736.0	897.5	1,276.3	1,801.8	2,989.4	3,935.3	4,955.0	5,962.3	6,437.3	6,683.0	6,797.7

CCC WWDG 6.6.2 design consideration of detention basins specifies that no inundation shall exceed 24 hours in duration.

Attenuation storage required discharging at 24h pre development storm flow rate (m³)

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
50	963.4	1,307.8	1,578.3	2,193.3	2,992.3	4,489.9	5,184.9	4,955.0	2,578.7	-786.2	-4,577.0	-8,611.2

Fraser Thomas Ltd - Attenuation Pond Calculations													
Job no:	CH01508						Date:	29/08/2023					
Client:	Spark Brothers Limited						Revision:	A					
Job Name:	Northbrook Subdivision						Designer:	MP					
	Boys Road, Rangiora						Reviewer:	DRAFT					
Purpose:	To calculate draft attenuation basin sizes for outline development plan design												
Block B													
Total catchment area	29.25 ha												
Pre development													
Surface	Area, A _i , ha	Run-off Coeff., C _i			C _i A _i	Surface type							
Grass	29.25	0.3			8.775	Pasture and grass cover, medium soakage soil type. (NZBC E1 Table 1)							
Post development													
Surface	Area, A _i , ha	Run-off Coeff., C _i			C _i A _i	Surface type							
Developed land	29.25	0.65			19.0125	Industrial, commercial, shopping areas and town house developments (NZBC E1 Table 1)							
Attenuation storm events, i (NIWA HIRDS, RCP8.5, 2081-2100, 50 Year event) (mm/hr)													
ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
0	94.0	64.7	52.6	37.4	26.4	14.6	9.6	6.1	3.6	2.6	2.0	1.7	
Storm duration (minutes)													
Storm	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
Length	10	20	30	60	120	360	720	1,440	2,880	4,320	5,760	7,200	
Pre development run-off (m ³)													
ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
50	1,374.8	1,892.5	2,307.8	3,281.9	4,633.2	7,686.9	10,119.3	12,741.3	15,331.7	16,553.2	17,185.0	17,479.8	
Post development run-off (m ³)													
ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
50	2,978.6	4,100.4	5,000.3	7,110.7	10,038.6	16,655.0	21,925.2	27,606.2	33,218.6	35,865.2	37,234.1	37,872.9	
Attenuation live storage (m ³)													
ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
50	1,603.9	2,207.9	2,692.5	3,828.8	5,405.4	8,968.1	11,805.9	14,864.9	17,887.0	19,312.0	20,049.1	20,393.1	
CCC WWDG 6.6.2 design consideration of detention basins specifies that no inundation shall exceed 24 hours in duration.													
Attenuation storage required discharging at 24h pre development storm flow rate (m ³)													
ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
50	2,890.1	3,923.4	4,734.8	6,579.8	8,976.8	13,469.6	15,554.6	14,864.9	7,736.0	-2,358.7	-13,731.1	-25,833.6	